

USE OF MODERN TECHNOLOGY IN
AGRICULTURE AND ITS EFFECTS
ON DEMOGRAPHIC CHARACTERISTICS

GIFT

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A Thesis Submitted to the Department
of Geography, Faculty of Science,
University of Dhaka, in Partial
Fulfilment of the Requirements of the
Degree of M.Phil.

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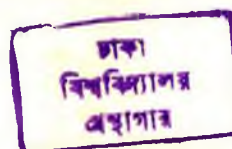
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In partial fulfilment of the requirements for the degree of M.Phil. in Geography, the thesis titled **The Use of Modern Technology in Agriculture and its Effects on Demographic Characteristics** is recommended for its approval by the Academic Council.

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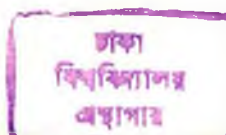
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ABSTRACT

The objective of this study is to find out the impact of modern technology in agriculture and its effects on demographic characteristics. For this study, Heyatpur, a remote but agriculturally well developed village located in the Barind Tract is selected where modern urban facilities are not available. For comparative analysis, an adjoining village, Binodnagar, less developed technologically, has been selected for study.

For the analysis of the data obtained from the questionnaire survey, X^2 test was employed. Interpretation of the households' socio-economic and demographic characteristics, among other, were done by statistical techniques. It was observed that in the study area productivity of the crops, which depends on irrigation and other modern inputs, was higher (1989) compared to the preproject year (1977). It was also seen to be higher than the non-adopting area, i.e. Binodnagar. Due to this apparent change the demographic characteristics of the two villages were also found to be significantly different than the preproject year.

From 1977 to 1989, crude birth rate, crude death rate and infant mortality rates decreased in Heyatpur. But the decreasing rate of crude death rate was seen to be higher than the crude birth rate, resulting in higher population growth for Heyatpur which again is seen to be higher than Binodnagar, the non-adopting village as compared to 1977, the base year.

Although infant mortality rate is being controlled in the study area, the family planning activities are seen to be lagging behind as a result of which the population growth rate is still high. The steps to be taken in this perspective for bringing about overall development in the study area have been suggested accordingly.

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Chapter-1

INTRODUCTION

Statement of the Problem

Rural development as a concept has largely become a part and parcel of the development programme in the Third World countries. Bangladesh is no exception. A peasant society, in Bangladesh 85 percent of the total population lives in the rural areas and the economy is primarily dependent on agriculture (Rahman, 1987). Agricultural products constituted nearly 37 percent of the total GDP in 1989-90 - agricultural sector providing employment to 74 percent and 48 percent of the total male and female labour force respectively. The societal aspects of Bangladesh, very much related to rural development, would remain non-transparent unless an attempt is made to understand the process under which agricultural activities take place keeping in view the rapid rise of population. Use of modern seed-fertilizer-water technology, the off-quoted Green Revolution and related strategies for higher output are all comparatively recent phenomena, extending widely after the liberation of Bangladesh in 1971.

Agriculture and Population in Perspective

Though a matter of incisive analysis, there is a view that in Bangladesh for a sustaining livelihood at least 1.2 acres of cultivated land per head is needed. The fact of the matter is that man land ratio in Bangladesh is becoming critical day by day owing to rapid population increase, net cropped area almost

remaining the same. If the population increases at the present rate of 2.17 percent, the per capita cultivated land will be 0.13 acres by 2001 A.D. In the last forty years agricultural production did not keep pace with the population growth rate. Agricultural production of late has of course increased appreciably but at a cost of environmental degradation. Demand for food is increasing by more than 3 percent per annum due to urbanization.

Being a developing country with a vast population base, Bangladesh suffers from acute socio-economic problems. According to 1991 census, the country has 108 million people, population growth rate being 2.17 percent, and the average population density rising over 750 per sq. km. If this growth rate remains unchanged the total population will be 160 million by the end of this century.

While population growth is influenced by fertility, mortality and migration, the fertility, mortality and migrational aspects in return are influenced by each other and other external factors. The aspect of population growth and the agricultural development is thus an area needing intensive study, especially in a country like Bangladesh.

This study endeavours to analyse the relationship between demographic characteristics and the adoption of improved agricultural technology in a rural setting in Bangladesh. Heyatpur village of Nawabganj Upazila of Dinajpur District has

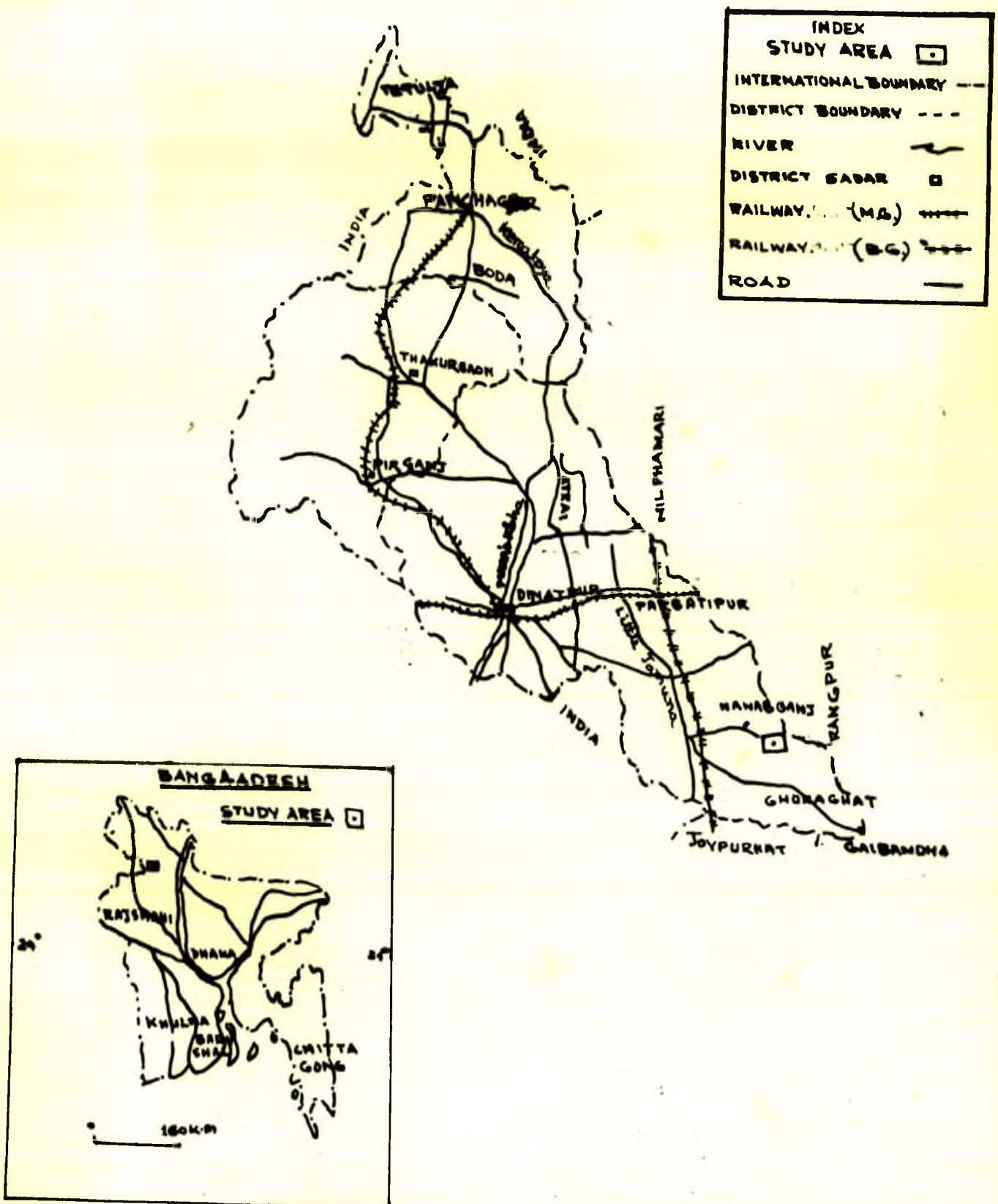
been selected as the study area (Map 1). Although Bangladesh has a high fertility rate like other third world countries mortality rate on the other hand has decreased recently owing to advancement of medical facilities. As a result, natural growth rate has increased many folds.

In developed countries not only are mortality and fertility rates very low but also an advancement in education, better employment opportunities, better income and living standard made them cautious to keep their population size limited. Agricultural production increased due to adoption of modern technology. With the increased production, socio-economic condition of the farmers changed and consequently the living standard attained higher level. Further according to Malthus, if the food supply is sufficient then trends of population growth become high like other animals.

Conceptual Framework of the Study

Development of the rural economy can be achieved through the implementation of various development projects. The development, as may be stated, is likely to be achieved by increasing the agricultural production, farming infrastructures and establishment of industries, especially agro-based and cottage industries. Village infrastructure can be improved through building structures, electrification, road construction, and various institutional supports such as administrative infrastructures, schools, colleges, insurance programmes, family planning facilities and agricultural and community centres.

DINAJPUR REGION



Map - 1

Source: Field Survey 1989

As hypothesized, by adopting irrigation and other modern technology we can achieve food sufficiency and bring about improvement in socio-economic condition of rural life with higher productivity and higher income which would also be able to bring significant change in the demographic characteristics, in the area concerned (Fig.1).

Impact of Modern Technology in Agriculture and its Effect on demographic characteristics: A Conceptual Framework

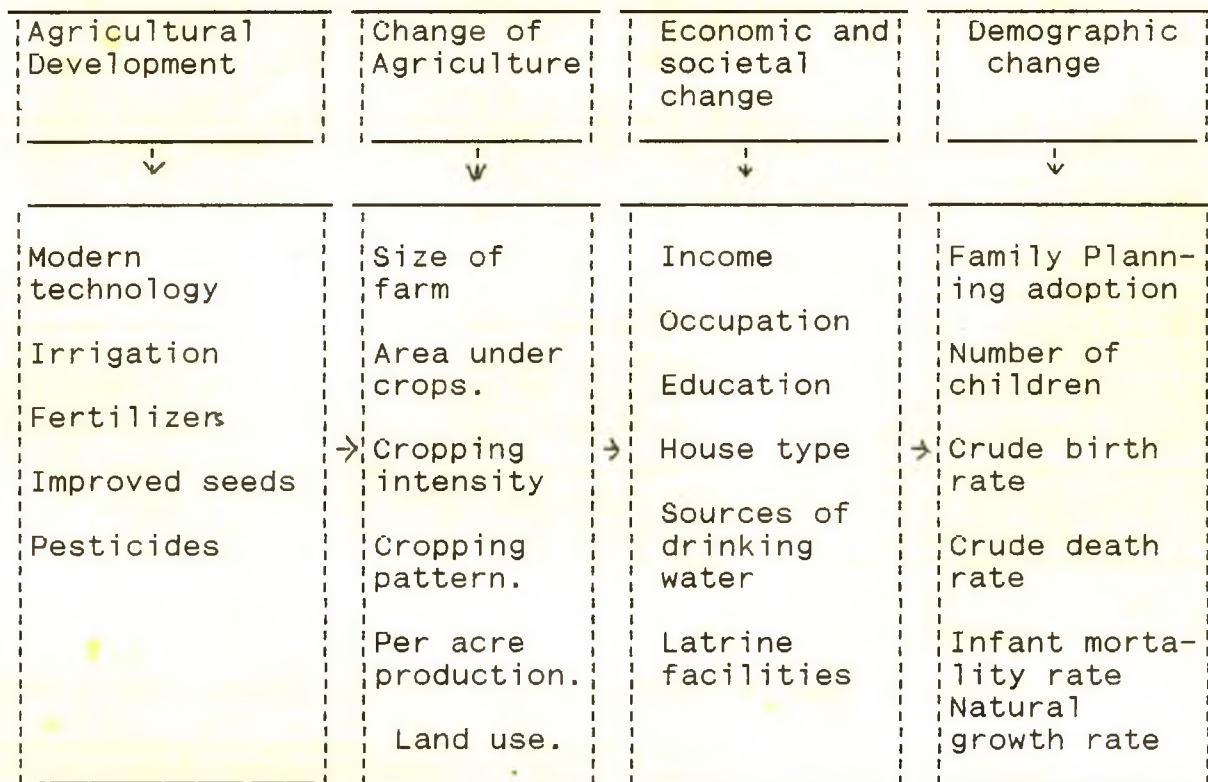


Figure: 1

Herrin N.Alejandro (1977) shows in his study, carried out in the Mindenao province of the Phillippines, that the agricultural development influenced the fertility rate negatively. [*Population and Development Review* Vol. 5 No. 1, March 1979, Rural

Electrification and Fertility Change in the Southern Philippines]. Thus, it is hypothesized in this thesis that agricultural development, especially the adoption of improved agricultural technology has an important bearing on the demographic characteristics.

Works on rural development are often confronted with the premise that higher socio-economic condition leading to higher income levels have influences on fertility rates. The study on Rural Electrification and Fertility Change by Herrin (1979) shows that through the implementation of large scale rural electrification project there has been significant improvement in socio-economic condition. Increased household income and greater opportunities for saving and investment may have reduced value of children to parents as productive agents and for old age security.

Although it is held that large farm size leads to higher productivity - Green Revolution widens the income gap between small and large farms; small farms given adequate access to modern inputs may be more productive than large farms (Abedin and Bose, 1988). This is evident in the case of Comilla Approach to Rural Development. The area included in this model is characterised largely by small farms. The farmers have been to a large extent able to modernize their farm practices and increase per acre yield and total production.

Objective of the Study

The objective of the study is to analyse the application of modern technology, being used in agriculture in the study area, on demographic characteristics. Keeping this objective in view, data have been collected from the sample village Heyatpur, a village where irrigation technology is in use. To compare the demographic characteristics, Binodnagar, which does not have access to modern technology, has also been selected.

More specifically, the objective of this study is to identify the processes of using modern technology in agriculture and the level of increase of farm productivity as well as to evaluate its impact on socioeconomic and demographic condition of the farmers due to the resultant higher productivity. This study, in essence, aims to analyse the impact of modern inputs on agriculture, and the impact of agricultural development on demographic characteristics. Other objectives were to test the hypotheses as enunciated below :

- i) That in the study area agricultural productivity has increased due to the use of modern technology in agriculture, specially the deep tubewell and shallow tube well.
- ii) As a result of higher farm productivity, the socio-economic condition of the farmers has improved.
- iii) Due to irrigation and other modern inputs used in agriculture, demographic characteristics has been changed.

Chapter 2

METHODOLOGY

Selection of the Study Area

For this study two villages were selected for in-depth investigation based on the assumption that agriculture is the only form of development. Heyatpur, located in the Nawabganj Upazilla of Dinajpur district, has access to modern inputs (irrigation, HYV seeds, fertilizer, pesticides among others) and although is one of the populous villages in Nawabganj Upazilla, family planning facilities remain largely absent. Binodnagar, a nearby village, on the other hand with a similar environmental set up, neither has access to modern agricultural inputs, nor farmers have adopted any form of improved technology in agriculture, agricultural development thus lacking direction. The intensive study is based on Heyatpur; Binodnagar has been selected only for a comparative analysis.

Reconnaissance Survey

For the reconnaissance survey, problems related to the study areas were identified and then appropriate samples were designed to prepare the final questionnaire survey. As referred to earlier, two villages were selected as they would be the representative of farmers either adopting irrigation or non adopting irrigation technology. Village characteristics were noted by observation techniques. With a preliminary

questionnaire containing probable questions on personal and family life styles, agricultural and socio-economic characteristics, demographic characteristics and the attitude towards family planning, a pilot survey was conducted in order to prepare the final questionnaire. Out of the total 450 households 23 households (5 percent) were selected for the reconnaissance survey.

Formulation of the Questionnaire

The questionnaire was prepared in two parts for collecting the necessary information :

Part I included the questions on general information of the head of the households adopting irrigation and other modern techniques as well as agricultural and socio-economic conditions of farmers of the study area.

Part II included questions on demographic characteristics of the farmers including population control, family planning and migration.

The Selection of Sample Households

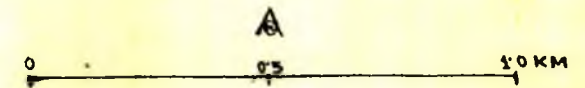
According to the objectives of the study it was decided that data would be collected from 450 households of the two sample villages. It has been done at two levels: first 150 households were randomly selected from each village, and then after two months further 150 households were selected randomly from Heyatpur village (a total of 300) for socio-economic and

demographic survey. This represents approximately a 67% sample from Heyatpur and 52% sample from Binodnagar. To compare the demographic characteristics for the period 1977 - 1989, as mentioned above, 300 questionnaires from Heyatpur and 150 from Binodnagar were filled randomly by asking household members of these two villages.

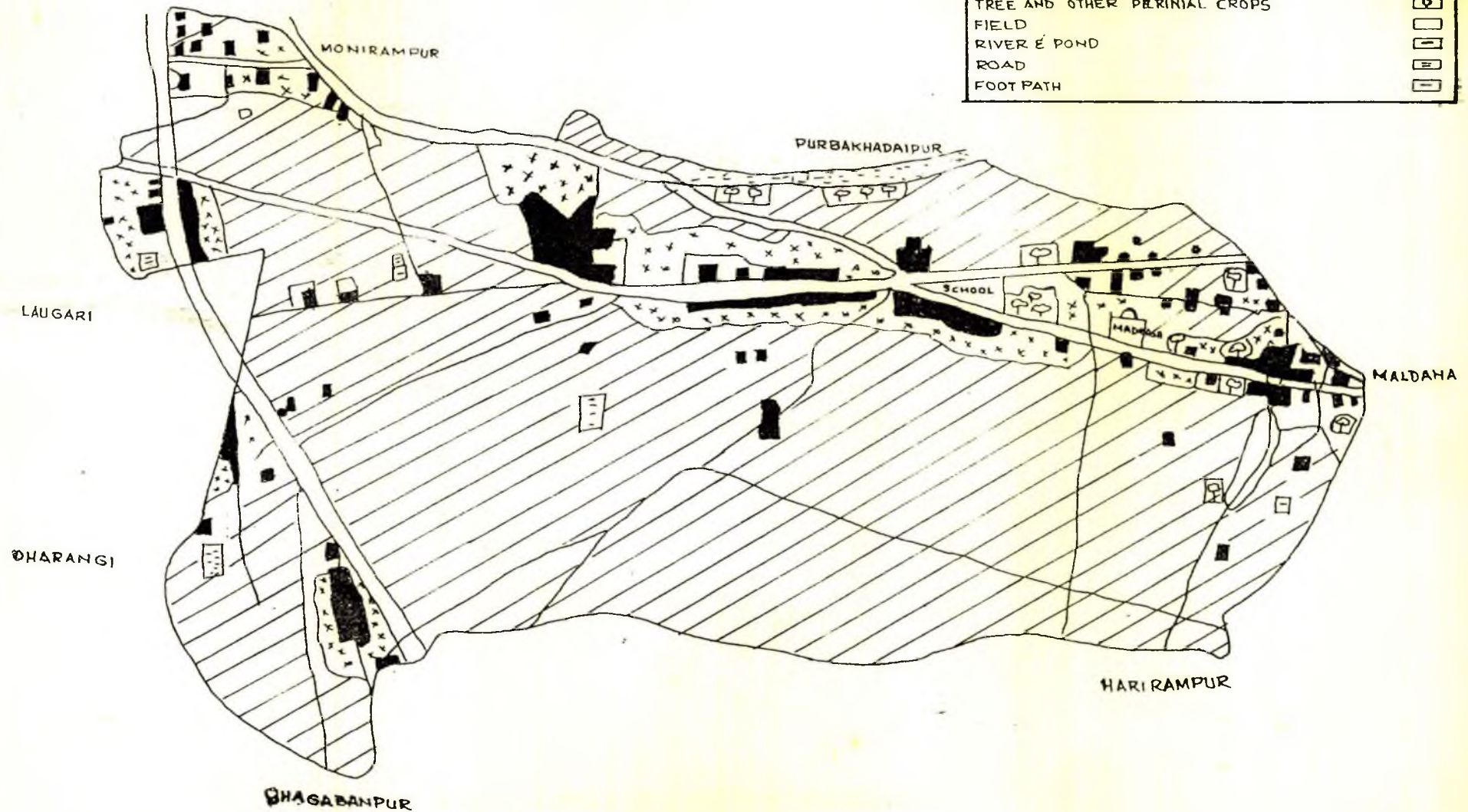
Data collection. Having formulated the final questionnaire based on feedbacks from the pilot survey commensurate with the objective of the study, the actual field survey began with interviewing heads of households and filling questionnaires. In the absence of household heads, the wives were approached to provide necessary information which they obliged. It has been evident from the foregoing discussion that collection of data involved required reconnaissance, pretesting and pilot survey. At all stages of the survey, the people of the villages, local leaders and concerned officials of many organizations were taken into confidence and consulted. Field work was conducted in the year 1989-90. Other necessary secondary data were collected from Statistical Year Book, Population Census Reports and professional journals.

Land Use Survey. A land use survey was undertaken in the study area for collection of plotwise and seasonwise data on crops and present use of land (Map 2). The objective was to know how the land is used for settlement, agriculture and other purposes. The other objectives were to get the idea about the cropping intensity and cropping pattern including ownership categories.

LAND USE (1989) HEYATPUR



INDEX	
SETTLEMENT AND ASSOCIATED NON AGRICULTURAL LAND	
CROPS LAND	
HORTICULTURE	
TREE AND OTHER PERENNIAL CROPS	
FIELD	
RIVER & POND	
ROAD	
FOOT PATH	



Analysis of Data. The data obtained from questionnaire survey were prepared for analysis through use of transcription sheet. Then the responses to the items on the questionnaires were converted into tables or matrices. All the sample and cross tables and their analysis were done using various statistical techniques including chi-square test. A series of graphs and diagrams were used to represent the result, especially the characteristics of variables. Historical data on irrigation expansion and land use data needed for compiling land use map were supplied by Thana BRDP office.

Chapter 3

PHYSICAL, SOCIO-ECONOMIC AND DEMOGRAPHIC SET UP

Heyatpur, the study area, lies in the eastern part of the Barind Tract (Nawabganj Thana). It is located about 6 km to the south east of Nawabganj sadar and is surrounded by Monirampur and Purbakhadaipur to the north, Maldaha to the east. Bhagabanpur and Harirampur are in the south and Laugari and Dharangi in the west (Map 1).

Physiography

The district of Dinajpur covers part of the Himalayan Piedmont Plains, Tista Flood Plain, Barind Tract and Little Jamuna Flood Plain. Nawabganj upazila stands in a portion of the Barind Tract and the Tista Flood Plain. The study village, Heyatpur, lies in the eastern part of the Barind Tract, situated beside the Karatoa fault. The landscape is characterized by its comparatively higher elevation, reddish and yellowish clay soil, and a relatively sparser vegetation, locally known as *Khiyar*, elevation being about 100 feet above the sea level. Before 1910 Karatoa river used to flow along the eastern edges of the study villages. Slightly sloping from north to south, the landscape of Heyatpur conforms generally to natural levee rising about 5-10 feet compared to the adjacent flood plain.

Climate

The climate of the study area is more or less extreme. In summer, the mean maximum temperature is well above 32°C. whereas in winter the mean minimum temperature is below 10°C. The summer with scorching winds is dry, average annual rainfall being lower than 262mm - a phenomenon conforming to the subtropical semi humid area. The area is also noted for high rainfall variability.

Soils

Soils of the Barind Tract are characterized by latosols which are generally deficient in nitrogen, phosphorus, potassium and lime. Soil p^H varies from 6 to 6.5. The soils of Hayetpur are classified as belonging to the sub-group of the Grey Terrace Soils and Deep Red Brown Terrace Soils, which are mainly silty. Permeability is moderate in red-brown soils (Rashid 1977). The soils of the basins have reddish and the high lands yellowish colour. The low basin or low land is very suitable for *aman* rice production. The high lands on the other hand are suitable for sugarcane. In winter season, rice (HYV), wheat and other *rabi* crops are grown in this area supported by irrigation.

Vegetation

Upto 1950's there were forests of *shal*, shrub and bush in Hayatpur. The concentration of people was only along the edges of the villages lying above the adjacent flood plain; the tribal people, mainly *Saotal*, used to live in the forests. Today human habitation has spread in almost all over the area causing changes

in vegetation and environmental set up leading to the dryness of soils and above all soil erosion.(Jabbar 1980). A number of trees (Mango, Jackfruit, Shimul, bamboos) which are on the decline, are found around the homestead, along the road side, and near the ponds of the sampled villages. Vegetation being sparse and scarce, soil erosion is being hastened and its fertility reduced.

Land and water

One of the most striking characteristics of landscape of Heyatpur, and generally of the Barind Tract, is the fragmented land holdings which have changed the landuse pattern of the area over the years. Barind Tract is still the single cropped area. With the population increasing, while demand for food has increased, the process of sub-division and fragmentation of land holdings has been accelerated owing to tenurial and institutional factors.

Socio-economic setup

Households

In 1989, based on a sample survey of the 150 households, it is noted that non-farm households constituted 1% and the corresponding figures for large, middle and small farms being 10, 45 and 44 respectively. The sample survey also revealed that in Heyatpur 65 percent households belonged to lower socio-economic class, 34 percent to middle class and 1 percent to high class.

Education

The average literacy rate of the study area was 14.4 percent in 1981 and 10.53 percent in 1974, much less than the national average. According to the questionnaire survey (1989) average literacy rate of the sampled household heads and housewives were 47 percent in Heyatpur, an increasing trend over the year 1981.

Occupation

Agriculture and agriculture related activities characterize the occupation pattern of the study area. Among the 150 sampled household heads, 75% were seen to be agriculturalists. Other categories are as follows : 4 percent, cultivation cum services; 14 percent, cultivation cum business; 3 percent, cultivation cum labour. Only 10 percent housewives of Heyatput had secondary occupation like handicraft, business, animal husbandary and others.

Religion

Dominantly Muslim (92%), Hindus and Christians represent 3 and 4 percent respectively.

Infrastructure

Heyatpur has only 1.5 km of *pucca* road that is Birampur-Nawabganj-Bhadaria road and only 5 km of *Kutcha* road. Heyatpur has only one primary school and one madrasha. There are 7 mosques and 1 church in the study village.

Health and Hygiene

There is no medical centre in Heyatpur. Daudpur is a nearby market place where some medical services are available.

Sources of drinking water of this village are mudwells. The use of tubewell is on the increase. Latrine system is very poorly developed, maximum people using open field. Sanitary latrines are coming up but the progress is rather slow.

Demographic Setup

Heyatpur village, with an area of 887.86 acres, had a population of 2316 in 1981. The population has increased by 12% during the period 1974-1981. Density of population was 2.6 per acre. The average family size is 5.42 (1981).

The total number of population of 150 sample (1989) households was 912, male female ratio being 50.1: 49.9. The average family size was 6.08 (Table 2).

Age Structure of Households

The following age structure was observed among the 150 sampled households in Heyatpur. Table 1 shows that out of the total household heads, 2.67 percent were below 20 years of age, 1.33 percent were above 60 years and 36 percent were between 20 and 29 years. The maximum age cohort (42%) of head of households in Heyatpur was from age group of 30 to 39 years. It is found from the table that the second highest number of household heads belonged to the age group of 20-29 years (36 percent households).

It is further observed that 97 percent head of households out of the total were below 50 years of age and only 3 percent head of households were above 50 years (Table 1). Similarly, as to the housewives, the highest number belongs to the age group of 20-29 years (38.67%).

To measure the dynamic demographic characteristics of the village the young men and women were drawn in the sample. According to the Table 1 it is seen that including the age group of 40-49, some 90 percent of the females are in the productive child bearing age.

Table 1
Age Structure of Household Heads and Wives in Heyatpur

Age group	Male		Female		Total	
	No	%	No	%	No	%
0 - 19 years	4	2.67	12	8.00	16	5.33
20 - 29 "	54	36.00	58	38.67	112	37.33
30 - 39 "	63	42.00	44	29.33	107	35.67
40 - 49 "	24	16.00	36	24.00	60	20.00
50 - 59 "	3	2.00	-	-	3	1.00
60 above	2	1.33	-	-	2	0.67
Total	150	100.00	150	100.00	300	100.00

Source : Field Survey, 1989.

According to age and sex composition of the households as seen in Table 2 the female child (0-14) constitutes a large proportion of the total population (46.81 percent), outnumbering male child. Early child marriage is another factor influencing the demographic characteristics of the area (Table 2). More than 37 percent of the female got married at the age group of 16-21.

Table 2
Age and Sex Composition of Household in Heyatpur

Age group	Male		Female		Total	
	No	%	No	%	No	%
0 - 14 years	203	44.42	23	46.81	416	45.62
15 - 59 "	242	52.95	234	51.43	476	52.19
60 above "	12	2.63	8	1.76	20	2.19
Total	457	100.00	455	100.00	912	100.00

Source : Field Survey, 1989.

It was observed in Heyatpur that out of 150 heads of households 2 percent got married at the age of 10-15, 58 percent at the age of 16-21; 36 percent at the age of 22-27; 3.33 percent at the age of 28-33; and 0.67 percent got married above the age of 33 (Table 3).

As to the households, the age at marriage represents slightly different compared to that of the total population (Table 2), nearly 94 per cent of the household members getting married at the age group of 16-27 years.

Table 3
Age at Marriage : Household and Wife in Heyatpur

Age group	Male		Female		Total	
	No	%	No	%	No	%
0 - 9 years	-	-	5	3.33	5	1.67
10 - 15 "	3	2.00	85	56.67	88	29.33
16 - 21 "	87	58.00	55	36.67	142	47.33
22 - 27 "	54	36.00	5	3.33	59	19.67
28 - 33 "	5	3.33	-	-	5	1.67
33 above	1	0.67	-	-	1	0.33
Total	150	100.00	150	100.00	300	100.00

Source : Field Survey, 1989.

Chapter 4

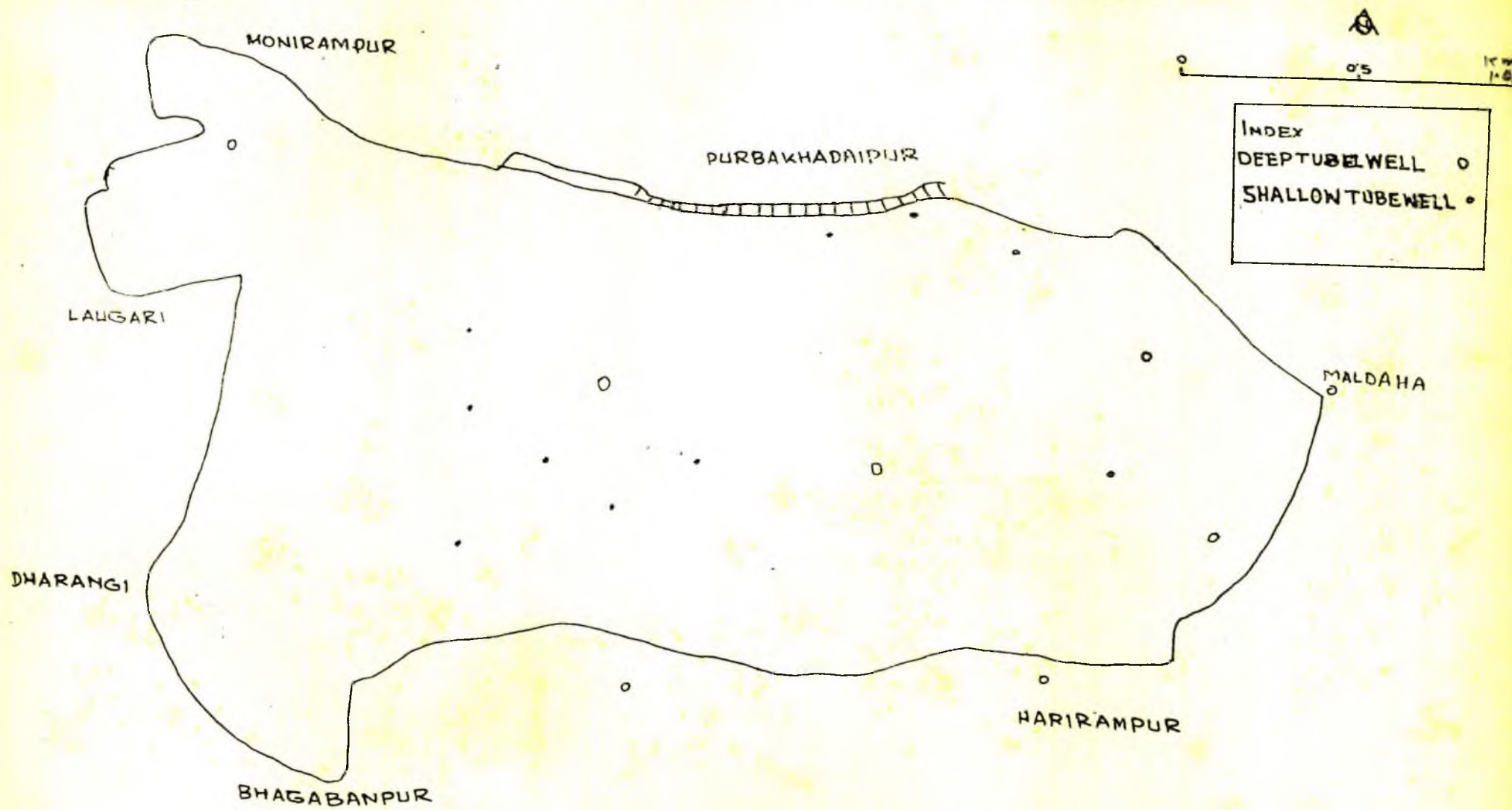
ADOPTION OF MODERN TECHNOLOGY IN AGRICULTURE

Water-Seed-Fertilizer Technology

Deep and Shallow Tubewells. The hypothesis that adoption of modern technology in a rural set up brings about a change in the socio-economic condition of the people was tested initially by taking notes of the kinds of technology change in the study area. The field survey reveals that there have been an increase in the numbers of deep and shallow tubewells (Map 3) in the survey year over 1977, the number increased being 4 and 9 respectively (1977-1989). In terms of ownership category, it is seen that one deep tubewell is held under a private ownership, the rest of the deep tubewells being under cooperatives. All shallow tubewells are held under private ownerships. But there is a significant difference among the various socio-economic groups about the ownership of deep and shallow tubewells. Maximum number of deep and shallow tubewells is under the ownership of the high socio-economic class(Appendix 1).

Fertilizer Input. There has been a spectacular increase in the use of chemical fertilizers (Table 4 and Figure 2). While a total of 35000 kg of fertilizers were in use in the study area according to the Thana record, the field data in 1989 record the use of fertilizer being over 86000 kg - an increase of over 51000 kg in 12 years. The per acre use of fertilizers is also on the rise. Per acre use of urea increased from 19 kg to 35 kg during

LOCATION OF DEEP AND SHALLOW TUBEWELLS (1989)



DISTRIBUTION OF FERTILISERS

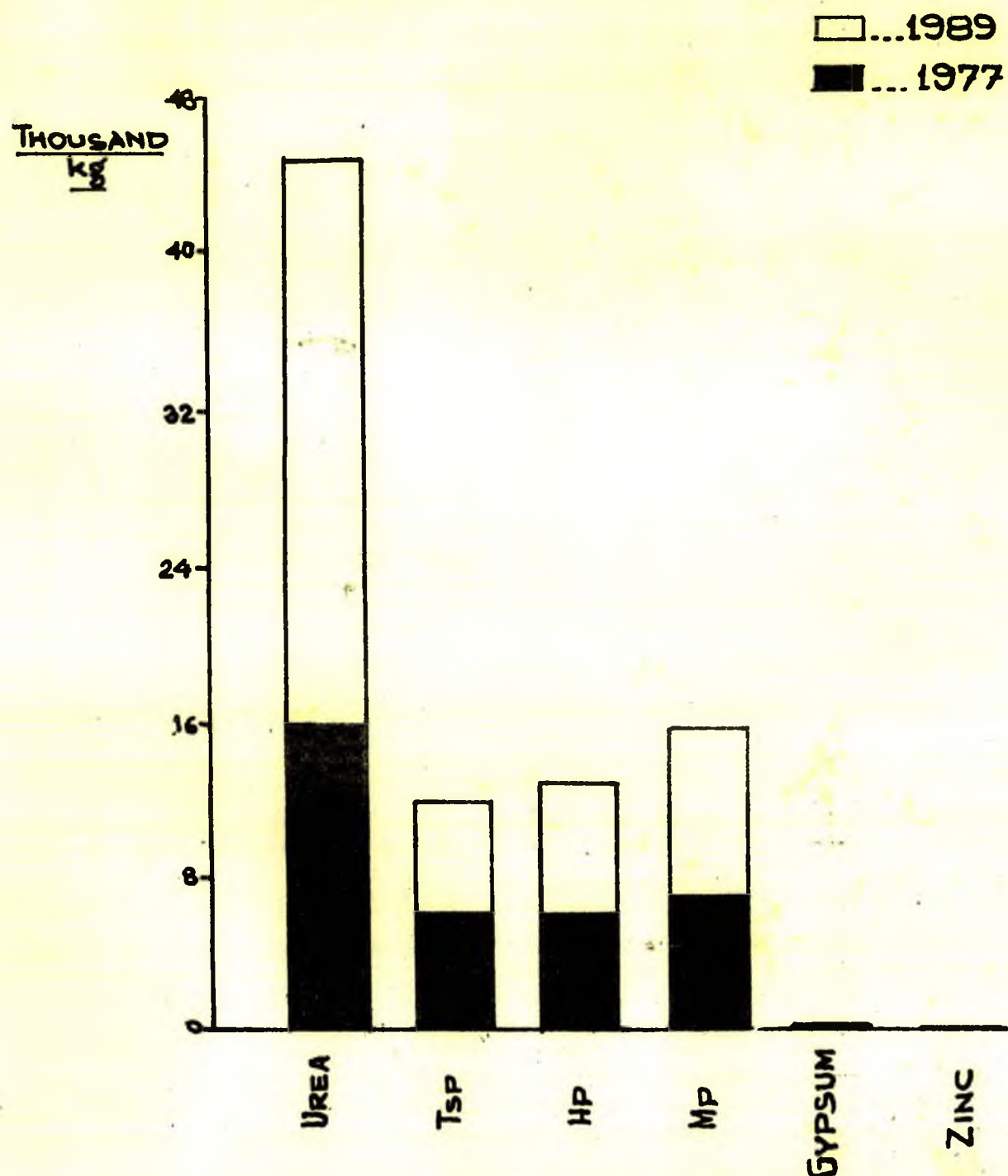


Figure - 2

Source: Field Survey 1989

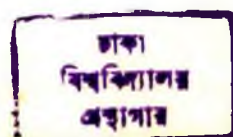
the period (1977-1989). The field survey reveals that there is no significant difference among the high, middle and low categories of farmers as to their increasing use of chemical fertilizers for the period 1977-1989 (Appendix 2).

Table 4
Distribution of Fertilizers in Heyatpur

Name of fertilizer	1977		1989		Increased	
	Total use	per acre use	Total use	per acre use	Total use	per acre use
Urea	16,000	19	45000	54	29000	35
TSP	6000	7	12000	14	6000	7
HP	6000	7	13000	15	7000	8
MP	7000	8	16000	19	9000	11
Gypsum	-	-	14	0.02	14	0.02
Zinc	-	-	7	0.01	7	0.01
Total	35000	41	86021	102.03	51021	61.03

Source : Upazila record, 1977 and 1989

Improved Seeds. Improved seeds including HYV paddy, wheat, jute, potato and to a certain extent onion have been adopted in recent years. Among the improved seeds HYV paddy figures prominently (Table 5, Fig.3). In almost a decade some 10 per cent of the acreage has been brought under HYV paddy with the signs of increasing trend. But the field survey reveals that there has not been any significant difference in increasing the use of HYV seeds by the large, medium and small farming groups as yet (Appendix 3).



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DISTRIBUTION OF IMPROVED SEEDS

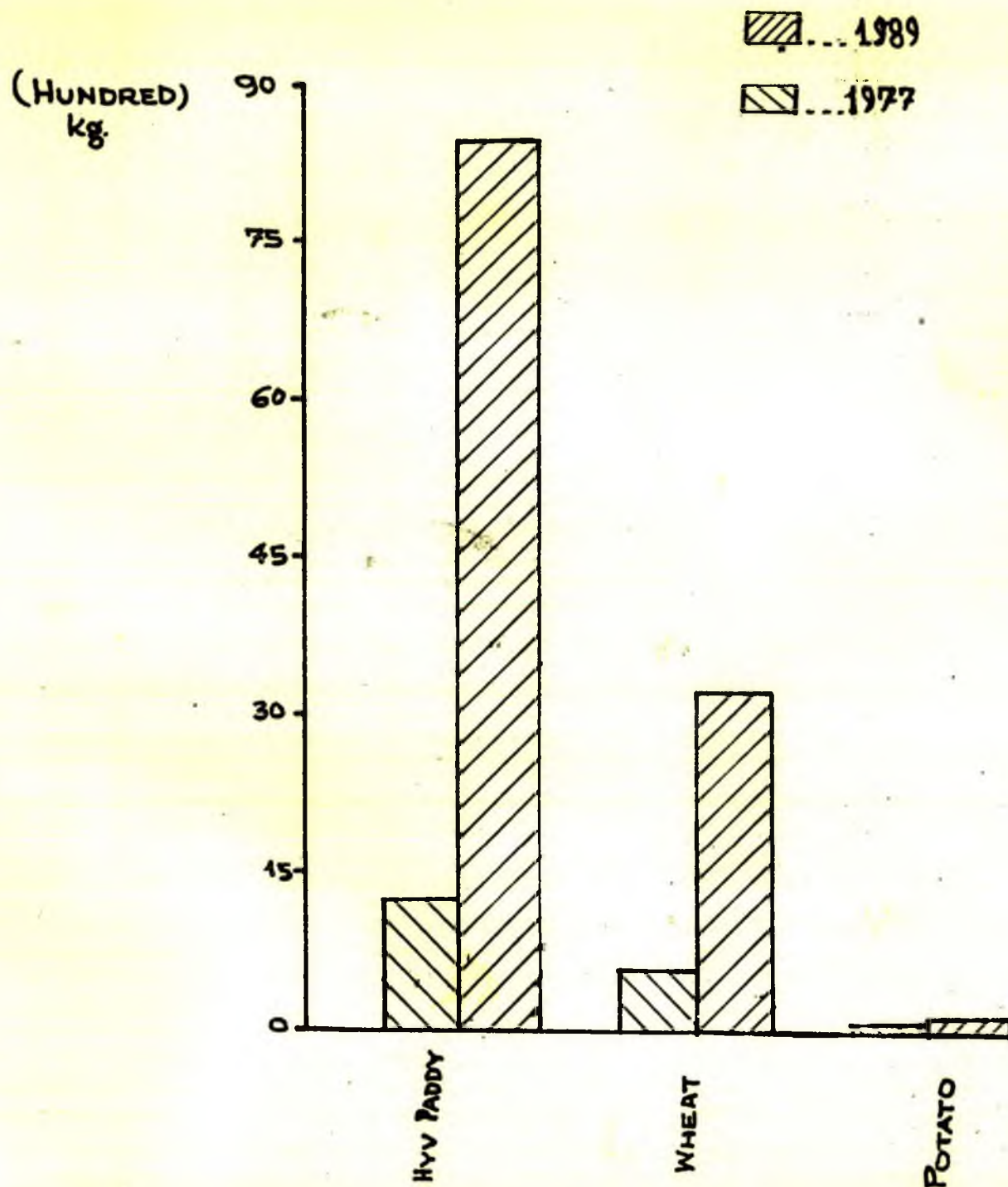


Figure - 3

Source : Field Survey 1989

Table 5
Distribution of Improved Seeds in Heyatpur (in kg)

Crop	1977		1989		Increase	Increase per acre
	Total	Per acre	Total	Per Acre		
HYV paddy	1230	1.47	8000	9.56	6770	8.09
Wheat	600	0.72	3300	3.94	2700	3.22
Jute	8	-	4	-	4	-
Potato	70	0.08	200	0.24	130	0.16
Onion	1	-	4	-	3	-
Total	1909	2.27	11508	13.74	9607	11.47

Source : Thana Record, 1977 and 1989.

Pesticides. It is also found from the field survey that in Heyatpur among the 150 households, 47 households used pesticides adequately, 93 inadequately and 10 households did not use pesticides at all in 1977. In 1989 an addition of 92 households used pesticides adequately as per household survey - only 11 households used inadequately (Table 6, Fig.4). The availability as well as people's choice for the increasing use of pesticides has augured well insofar as it relates to farming technology. But it is also revealed from the field survey that there is a significant difference among the various socio-economic groups as to their using pesticides during the period 1977-1989, cent percent of the large farmers using pesticides adequately and along with middle farmers a large proportion of the small farmers (83%) have adopted pesticide technology.

USE OF PESTICIDES

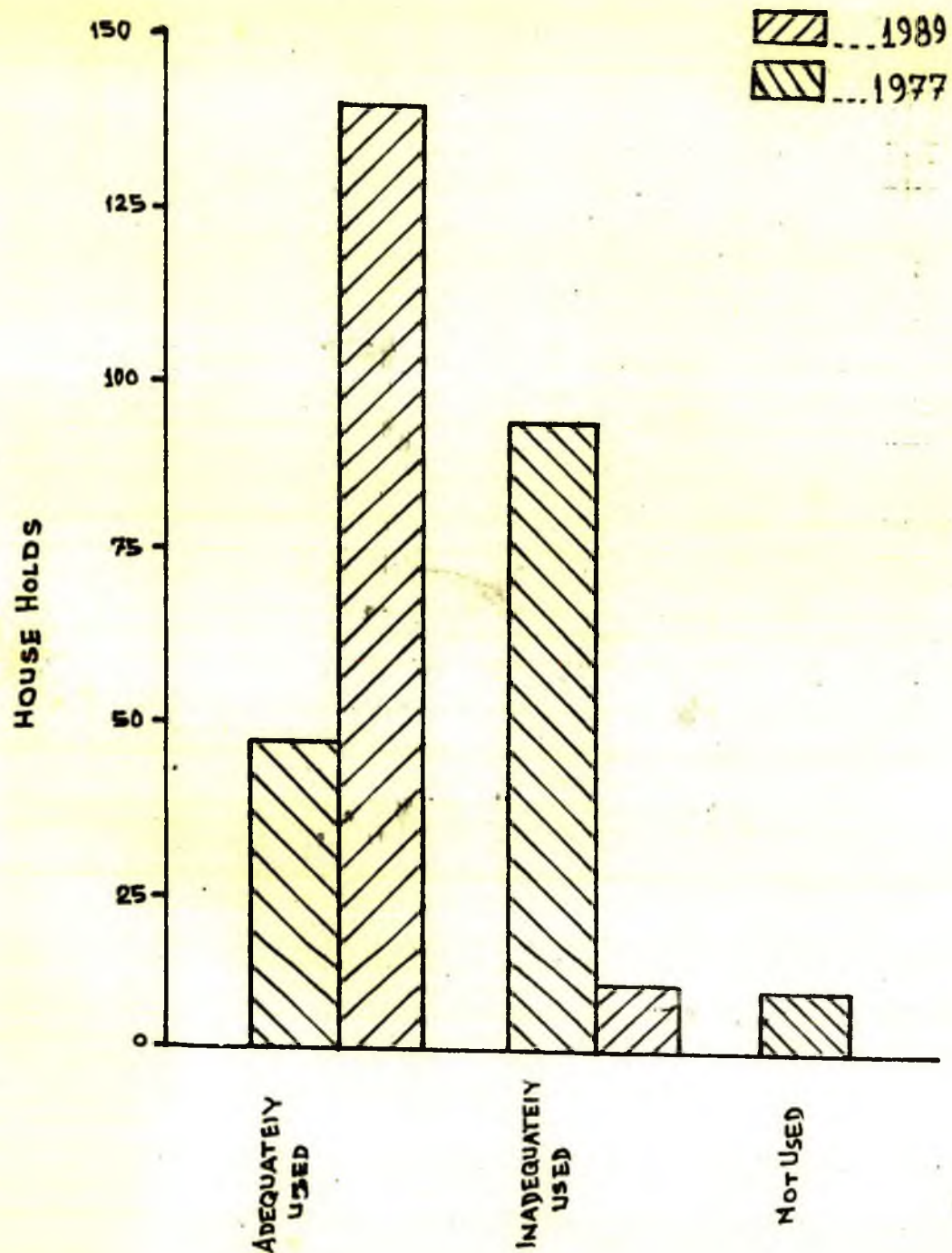


Figure - 4

Source: Field Survey 1989

Table 6
Use of Pesticides in Heyatpur by Socio-economic Classes

Level of use	1977				1989				Grand Total
	Large farm	Medium farm	Small farm	Total	Large farm	Medium farm	Small farm	Total	
Adequately	12	34	1	47	15	68	56	139	186
Inadequately	-	39	54	93	-	-	11	11	104
Not used	-	1	9	10	-	-	-	-	10
Total	12	74	64	150	15	68	67	150	300

Source : Field Survey 1989.

n^2 = Significant at .05 level.

df = 10

n^2_c = 188.29

n^2_f = 18.307

Null hypothesis is rejected.

Effect of Seed-Fertilizer-Water Technology on Agricultural Change

The effect of seed-fertilizer-water technology on agriculture is assessed under the following categories: changes in farm size, land under irrigation, cropping intensity, cropping pattern and production.

Farm Size. The questionnaire survey revealed that compared to 1977, the farm size of the 150 households in 1989 shows no significant change (Figure 5). The only significant change noticed is in the category of middle farms, decreasing in numbers from 74 to 68. But in terms of acreages held by different socio-economic classes, more than 80 per cent is still held by the middle (44%) and large farms (40%) - small farms occupying only 16 per cent (1989). The skewed distribution of farm holdings, like other rural areas in Bangladesh, is seen as the major constraint for areal development (Table 7).

CHANGE OF FARM SIZE

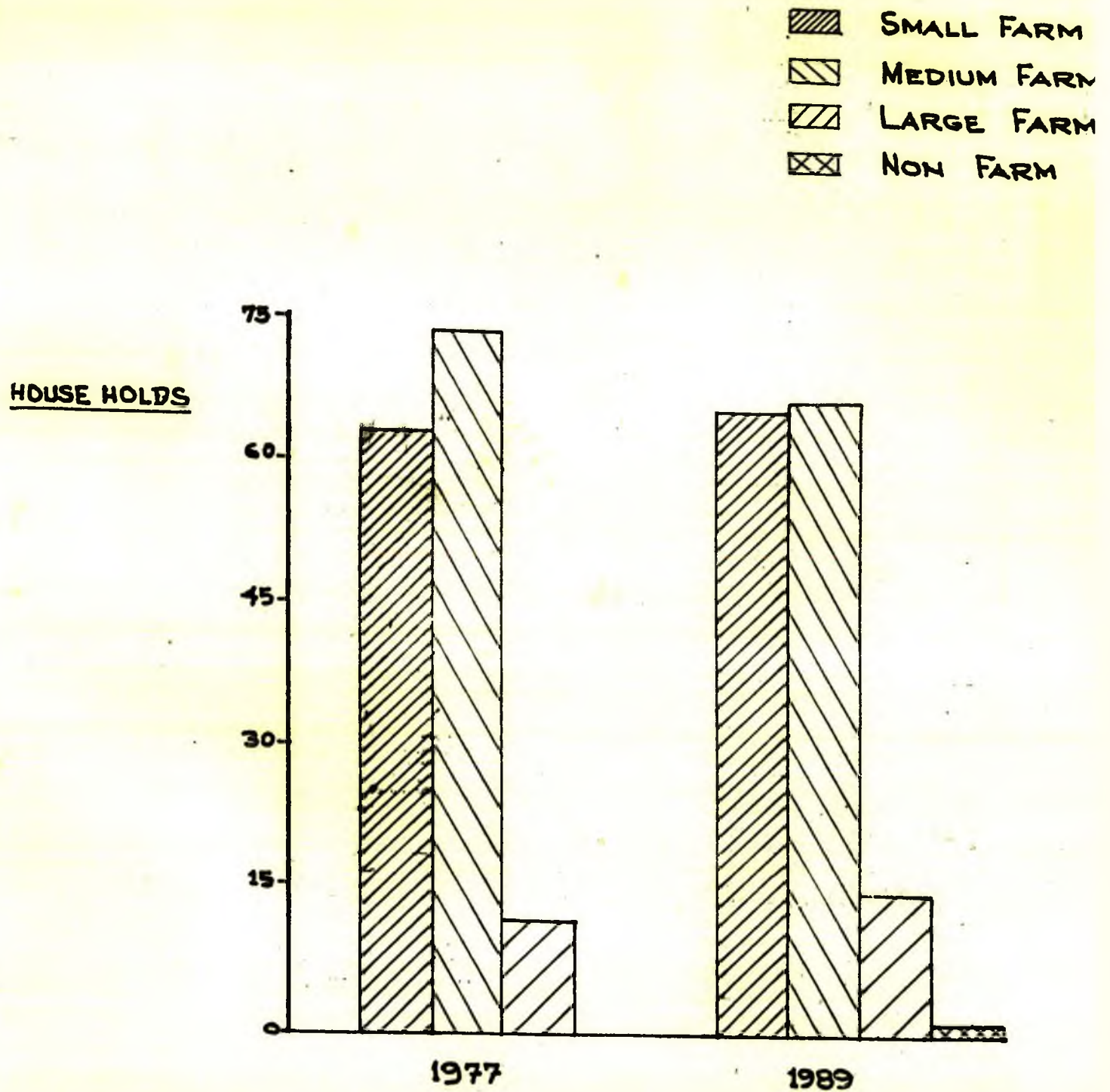


Figure - 5

Source: Field Survey 1989

Table 7
Change of Farm Size in Heyatpur by Socio-economic Classes

Farm size	1977						1989									
	No.of		Within the		Outside the		Total		No.of		Within the		Outside the		Total	
	house-	village	house-	village	house-	village	house-	village	house-	village	house-	village	house-	village	house-	village
	holds															
		Acres	%	Acres	%	Acres	%		Acres	%	Acres	%	Acres	%	Acres	%
Non farm	-	-	-	-	-	-	-	1	0.05	0.01	-	-	-	-	0.05	0.01
Small farm	64	55.68	15.26	27.84	15.25	83.52	15.26	66	65.03	16.44	35.97	17.38	101.00	16.95		
Medium farm	74	186.27	51.03	93.14	51.04	279.41	51.03	68	178.15	45.03	80.95	40.45	259.10	43.49		
Large farm	12	123.05	33.71	61.52	33.71	184.57	33.71	15	152.39	38.52	83.19	41.57	235.58	39.55		
Total	150	365.00	100	182.5	100	547.5	100	150	395.62	100	200.11	100	595.73	100		

Source : Field Survey 1989.

χ^2 = Significant at 0.055 level.

$\chi^2_c = 0.739$, $\chi^2_t = 5.991$

Null hypothesis is accepted.

Irrigated Land. The provision of irrigation by deep and shallow tubewells has changed the agricultural scene of the study area with increasing acreages coming under irrigation. According to land use survey (1989) it was revealed that irrigated land in the study area increased to 505 acres (60% of the cultivated area) compared to 67 acres (or 8% of the cultivated area) in 1977 (Map 4). The result of 150 sampled household survey revealed that there is no significant difference among the high, medium and small class of farmers in terms of increases in irrigated land from 1977 to 1989 (Table 8).

IRRIGATED LAND HEYATPUR

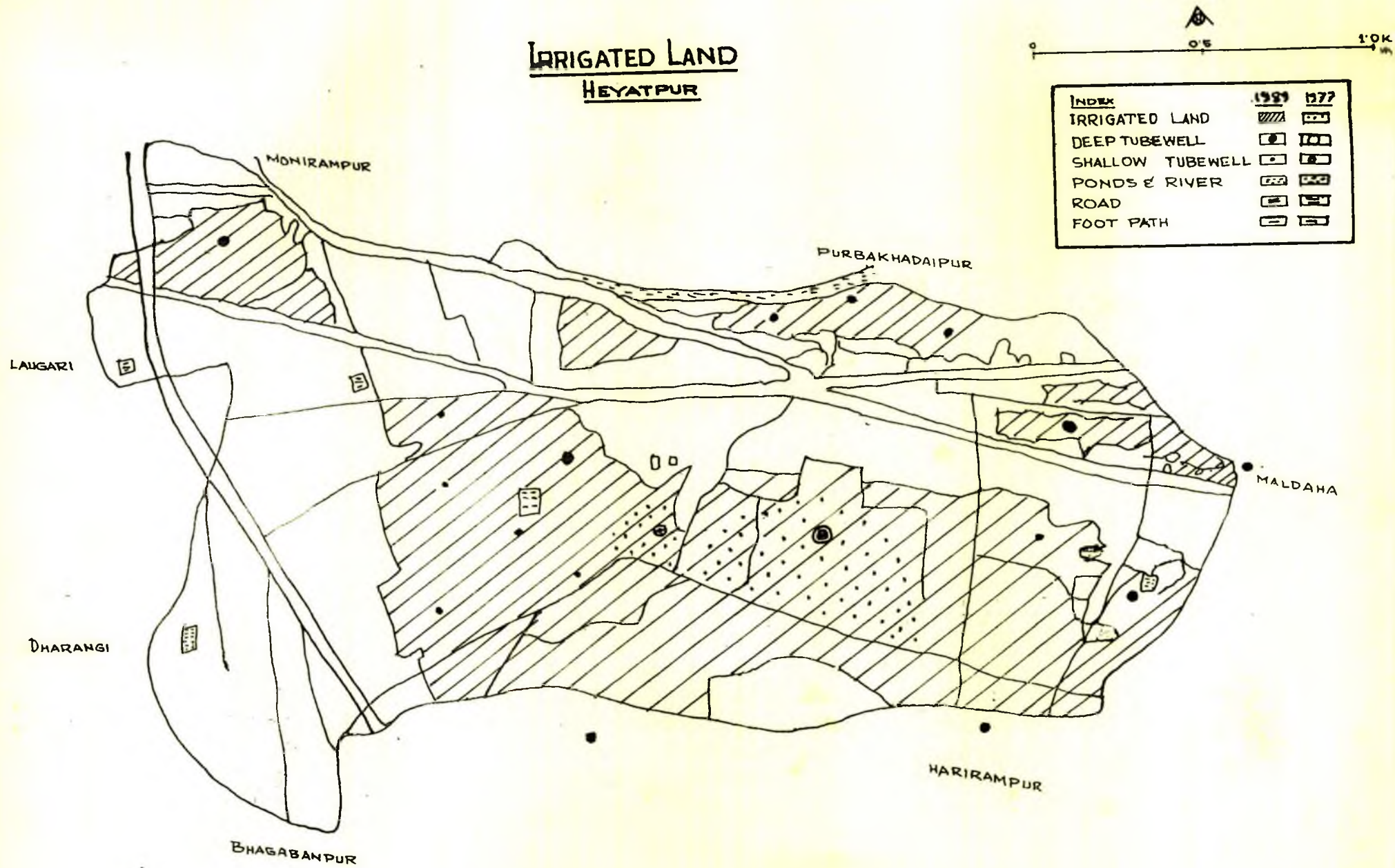


Table 8
Acrage Under Irrigation by Various Socio-economic
Classes in Heyatpur

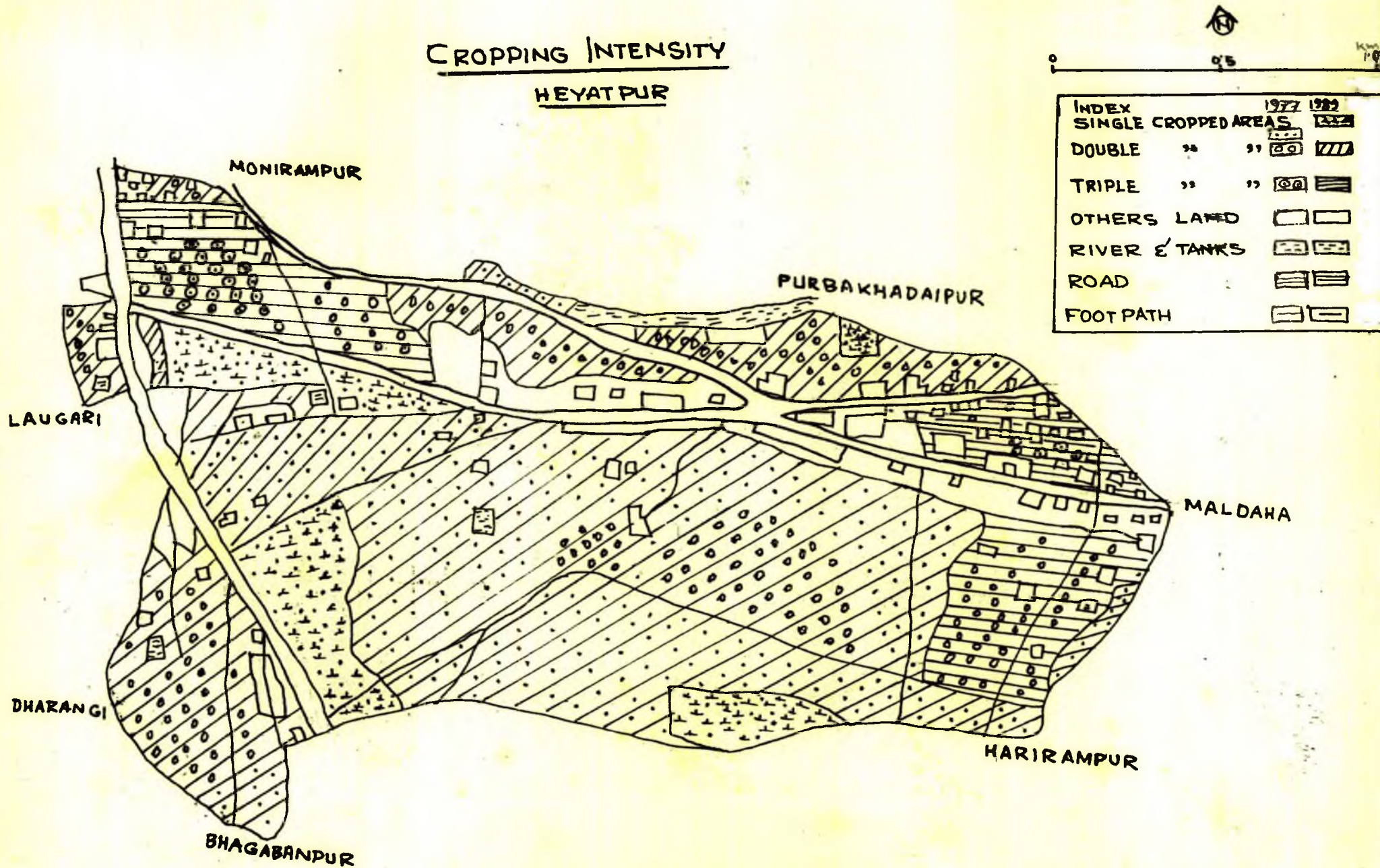
Farm size	1977		1989		Total	
	No	%	No	%	No	%
Large	21	45.65	97	41.63	118	42.29
Medium	18	39.13	109	46.78	127	45.52
Small	7	15.22	27	11.59	34	12.19
Total	46	100	233	100	279	100

Source : Field Survey 1989.

χ^2 = Significant at .05 level,
df = 2, χ^2_t = 5.991, χ^2_c = 1.857
Null (H_0) hypothesis is accepted.

Cropping Intensity. Extension of irrigation system is seen to have its effect on the cropping intensity of the study area in general. The practice of multiple cropping in view of the expanding population and demand for food has increased, especially the double cropping - an increase from 146 acres in 1977 to 400 acres in 1989, or an increase of about 275 percent (Map-5). A positive relationship was found between the number of deep and shallow tubewells in use and land under double and triple cropping. The sample household survey corroborating the same as discussed above shows that while single cropped area decreased from 65 to 19 percent, double and multiple cropped areas were increased from 27 to 48 and from 8 to 33 percent in 1989 respectively. But the χ^2 test shows that there was not so significant a difference in the increase of single, double and multiple cropped areas among the various socio-economic classes (Table 9).

CROPPING INTENSITY HEYATPUR



Map-5

Source: Field Survey 1989

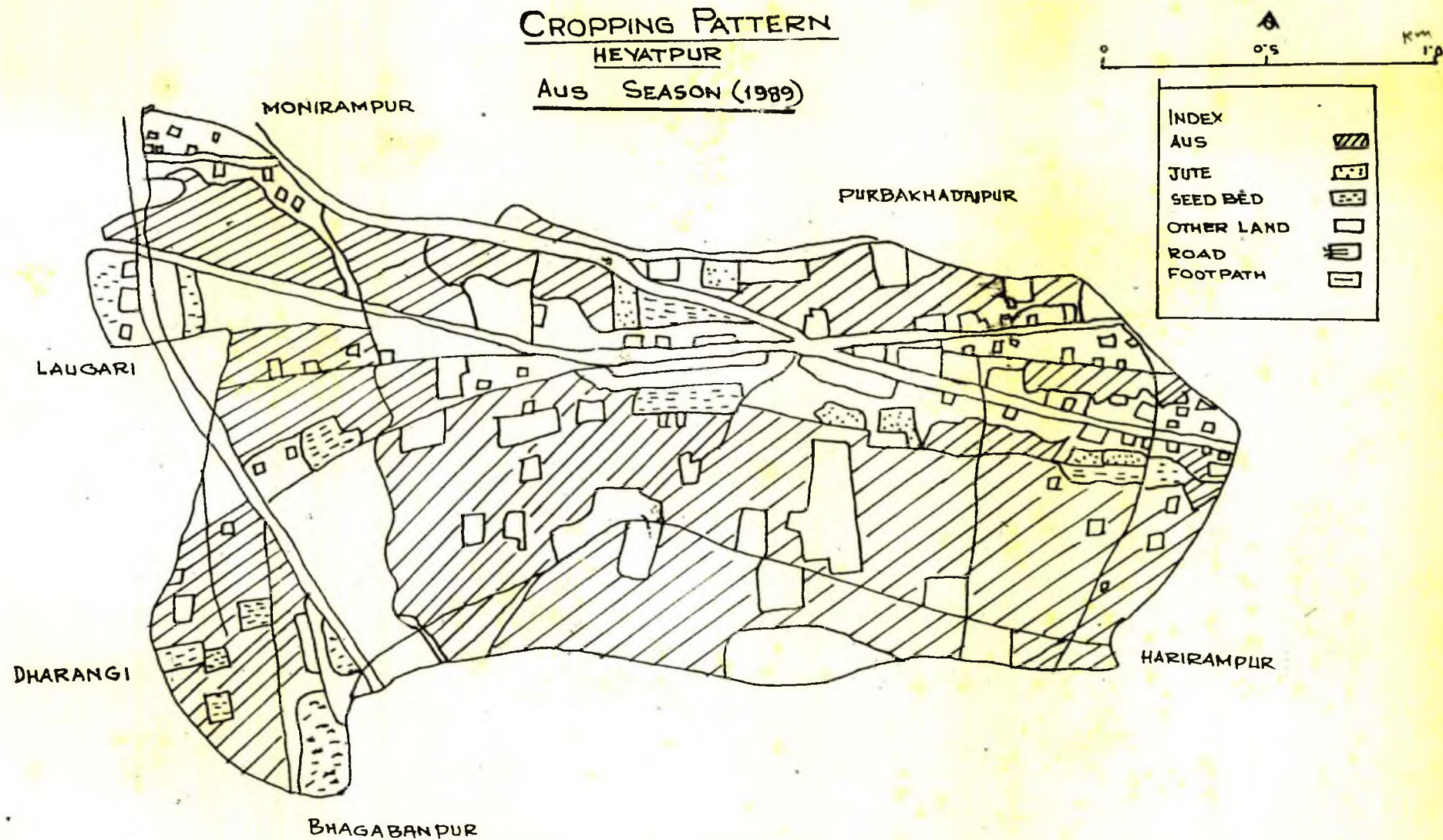
Table 9
Change in cropping intensity in Heyatpur (in percentage)

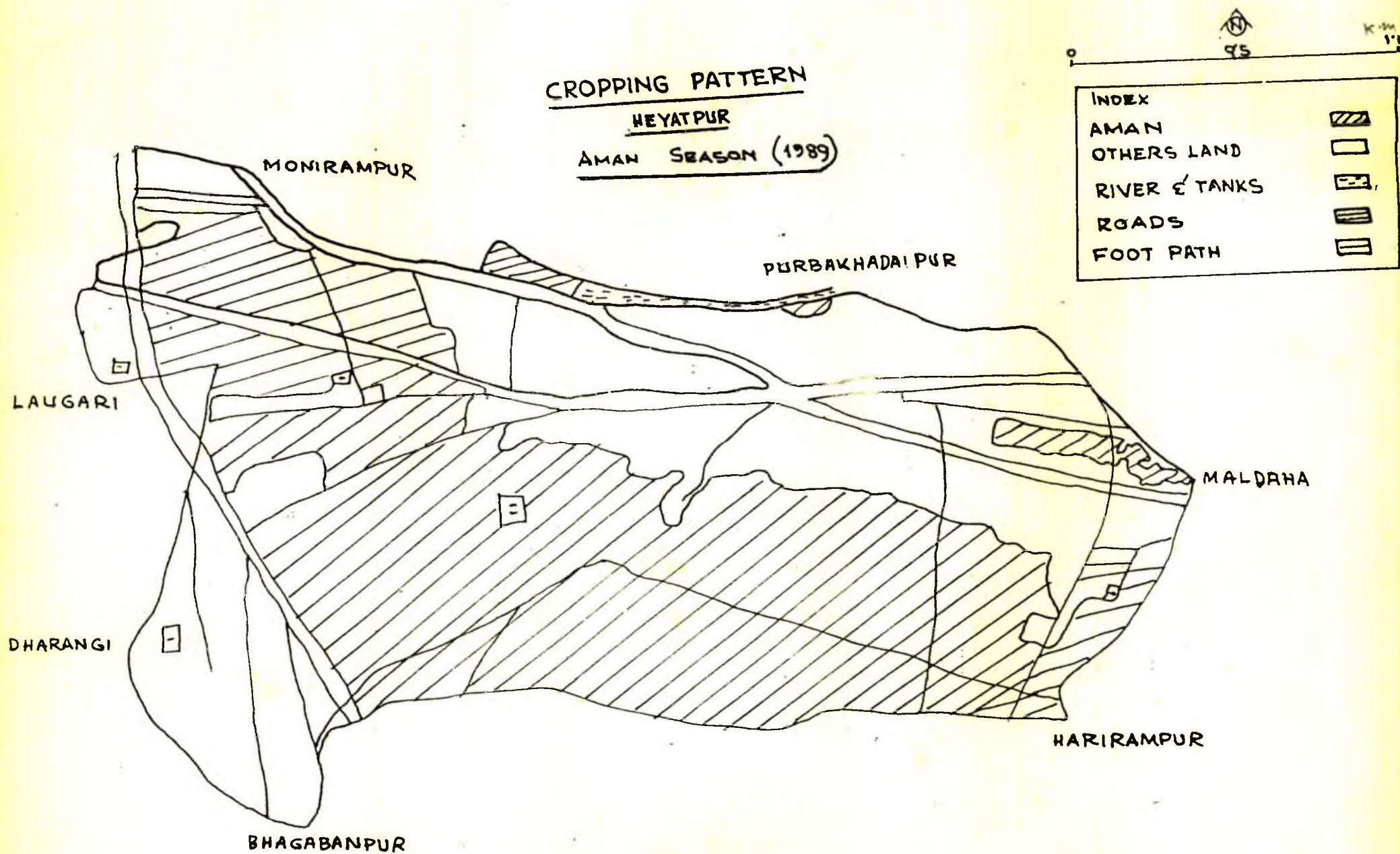
Type of Farm	Single cropped		Double cropped		Multiple cropped		Total		Grand Total
	1977	1989	1977	1989	1977	1989	1977	1989	
Large	22.0	7.0	9.0	19.0	3.0	13.0	34.0	39.0	73.0
Medium	33.0	9.0	14.0	21.0	3.0	15.0	51.0	45.0	95.0
Small	10.0	3.0	4.0	8.0	2.0	5.0	15.0	16.0	32.0
Total	65.0	19.0	27.0	48.0	8.0	33.0	100	100	200

Source : Field Survey, 1989.

χ^2 = Significant at 0.05 level,
df=5, χ^2_t = 11.07, χ^2_c = 1.48
Null hypothesis is accepted.

Cropping Pattern. The adoption of seed-fertilizer-water technology in the study area has led to a significant change in the land use pattern, especially the cropping pattern - from local variety *aus*, *aman* to high yielding varieties of *aus* and *aman* in the *bhadoi* season (Map 6/a,b). The major change noticed is the cultivation of wheat aided by the introduction of deep and shallow tubewells (Map 6/c). Sugarcane is another crop being cultivated extensively. Besides, the acreages in the *rabi* season have increased under mustard, potato, pulses and vegetables, a manifestation of double and triple cropping allowing for crop diversification in the area. The production of crops per acre has increased by many folds : *aus* (all) by 300 percent; *aman* (all) by nearly 175 percent and wheat by about 180 percent. The newly introduced *boro* in the dry season has been the most successful crop achieving an yield of over 1500 kg per acre (Figure 6). The availability of water supply during the *aman*





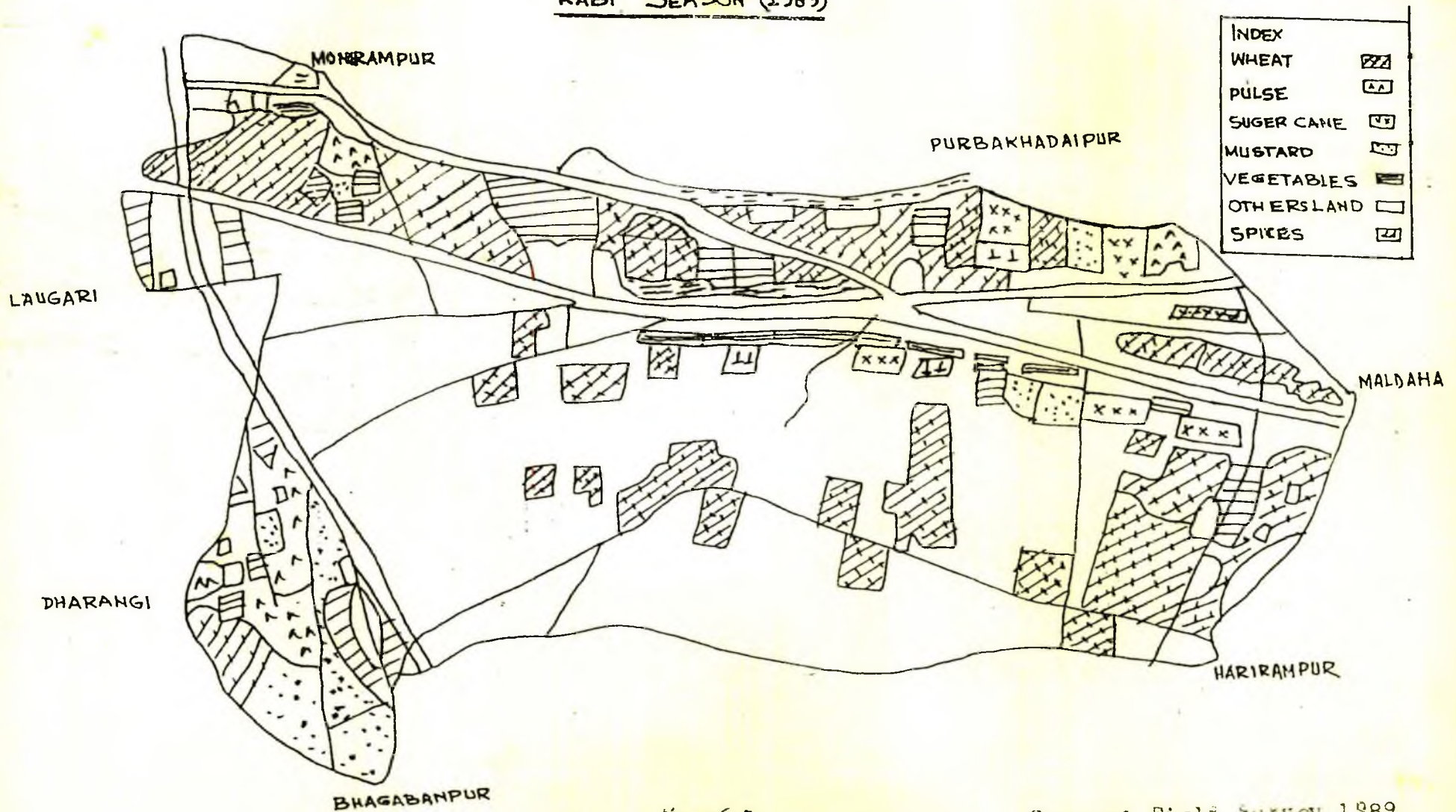
Map-6 b

Source: Field Survey 1989

CROPPING PATTERN

HEYATPUR

RABI SEASON (1989)



Map-6 c

Source: Field Survey 1989

CHANGE OF AVERAGE PRODUCTION

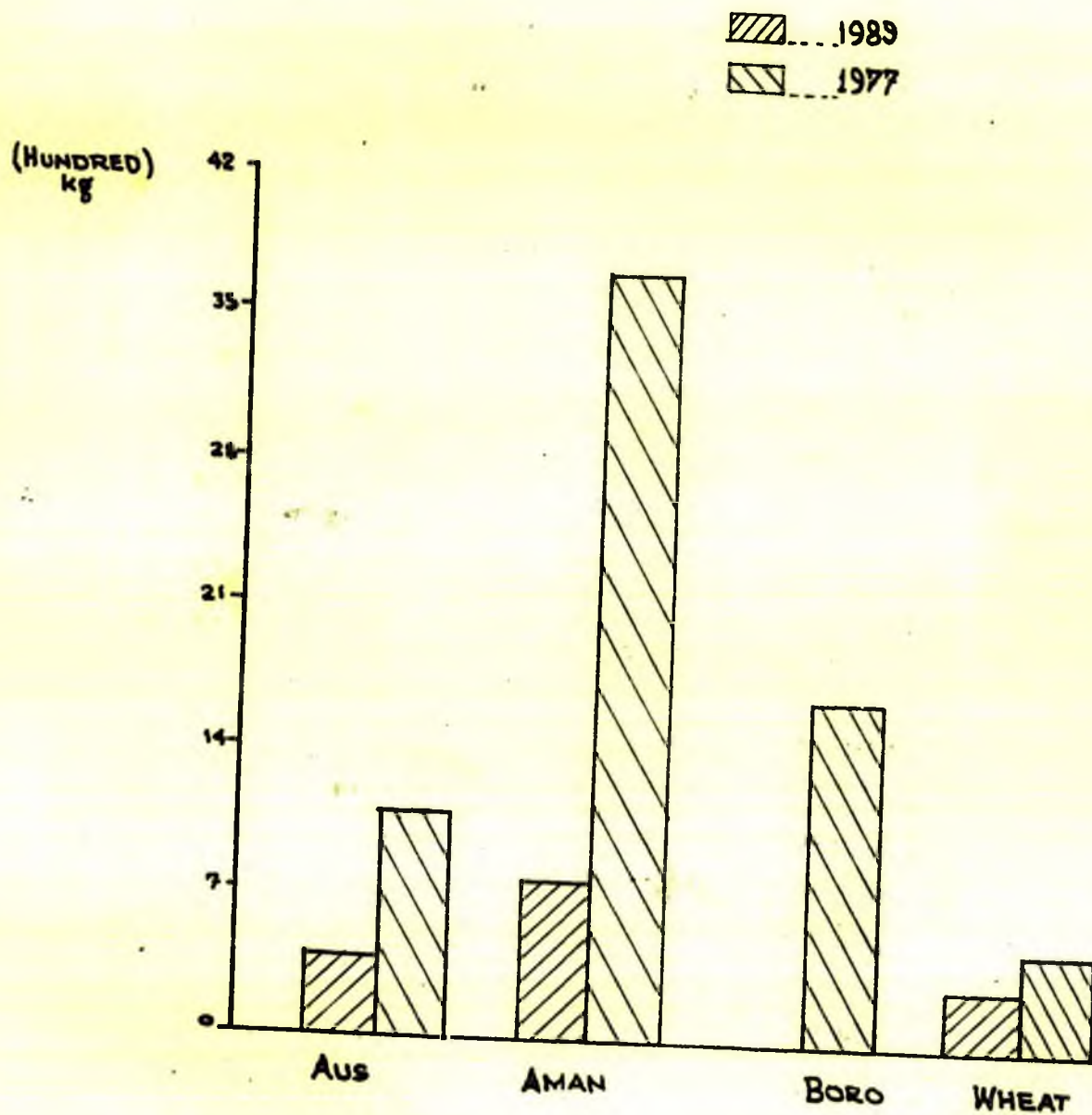


Figure - 6

Source: Field Survey 1989

season and especially the dry *rabi* season has been a major factor in bringing about increased crop production. The production of potato, mustard, pulses, onion, garlic, has increased by more than three times since the introduction of modern technology in the study area.

Economic and Societal Change

Income Distribution. With the introduction of improved technology in agriculture, there appears to have increases in income of the sample households. The field survey revealed that there is a significant difference among the large, medium and small farmers in terms of their income since the introduction of modern technology. Based on the household data provided by interview schedule, it was possible to categorize the different socio-economic classes according to their monthly income: high income group more than Tk. 3,000; middle Tk. 1501-3,000 and small less than Tk. 1500.

The Table 10 shows that there has been a decrease in the number of households belonging to the small socio-economic class while the number of households belonging to the middle and high classes has increased from 51 (34.00%) to 65 (43.33%) and 2 (1.33) to 6 (4.00%) respectively. With the improvement of economic condition as a whole frequency of food taken in a day in Heyatpur has also increased (Table 11).

Table 10
Income Distribution of the Households of the
Various Socio-economic Classes in Heyatpur
(N-150)

	1977		1989		Change	
	No	%	No	%	No	%
Small	97	64.67	79	52.67	-18	-12.00
Middle	51	34.00	65	43.33	14	9.33
High	2	1.33	6	4.00	4	2.67
	150	100.00	150	100.00	-	

Source : Field Survey, 1989

Table 11
Food Intake in a Day in Heyatpur

Frequency	1977		1989		Total
	No	%	No	%	No
Once	-	-	-	-	-
Twice	18	12.0	3	2.0	21
Thrice	132	88.0	146	97.33	278
Fourth	-	-	1	0.67	1
Total	150	100.00	150	100.00	300

Source : Field Survey, 1989

Occupational Status. The major occupations of the area shown in Appendix 4 are agriculture and agriculture related activities. Other than agriculture alone, agriculture-cum-services, agriculture-cum-business, agriculture-cum-labour and agriculture-cum-others constitute a significant occupational group. The table reveals that while the households adopting agriculture has increased from 104 (69.33%) in 1977 to 113

(75.33%) in 1989 - the number of households having service and business as subsidiary occupations has increased. The fact that the number of households having subsidiary occupations as cultivation cum labours and other testifies to the point that agriculture since the adoption of improved technology has become a productive enterprise. However, as indicated in the Appendix Table 5, there appears to have significant difference in the change of occupational status among the large, medium and small and landless farmers during the period 1977-1989. While agriculture as an occupation is seen to have increased in the category of farmers of small size, the proportion of farmers in the category of medium size engaged in agriculture has on the other hand decreased, the position in the case of large farms remaining almost the same during the period 1977-1989.

Education. The field survey revealed that over the years after the initiation of the improved level of technology in agriculture the literacy level of the households has gone up, especially at the secondary, SSC and HSC levels. The field survey also reveals that there is a significant difference among the various socio-economic classes in regard to the change in educational levels from 1977 to 1989. While the literacy rate in the category of small farms and landless farmers has increased, higher levels of education were achieved by the medium and large farming households (Appendix 6).

House Type. The significant aspect of house types vis-a-vis the size of farms is the ownership of *pucca* or semi *pucca* houses.

In regard to large and medium farmers, the number of *pucca* as well as semi-*pucca* structures is seen to have increased at the expenses of *kutcha* structures. None in the category of small and landless farmers owns either *pucca* or semi-*pucca* house structures (Appendix 7).

Health Care Facilities. Along with the introduction of irrigation facilities, the number of private and public tubewells has increased significantly, public and private wells decreasing appreciably (Appendix 8a). The availability of water supply for both irrigation and drinking purposes has an important bearing on the health and hygiene of the area - a phenomenon largely attributable to the overall improvement of the economy through improved agricultural practices. The significant aspect is that there is a significant difference in the trend of drinking water sources among the large, medium, small and landless farmers from 1977 to 1989 (Appendix 8b). But on the whole a majority of farmers of all classes are found to be using tubewell as the source of drinking water.

As well as having improvement in the sources of drinking water, household latrine types show significant improvement, again a phenomenon occurring as a result of the improvement of the economy. While 83 per cent of the households used open field latrine in 1977, the same was reduced almost by half (43%) in 1989. Use of *katcha* latrines is another phenomenon worth noticing - increasing by over 15 percent compared to 1977. As expected, there appears to be a significant difference in the use

of various types of latrines by different socio-economic classes (Appendix 9). Overall improvement is noticed in the cases of large farming households, and medium farm households to a large extent.

Demographic Structure

Age Structure: Housewives. The age structure of the housewives in the sample households presents no significant change during the period 1977-89. The aspect that merits attention is the fact that nearly 8 per cent of the housewives are below the age of 20 years. Furthermore, more than 78 per cent of the housewives are in the age group of 20-44 years - the age structure thus revealed promises of rapid population growth.

Age and Sex Composition. The age and sex composition of the sample households as shown in the Appendix Table 10 shows that percentages of males and females in the age group of 0-14 years have remained almost the same - a little over 45 per cent of the total population is constituted by males and females of the age group of 0-14 years in 1989. The overall age-sex ratio does not vary appreciably during the years 1977 (103 males per 100 females) and 1989 (almost the same, 100.4 males per 100 females). But when the age-sex ratio of different age groups are taken into consideration, more females per 100 males are revealed: the age sex composition of the age groups 0-14, 15-59 and 60 and above being 95 males per 100 females, 103 females per 100 males and 125 females per 100 males respectively in 1989.

Age at Marriage. Early female marriage below 15 years of age is manifested by the household survey. In the case of Heyatpur, both in the years of 1977 and 1989, more than 60 per cent of the housewives were married below the age of 15 years. In the case of household heads 95 per cent were married at the age of 16-27 years.

Number of Children. The average number of children as revealed by the household survey, considering the years 1977 and 1989, has been fewer than 5. Besides there is no significant difference found among the various socio-economic classes in terms of the number of children.

The household survey also reveals that out of the 150 housewives 148 gave birth to a number of children. The cases of two other housewives could not be confirmed. However, the crude birth rate (CBR) is calculated at 37.28 in 1989 - significantly higher than the national average(33.0). It may be stated here that the birth rate in 1977 was calculated as 43.20, much higher than the national rate. (Table 12). The crude death rate (CDR) was similarly 18.97 in 1977 and decreased to 12.06 in 1989; nevertheless, it is seen to be higher than the national average (11.4 in 1989) owing largely to higher infant mortality and inadequate health services. Since the crude death rate (CDR) as revealed by the household survey has come down in the year 1989 compared to 1977, a higher rate of natural growth was noted in 1989.

From the Appendix Table 11 it becomes evident that number of children (5-6) for the age groups 25-49 has shown a gradual decline. This is not to say that number of children of the sample housewives on the whole in 1989 compared to 1977 has declined since the families with more than 6 children show no consistency in change. On this basis it is also not proposed to base any inference on the basis of data collected from the households. But the sample housewives of 150 households give a general picture about the number of children for the various age groups. Further the χ^2 test was performed to measure the difference between number of children and such other variables as income, occupation, education and farm size.

In none of the cases the χ^2 test revealed any significant difference in the relationship between the number of children and the variables such as income, occupation, education (especially the housewives) and farm size (Appendix tables 12, 13, 14 and 15).

Table 12
Natural Growth Rate of Heyatpur

Year	CBR	CDR	NGR	Infant mortality rate
1977	43.20	18.97	2.42	146
1989	37.28	12.06	2.52	118

Source : Field Survey, 1989

Chapter-5

EFFECT OF IMPROVED TECHNOLOGY ON THE DEMOGRAPHIC CHARACTERISTICS OF THE ADOPTING AND NON-ADOPTING VILLAGES

This section of the study deals with the effects of seed-fertilizer-water technology on the demographic characteristics of the adopting and non-adopting villages. Heyatpur is compared with Binodnagar, an adjacent village which has not come under the influence of the improved technology.

Age structure of Households. The maximum age cohort (42 per cent) of the head of households in Heyatpur as revealed from field survey is from 30 to 39 years, 36 percent of the households representing age structure of 20-29 years (97 per cent of the 150 households were below 50 years of age). By comparison in Binodnagar the highest number of households belonged to the age group of 20-29 years (49 percent of the total). Further, 33 percent of the households belonged to the age group of 30-39 years - the above thereby suggesting a younger age structure of the households of Binodnagar as compared to Heyatpur (Appendix 16/a).

Age Structure of Housewives. As with age structure of the households, the age structure of the housewives of Binodnagar as compared to Heyatpur is seen to be younger - 55 per cent belonging to the age group of 20-29 years (Heyatpur: 39 per cent). The overall position is that while 77 per cent of the

housewives in Binodnagar fall in the age group of 20-39 years, the same represents 68 per cent for Heyatpur (Appendix 16/b).

Age and Sex Composition. The field survey reveals that with regard to the age and sex composition of Binodnagar and Heyatpur there is no conspicuous difference. The only difference is with the female population composition in Heyatpur, outnumbering (47 per cent) males (44 per cent) in the age group of 0-14 years. Insofar as with the younger composition in Binodnagar with respect to household structure and age structure of housewives, including higher percentage of female in the age group of 0-14 years, Binodnagar shows marked contrast in demographic characteristics compared to Heyatpur(Appendix 17).

The sex ratio of Binodnagar is worked out at 100.91 : 100, i.e. per hundred females there are 100.91 males. This is quite different from that of the Heyatpur (104:100). With regard to the age at marriage, both from the male and female perspective, the data collected show no conspicuous difference (Appendix 18 a,b). Nevertheless, people marrying at a tender age (10-15 years) is somewhat noticeable in Binodnagar - not a significant phenomenon in terms of social characteristics of the area. That most of the people (58-60%) in both the villages got married at the age group of 16-21 shows a lack of awareness about the population increase in the societal setup. Lack of education and agricultural rural set up are other factors influencing the population characteristics of the area.

Number of Children

Regarding the number of children, the field survey of 150 households from each selected villages reveals that compared to Binodnagar (average size 2.9), Heyatpur has a larger average size of children: 4.5. This may be attributed to the fact that in Heyatpur the number of older wives (30-49) with longer period of exposure is higher than that in Binodnagar (Appendix 18c and 19). It may also be noted that among the younger wives (below 25) proportion of households with smaller number of children (less than 3), is higher in Binodnagar which, it may be stated, could be an indication of wives practicing family planning. The data on family planning practice supports the above proposition since 58% of the wives of Binodnagar as against 22% wives of Heyatpur are found practicing family planning.

Further, the field survey revealed that the crude birth rate (CBR) of Binodnagar is less (36.53) than that of Heyatpur (37.28). Apart from the fact that Heyatpur is not only more developed agriculturally, but the number of mothers not giving birth to children in Binodnagar has been noted to be higher. The crude death rate (12.06) and infant mortality rate (118) of Heyatpur on the other hand are less than Binodnagar (CDR: 13.70; IMR: 125) - both the rates being higher than the national average.(CDR: 11.4; IMR: 98). The lack of hygienic facilities, medical services and lack of overall development efforts in Binodnagar have led to higher CDR as compared to Heyatpur. Insofar as it relates to crude rate of natural increase (the difference between CBR and CDR, expressed in percentage) Heyatpur

(2.52) shows markedly a higher rate than Binodnagar (2.28). As stated before, natural increase of population of the sample 150 households in Heyatpur as compared to Binodnagar is higher - a phenomenon ascribed as the result of agricultural development in particular.

Income and Number of Children

The field survey revealed that there was an inverse relationship between the higher income and the number of children in the village Heyatpur - more than 6 children were found among the 23 per cent of the lower class family, 27 per cent in the middle class and 17 per cent in the case of higher class family. In Binodnagar, likewise, a negative relationship was observed between the income groups and fertility groups. The chi-square test reveals that there is a significant difference in the number of children between the lower, middle and higher classes of Binodnagar and Heyatpur (Appendix 20).

Occupation and Number of Children

The data regarding the above were collected from the questionnaire survey. While in Heyatpur which is agriculturally more developed, the highest number of children were found among the groups engaged in cultivation and the lowest number in the occupational group of cultivation-cum-services, the situation in Binodnagar is somewhat different. But in both the villages one characteristic is common: the occupational group engaged in cultivation having the maximum number of children (Appendix 21).

Education and Number of Children

A negative relationship exists between educational level and the number of children in both the villages. The housewives of Heyatpur (both literate and illiterate) as revealed by the field survey, have a larger size of children as compared to Binodnagar. The chi-square test refers to the fact that there is a significant difference between illiterate housewives of Heyatpur and Binodnagar in respect of number of children. Likewise, there is a significant difference in the number of children between literate women of Heyatpur and Binodnagar (Appendix 22).

Farm Size and Number of Children

Although neither the landless and large land holders had a size of children of not more than 6, there does not exist any significant relationship between the farm size and number of children in both the villages of Heyatpur and Binodnagar. Further, with respect to families having at least 2 children, the percentage recorded was seen to be higher in Binodnagar (68%) than Heyatpur (36%). The x^2 test suggests that there is a significant difference between Heyatpur and Binodnagar in respect of the number of children among the landless farmers, small and medium farm holders, and large farm size holders (Appendix 23).

Family Planning Practices and Number of Children

The study of the 150 household families in both the villages reveals that families adopting family planning practices were higher in Binodnagar (87) than Heyatpur (33). In Heyatpur in particular, households using family planning (FP) practices were

found with lesser number of children than the non-users percentage-wise. In Binodnagar, on the other hand, it was seen that families adopting FP practices have more children than the non-adopters in terms of percentages because they belong to older age group - percentage of 2 children is higher in respect of non-practicing group as they belong to the younger age group (Appendix 24). The percentage of more than 6 children was also found to be higher among the non-practicing group. This is not inexplicable and warrants further acceleration of the family planning efforts.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

For the last three decades the use of modern technology in agriculture has been extended in Bangladesh. This extension of improved technology naturally has an impact on farmers' socio-economic and demographic behaviour. Heyatpur village, the study area, has got the privilege of using modern technology in agriculture. This study was designed to find out the impact of modern technology in agriculture and its effects on demographic characteristics. For a comparative analysis two villages (Heyatpur with agricultural development by means of modern inputs, and Binodnagar with less developed technology were selected.

In Heyatpur, with the increasing number of deep and shallow tubewells land under irrigation has extended more than 7 times from 1977 to 1989. There has been a spectacular increase in the use of chemical fertilizer, improved seeds and pesticides. Area of HYV rice and wheat has increased more than five times, triple cropped area has increased about 7 times, and cropping intensity has increased from 114.42 percent to 212.74 percent. Cropping pattern has also been changed. Per acre rice and wheat production has increased two times. As a result per capita income in the study area has gone up from Tk. 1300 to 1500. Illiteracy rate has decreased. House condition is better now

than that in 1977. Source of drinking water is better now. Comparatively latrine facilities have improved. Over all improvement is noticed in the cases of large farming household and medium farm households to a large extent.

From 1977 to 1989 crude birth rate and crude death rate decreased in Heyatpur. But the decreasing rate of crude death rate is a bit higher than the crude birth rate, which may have occurred owing to improvement of the living environment such as agricultural development and resultant improved diet. On the other hand, in Binodnagar which is less developed technologically, crude birth rate is less but crude death rate is higher than Heyatpur. The average number of children also is higher in Heyatpur than Binodnagar. Crude birth rate, Crude death rate and natural growth rates of the said two villages are higher compared to national averages - national averages being 33.0, 11.4 and 2.16 respectively.

In comparison, the number of aged wives with longer period of exposure is higher in Heyatpur than Binodnagar. But the proportion of wives younger in age with no children is higher in Binodnagar. Family planning users are also much higher in Binodnagar (22% in Heyatpur; 58% in Binodnagar). Now it can be said that natural increase of population in Heyatpur as compared to Binodnagar is higher - a phenomenon ascribed to the result of agricultural development in particular. As well as the development of agriculture, infant mortality rate is being controlled in the study area, Heyatpur (146 in 1977, 118 in 1989)

but family planning activities are still lagging behind. As a result the population growth rate is still high. In this perspective the following steps should be taken in the study area.

- i) Activities of family planning programme should be more vigorous in the study area. An effort should be made as to ascertain why the family planning acceptance rate is not increasing under the present level of technology.
- ii) Rural industries should be established parallel to agricultural development in order for women to augment their income and increase their involvement in non-farm income outside their household activities.
- iii) The key to all of these discussed above is higher level of education, increasing the literacy rate and the change of attitude towards family planning.
- iv) There is a need to provide more recreation facilities for improving mental as well as physical health.
- v) Opportunities should be created for more female employment as they represent almost half of the total population.
- vi) There is also the need for improving health care and improved hygienic environment and involvement of women organization.

In fine, it is submitted that this study presents the result of a sample survey of a very small area. It is an effort to find out the impact of modern inputs, in agriculture, especially their impact on agricultural development vis-a-vis demographic characteristics. This necessitated a systematic analysis taking

into consideration the time periods for which data were collected both from the field and secondary sources.

Given the fact that this study has limitations, the perspective that it has created with reference to agricultural development especially in a very densely populated country like Bangladesh, may be of some importance for the planners and decision-makers at large. The premises and hypotheses as set up in this study, especially to have an understanding about the role of modern techniques in agricultural development vis-a-vis demographic characteristics may make a valuable contribution to future research on the economic and social development of Bangladesh.

Appendix 1
Number of Deep and Shallow Tubewell by
socio-economic classes in Heyatpur

Tubewell	Private			Not private	Total
	large farm	medium farm	small farm		
Deep tubewell	1	-	-	4	5
Shallow tubewell	6	3	1	-	10
Total	7	3	1	4	15

Source : Field survey 1989.

χ^2 test :- significant at '05 level.

df = 3

$n^2_t = 7.815$

$n^2_c = 11.16$

Null (H₀) hypothesis is rejected.

Appendix 2
Use of Fertilizer by various socioeconomic classes (in kg)
in Heyatpur

Farm type	1977		1989		Total	
	'000 kg	%	'000 kg	%	'000 kg	%
Large farm	5	41.67	11	37.93	16	39.02
Medium farm	4	33.33	10	34.48	14	34.15
Small farm	3	25.00	8	27.59	11	26.83
Total	12	100	29	100	41	100

Source : Field Survey 1989.

n^2 = Significant at .05 level.

df = 2, $n^2_t = 5.991$, $n^2_c = 0.322$

Null (H₀) hypothesis is accepted.

Appendix 3
Use of HYV Seed of paddy and wheat (in kg)
by socio-economic classes in Heyatpur

Farm type	1977		1989		Total	
	Kg	%	Kg	%	Kg	%
Large	750	40.98	4180	36.99	4930	37.55
Medium	615	33.61	3840	33.98	4455	33.93
Small	465	25.41	3280	29.03	3745	28.52
Total	1830	100	11300	100	13130	100

Source : Field Survey 1989.

n^2 = Significant at .05 level.

df = 2, n^2_c = 0.444, n^2_t = 5.991

Null (H_0) hypothesis is accepted.

Appendix 4
Change of occupational status in Heyatpur

Occupational category	1977		1989		Increase/ decrease (Number)
	No	%	No	%	
Cultivation	104	69.33	113	75.33	+6
Daily Labour	1	0.67	-	-	-1
Service	1	0.67	-	-	-1
Business	2	1.33	-	-	-2
Cultivation+Service	2	1.33	6	4.00	+4
Cultivation+Business	15	10.00	21	14.00	+6
Cultivation+Labour	10	6.67	4	2.67	-6
Cultivation+Other	15	10.00	6	4.00	-9
Total	150	100	150	100	-

Source : Field Survey 1989.

Appendix 5
Change of occupational status by socio-economic classes in Heyatpur

Occupational category	Large farm				Medium farm				Small and Landless				Total		Grand Total		
	1977		1989		1977		1989		1977		1989		1977		1989		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Cultivation	10	6.67	12	8.0	58	38.67	51	34.0	36	24.0	50	33.33	104	69.33	113	75.33	217
Daily labour	-	-	-	-	-	-	-	-	1	0.67	-	-	1	0.67	-	-	1
Service	-	-	-	-	1	0.67	-	-	-	-	-	-	1	0.67	-	-	1
Business	-	-	-	-	-	-	-	-	2	1.33	-	-	2	1.33	-	-	2
Cultivation + Business	2	6.33	2	1.33	6	4.00	12	8.00	7	4.67	7	4.67	15	10.00	21	14.0	36
Cultivation + Service	-	-	1	0.67	2	1.33	3	2.00	-	-	2	1.33	2	1.33	6	4.0	8
Cultivation + Labourer	-	-	-	-	-	-	-	-	10	6.67	4	2.67	10	6.67	4	2.67	14
Cultivation + Others	-	-	-	-	7	4.67	2	1.33	8	5.33	4	2.67	15	10.00	6	4.0	21
Total	12	15.00	15	10.00	74	49.34	68	45.33	64	42.67	67	44.67	150	100	150	100	300

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
df = 35, χ^2_c = 60.06, χ^2_t = 49.800
Null hypothesis is rejected.

Appendix 6
Change of education by socio-economic classes in Heyatpur

Education	Large farm				Medium farm				Small farm and landless				Total		Grand Total		
	1977		1989		1977		1989		1977		1989		1977		1989		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Illiterate	1	0.67	1	0.67	37	24.67	30	20.00	27	18.0	30	20.00	65	43.33	61	40.67	126
Primary	3	2.00	3	2.00	30	20.00	23	15.33	35	23.33	34	22.67	68	45.33	60	40.00	128
Secondary	7	4.67	8	5.33	6	4.00	7	4.67	2	1.33	2	1.33	15	10.00	18	12.00	33
SSC	1	0.67	2	1.33	1	0.67	6	4.00	-	-	3	2.00	2	1.34	8	5.33	10
HSC	-	-	1	0.67	-	-	2	1.33	-	-	-	-	-	-	3	2.00	3
Degree +	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	12	8.01	15	10.00	74	49.34	68	45.33	64	42.67	69	46.00	150	100	150	100	300

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
df = 20, χ^2_t = 31.41, χ^2_c = 93.5
Null hypothesis is rejected.

Appendix 7
Change of House Type by socio-economic classes in Heyatpur

House Type	Large farm				Medium farm				Small farm and landless				Total		Grand Total	
	1977		1989		1977		1989		1977		1989		1977		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Semi pucca	1	0.67	6	4.00	-	-	2	1.33	-	-	-	-	1	0.67	8	5.33
Pucca	-	-	4	2.67	-	-	-	-	-	-	-	-	-	-	4	2.67
Kutcha	11	7.33	5	3.33	74	49.33	66	44.00	64	42.67	67	44.67	149	99.33	138	92.00
Total	12	8.00	15	10.00	74	49.33	68	45.33	64	42.67	67	44.67	150	100	150	100

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
df = 15, χ^2_t = 18.307, χ^2_c = 88.96
Null hypothesis is rejected.

Appendix 8a
Change of source of drinking water of households in Heyatpur.

Source	1977		1989		Percent increase/ Decrease
	No	%	No	%	
Private well	102	68.00	50	33.33	-34.67
Others well	1	0.67	1	0.67	-
Public well	11	7.33	9	6.00	-1.33
Private tubewell	9	6.00	44	29.33	+23.33
Others tubewell	9	6.00	1	0.67	-5.33
Public tubewell	18	12.00	45	30.00	+18.00
Total	150	100	150	100	

Source : Field survey 1989.

Appendix 8b

Change of source of drinking water of household by socio-economic classes in Heyatpur.

Source	Large farm				Medium farm				Small and Landless				Total		Grand Total	
	1977		1989		1977		1989		1977		1989		1977		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Private well	3	2.00	-	-	63	42.00	35	10.00	36	24.00	15	10.00	102	68.00	50	33.33
Others well	-	-	-	-	-	-	-	-	1	0.67	1	0.67	1	0.67	1	0.67
Public well	-	-	-	-	-	-	-	-	11	7.33	9	6.00	11	7.33	9	6.00
Private tubewell	7	4.66	15	10.00	2	1.39	24	16.00	-	-	5	3.33	9	6.00	44	29.33
Others tubewell	1	0.67	-	-	2	1.33	-	-	6	4.00	1	0.67	9	6.00	1	0.67
Public tubewell	1	0.67	-	-	7	4.67	9	6.00	10	6.67	36	24.00	18	12.00	45	30.00
Total	12	8.00	15	10.00	74	49.34	68	45.33	64	42.67	67	44.67	150	100	150	100

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
 $df = 25$, $\chi^2_c = 229.37$, $\chi^2_t = 37.652$
 Null hypothesis is rejected.

Appendix 9

Change of type of latrine of household by socio-economic classes in Heyatpur.

Type of latrine	Large farm				Medium farm				Small and Landless				Total		Grand Total	
	1977		1989		1977		1989		1977		1989		1977		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Kutcha	6	4.00	-	-	44	29.33	56	37.33	10	6.67	27	18.00	60	40.00	83	55.33
Semi Pucca	-	-	7	4.67	1	0.67	8	5.33	-	-	-	-	1	0.67	15	10.00
Pucca	6	4.00	8	5.33	-	-	1	0.67	-	-	-	-	6	4.00	9	6.00
Open field	-	-	-	-	29	19.33	3	2.00	54	36.00	40	26.67	83	55.33	43	28.67
Total	12	8.00	15	10.00	74	49.33	68	45.33	64	42.67	67	44.67	150	100	150	100

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
 $\chi^2_c = 297.01$, $\chi^2_t = 24.99$, $df = 15$
 Null hypothesis is rejected.

Appendix 10
Age and Sex Composition of Heyatpur

Age group	Male				Female				Total			
	1977		1989		1977		1989		1977		1989	
	No	%	No	%	No	%	No	%	No	%	No	%
0-14 years	210	43.57	203	44.42	220	47.11	213	46.81	430	45.31	416	45.62
15-59 years	252	52.28	242	52.95	231	49.46	234	51.43	483	50.90	476	52.19
60 and above	20	4.15	12	2.63	16	3.43	8	1.76	36	3.79	20	2.19
Total	482	100	457	100	467	100	455	100	949	100	912	100

Source : Field Survey, 1989

Appendix-11
Age Group and Number of Children in Heyatpur

Number of Child																										
Age Group	0 - 2				3 - 4				5 - 6				7 - 8				8+				Total		Grand Total			
	1977		1989		1977		1989		1977		1989		1977		1989		1977		1989		1977		1989			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	
Below 20 years	10	6.67	11	7.33	2	1.33	1	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	12	8.00	12	8.00	24
20 - 24 "	15	10.00	16	10.67	7	4.67	12	8.00	-	-	2	1.33	-	-	3	2.00	-	-	-	-	-	22	14.67	33	22.00	55
25 - 29 "	6	4.00	7	4.67	10	6.67	12	8.00	10	6.67	3	2.00	-	-	3	2.00	-	-	-	-	-	26	17.33	25	16.67	51
30 - 34 "	2	1.33	2	1.33	15	10.00	6	4.00	12	8.00	10	6.67	2	1.33	6	4.00	1	0.67	2	1.33	32	21.33	26	17.33	58	
35 - 39 "	-	-	2	1.33	2	1.33	4	2.67	8	5.33	5	3.33	7	4.67	4	2.67	5	3.33	3	2.00	22	14.67	18	12.00	40	
40 - 44 "	-	-	-	-	3	2.00	3	2.00	9	6.00	8	5.33	3	2.00	1	0.67	2	1.33	3	2.00	17	11.33	15	10.00	32	
45 - 49 "	-	-	-	-	3	2.00	5	3.33	8	5.33	3	2.00	4	2.67	6	4.00	4	2.67	7	4.67	19	12.67	21	14.00	40	
Total	33	22.00	38	25.33	42	28.00	43	28.67	47	31.33	31	20.66	16	10.67	23	15.34	12	8.00	15	10.00	150	100	150	100	300	

Source : Field Survey 1989.

χ^2 = Significant at .05 level.

χ^2_c = 138.33, χ^2_t = 79.08, df = 60

Null hypothesis is rejected.

Appendix-12
Income and Number of Children in Heyatpur

Income (in Tk)																	
Number of children	Tk. 0 - 1500				Tk. 1501 - 3000				Tk. 3000+				Total		Grand Total		
	1977		1989		1977		1989		1977		1989		1977		1989		No.
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1 - 2	21	14.00	18	12.00	12	8.00	15	10.00	-	-	3	2.00	33	22.00	36	24.00	69
3 - 4	29	19.33	27	18.00	12	8.00	14	9.33	1	0.67	2	1.33	42	28.00	43	28.66	85
5 - 6	28	18.67	15	10.00	18	12.00	16	10.67	1	0.67	-	-	47	31.34	31	20.67	78
7 - 8	11	7.33	12	8.00	5	3.33	11	7.33	-	-	-	-	16	10.66	23	15.33	39
8+	8	5.33	6	4.00	4	2.67	8	5.33	-	-	1	0.67	12	8.00	15	10.00	27
No child	-	-	1	0.67	-	-	1	0.67	-	-	-	-	-	-	2	1.34	2
Total	97	64.66	79	52.67	51	34.00	65	43.33	2	1.34	6	4.00	150	100	150	100	300

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
 $\chi^2_c = 11.251$, $\chi^2_t = 37.65$, df = 25
 Null hypothesis is accepted.

Appendix-13
Occupation and Number of Children (in percentage) in Heyatpur

No. of child	Culti- vation		Daily labour		Service		Business		cultivation + service		cultivation + business		cultivation + labour		cultivation + other		Total		Grand Total
	1977		1989		1977		1989		1977		1989		1977		1989		1977		No.
	1977	1989	1977	1989	1977	1989	1977	1989	1977	1989	1977	1989	1977	1989	1977	1989	1977	1989	
1 - 2	17.33	14.67	-	-	0.67	-	-	-	-	3.33	1.33	4.67	0.67	0.67	2.00	2.00	22.00	24.00	46.00
3 - 4	18.00	23.33	-	-	-	-	1.33	-	0.67	-	2.67	4.00	2.00	-	3.33	-	28.00	28.67	56.67
5 - 6	18.00	14.00	0.67	-	-	-	-	-	0.67	-	4.67	3.33	4.00	1.33	3.33	2.00	31.33	20.67	52.00
7 - 8	9.33	15.33	-	-	-	-	-	-	-	-	-	-	-	-	1.33	-	10.67	15.33	26.00
8+	6.67	8.00	-	-	-	-	-	-	-	-	1.33	2.00	-	-	-	-	8.00	10.00	18.00
No child	-	-	-	-	-	-	-	-	-	0.67	-	-	-	0.67	-	-	-	1.33	1.33
Total	69.33	75.33	0.67	-	0.67	-	1.33	-	1.34	4.00	10.00	14.00	6.67	2.67	9.99	4.00	100	100	200

Source : Field Survey 1989.

χ^2 = Significant at .05 level.
 $\chi^2_c = 57.68$, $\chi^2_t = 79.08$, df = 60
 Null hypothesis is accepted.

Appendix-14
Education and Number of Children in Heyatpur

No. of Child	Illiterate				Literate				Total		Grand Total	
	1977		1989		1977		1989		1977		1989	
	No	%	No	%	No	%	No	%	No	%	No	%
1 - 2	14	9.33	19	12.67	19	12.67	17	11.33	33	22.00	36	24.00
3 - 4	18	12.00	23	15.33	24	16.00	20	13.33	42	28.00	43	28.66
5 - 6	20	13.33	21	14.00	27	18.00	10	6.67	47	31.33	31	20.67
7 - 8	9	6.00	13	8.67	7	4.67	10	6.67	16	10.67	23	15.33
8+	4	2.67	12	8.00	8	5.33	3	2.00	12	8.00	15	10.00
No child	-	-	-	-	-	-	2	1.33	-	-	2	1.33
Total	65	43.33	88	58.67	85	56.67	62	41.33	150	100	150	100

Source : Field Survey, 1989

 χ^2 = Significant at .05 level. χ^2_c = 12.82, χ^2_t = 24.99, df = 15

Null hypothesis is accepted.

Appendix-15
Farm Size and Number of Children in Heyatpur

Number of child	Small farm and Landless				Medium farm				Large farm				Total		Grand Total	
	1977		1989		1977		1989		1977		1989		1977		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1 - 2	11	7.33	17	11.33	18	12.00	14	9.33	4	2.67	5	3.34	33	22.00	36	24.00
3 - 4	19	12.67	23	15.33	18	12.00	17	11.33	5	3.33	3	2.00	42	28.00	43	28.66
5 - 6	20	13.33	15	10.00	24	16.00	14	9.34	3	2.00	2	1.33	47	31.33	31	20.67
7 - 8	7	4.67	7	4.67	9	6.00	16	10.66	-	-	-	-	16	10.66	23	15.33
8+	7	4.67	4	2.67	5	3.33	7	4.67	-	-	4	2.66	12	8.00	15	10.00
No child	-	-	1	0.67	-	-	-	-	-	-	1	0.67	-	-	2	1.34
Total	64	42.67	67	44.67	74	49.33	68	45.33	12	8.00	15	10.00	150	100	150	100

Source : Field Survey 1989.

 χ^2 = Significant at .05 level. χ^2_c = 23.81, χ^2_t = 37.65, df = 25

Null hypothesis is accepted.

Appendix-16a

Age structure of head of households of Heyatpur and Binodnagar

Age group	Heyatpur		Binodnagar		Total
	No	%	No	%	
0 - 19 years	4	3	4	3	8
20 - 29 years	54	36	73	49	127
30 - 39 "	63	42	50	33	113
40 - 49 "	24	16	21	14	45
50 - 59 "	3	2	2	1	5
60 and above	2	1	-	-	2
Total	150	100	150	100	300

Source : Field Survey, 1989.

Appendix-16b

Age structure of head of housewives of Heyatpur and Binodnagar

Age group	Heyatpur		Binodnagar		Total
	No	%	No	%	
0 - 19 years	12	8.00	30	20	44
20 - 29 years	58	38.67	82	55	138
30 - 39 "	44	29.33	33	22	78
40 - 49 "	36	24.00	5	3	40
Total	150	100	150	100	300

Source : Field Survey, 1989.

Appendix-17
Age and Sex Structure of Heyatpur and Binodnagar

Age group	Heyatpur						Binodnagar						Grand Total
	Male		Female		Total		Male		Female		Total		
	No	%	No	%	No	%	No	%	No	%	No	%	
0-14 years	203	44	213	47	416	46	201	46	202	46	403	46	819
15-59 years	242	53	234	51	476	52	227	51	223	51	450	51	926
60 and above	12	3	8	2	20	2	12	3	11	3	23	3	43
Total	457	100	455	100	912	100	440	100	436	100	876	100	1788

Source : Field Survey, 1989.

Appendix-18a
Age at the marriage of husband of Heyatpur and Binodnagar

Age group	Heyatpur		Binodnagar		Total
	No	%	No	%	
10 - 15 years	3	2	4	3	7
16 - 21 "	87	58	90	60	177
22 - 27 "	54	36	53	35	107
28 - 33 "	5	3	3	2	8
above 33 years	1	1	-	-	2
Total	150	100	150	100	300

Source : Field Survey, 1989.

Appendix-18b
Age at the marriage of wife of Heyatpur and Binodnagar

Age group	Heyatpur		Binodnagar		Total
	No	%	No	%	
4 - 9 years	5	3	1	1	6
10 - 15 "	85	57	99	66	184
16 - 21 "	55	37	49	32	104
22 - 27 "	5	3	1	1	6
Total	150	100	150	100	300

Source : Field Survey, 1989.

Appendix-18c
Duration of Marital Life

Duration	Heyatpur		Binodnagar		Total	
	No of wives	%	No of wives	%	No	%
Below 1 year	-	-	-	-	-	-
1 - 10 years	54	36.0	64	42.67	118	39.33
11 - 20 years	45	30.0	50	33.33	95	31.67
21 - 30 years	39	26.0	33	22.0	72	24.0
31 +	12	8.0	3	2.0	15	5.0
Total	150	100	150	100	300	100

Source : Field Survey, 1989.

Appendix-19
Age and Number of Children

Heyatpur																
No. of Child	Age Group															
	Below 20 yrs.		20-24 yrs.		25-29 yrs.		30-34 yrs.		35-39 yrs.		40-44 yrs.		45-49 yrs.		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
No child	2	16.67	-	-	-	-	-	-	-	-	-	-	-	-	2	-
1 - 2 child	9	75.00	16	48.49	7	28.00	2	7.69	2	11.11	-	-	-	-	36	-
3 - 4 "	1	8.33	12	36.36	12	48.00	6	23.08	4	22.22	3	20.00	5	23.80	43	-
5 - 6 "	-	-	2	6.06	3	12.00	10	38.46	5	27.78	8	53.33	3	14.29	31	-
7 - 8 "	-	-	3	9.09	3	12.00	6	23.08	4	22.22	1	6.67	6	28.57	23	-
8+	-	-	-	-	-	-	2	7.69	3	16.67	3	20.00	7	33.33	15	-
Total	12	100	33	100	25	100	26	100	18	100	15	100	21	100	150	-

Binodnagar																
No child	9	30.00	-	-	-	-	-	-	-	-	-	-	-	-	9	-
1 - 2 child	21	70.00	25	62.5	12	28.57	7	46.67	3	16.67	-	-	-	-	68	-
3 - 4 "	-	-	15	37.5	27	64.29	1	6.66	7	38.88	-	-	-	-	50	-
5 - 6 "	-	-	-	-	3	7.14	7	46.67	5	27.78	1	33.33	-	-	16	-
7 - 8 "	-	-	-	-	-	-	-	-	3	16.67	1	33.33	1	50.00	5	-
8+	-	-	-	-	-	-	-	-	-	-	1	33.33	1	50.00	2	-
Total	30	100	40	100	42	100	15	100	18	100	3	100	2	100	150	-

Source : Field Survey, 1989

Appendix-20
Income and Number of Children

Heyatpur

No. of child	Tk. 0-1500		Tk. 1501-3000		3000+		Total
	No.	%	No.	%	No.	%	No
No child	1	1	1	2	-	-	2
1 - 2 "	18	23	15	25	3	50	36
3 - 4 "	27	34	14	21	2	33	43
5 - 6 "	15	19	16	25	-	-	31
7 - 8 "	12	15	11	16	-	-	23
9 - 10 "	6	8	6	9	1	17	13
10 above	-	-	2	2	-	-	2
Total	79	100	65	100	6	100	150

Binodnagar

No. of child	Tk. 0-1500		Tk. 1501-3000		3000+		Total
	No.	%	No.	%	No.	%	No
No child	7	5	2	11	-	-	9
1 - 2 "	63	48	5	28	-	-	68
3 - 4 "	40	31	8	44	2	100	50
5 - 6 "	13	10	3	17	-	-	16
7 - 8 "	5	4	-	-	-	-	5
8+ "	2	2	-	-	-	-	2
Total	130	100	18	100	2	100	150

Source : Field Survey 1989.

n^2 test: lower class - n^2 Significant at .05 level.
df = 5, $n^2_t = 10.07$, $n^2_c = 24.4$
Null hypothesis is rejected.

Middle class - n^2 Significant at .05 level.
df = 6, $n^2_t = 12.59$, $n^2_c = 43$
Null hypothesis is rejected.

Upper class - n^2 Significant at .05 level.
df = 2, $n^2_t = 5.99$, $n^2_c = 100.8$
Null hypothesis is rejected.

Appendix-21
Occupation and Number of Children

Heyatpur

No. of child	Culti- vation		Daily labour		Service		Business		cultivation + service		cultivation + business		cultivation + labour		cultivation + other		Total
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No
No child	-	-	-	-	-	-	-	-	1	17	-	-	1	25	-	-	2
1 - 2 "	22	19	-	-	-	-	-	-	5	83	5	24	1	25	3	50	36
3 - 4 "	35	31	-	-	-	-	-	-	-	-	8	38	-	-	-	-	43
5 - 6 "	21	19	-	-	-	-	-	-	-	-	5	24	2	50	3	50	31
7 - 8 "	23	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
9 - 10 "	10	9	-	-	-	-	-	-	-	-	3	14	-	-	-	-	13
10 child	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Total	113	100	-	-	-	-	-	-	6	100	21	100	4	100	6	100	150

Binodnagar

No. of child	Culti- vation		Daily labour		Service		Business		cultivation + service		cultivation + business		cultivation + labour		cultivation + other		Total
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No
No child	6	8	3	7	-	-	-	-	-	-	-	-	-	-	-	-	9
1 - 2 "	33	43	24	54	2	33	-	-	-	-	3	50	6	50	-	-	68
3 - 4 "	22	29	10	23	4	67	2	100	2	100	2	33	6	50	2	100	50
5 - 6 "	9	12	7	16	-	-	-	-	-	-	-	-	-	-	-	-	16
7 - 8 "	4	5	-	-	-	-	-	-	-	-	1	17	-	-	-	-	5
9 - 10 "	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
10 child	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	76	100	44	100	6	100	2	100	2	100	6	100	12	100	2	100	150

Source : Field Survey, 1989.

Appendix-22
Education and number of children

Illiterate

Number of child	Heyatpur		Binodnagar		Total
	Number	Percent	Number	Percent	
No child	-	-	6	5	6
1 - 2 children	19	22	58	47	78
3 - 4 "	23	26	39	32	63
5 - 6 "	21	24	13	10	33
7 - 8 "	13	15	5	4	17
9 - 10 "	10	11	2	2	12
10 +	2	2	-	-	2
Total	88	100	123	100	211

Literate

Number of child	Heyatpur		Binodnagar		Total
	Number	Percent	Number	Percent	
No child	2	3	3	11	6
1 - 2 children	17	28	10	37	26
3 - 4 "	20	32	11	41	31
5 - 6 "	10	16	3	11	13
7 - 8 "	10	16	-	-	9
9 - 10 "	3	5	-	-	3
10 +	-	-	-	-	-
Total	62	100	27	100	88

Source : Field survey 1989.

χ^2 test :-

Illiterate : significant at .05 level.

$df = 6$

$\chi^2_t = 12.59$

$\chi^2_c = 35$

Null hypothesis is rejected.

Literate : significant at .05 level.

$df = 5$

$\chi^2_t = 11.07$

$\chi^2_c = 28.8$

Null hypothesis is rejected.

Appendix-23

Farmsize Number of Children

Heyatpur

No. of child.	Landless 0-05 acre		Small farm 0.05-2.49 acre		Middle farm 9.5-7.5 acre		Large farm 7.5 above		Total
	No	%	No	%	No	%	No	%	
No child	-	-	1	2	-	-	1	7	2
1 - 2 child	2	100	15	23	14	21	5	33	36
3 - 4 "	-	-	23	35	17	25	3	20	43
5 - 6 "	-	-	15	23	14	21	2	13	31
7 - 8 "	-	-	7	11	16	23	-	-	23
9 - 10 "	-	-	4	6	7	10	4	27	15
10 +	-	-	-	-	-	-	-	-	-
Total	2	100	65	100	68	100	15	100	150

Binodnagar

No. of child.	Landless 0-05 acre		Small farm 0.05-2.49 acre		Middle farm 9.5-7.5 acre		Large farm 7.5 above		Total
	No	%	No	%	No	%	No	%	
No child	3	6	3	4	3	11	-	-	9
1 - 2 child	24	49	36	52	7	26	1	20	68
3 - 4 "	17	35	21	31	8	30	4	80	50
5 - 6 "	5	10	7	10	4	15	-	-	16
7 - 8 "	-	-	2	3	3	11	-	-	15
9 - 10 "	-	-	-	-	2	7	-	-	2
10 +	-	-	-	-	-	-	-	-	-
Total	49	100	69	100	27	100	5	100	150

Source : Field survey 1989.

χ^2 test :-

Landless : significant at .05 level.
 $df = 3$, $n^2t = 5.99$
 $n^2c = 78.4$
 Null hypothesis is rejected.

Small farm : significant at .05 level.
 $df = 5$, $n^2t = 11.07$
 $n^2c = 22.4$
 Null hypothesis is rejected.

Medium farm : significant at .05 level.
 $df = 6$, $n^2t = 12.53$
 $n^2c = 25$
 Null hypothesis is rejected.

Large farm : significant at .05 level.
 $df = 4$, $n^2t = 9.49$
 $n^2c = 86.2$
 Null hypothesis is rejected.

Appendix-24

Family Planning practice and number of children

Number of Child	Heyatpur					Binodnagar				
	Practice		Not practice		Total	Practice		Not practice		Total
	No	%	No	%		No	%	No	%	
No child	1	3	1	1	2	6	9	3	5	9
1 - 2 "	8	25	28	24	36	37	42	31	49	68
3 - 4 "	9	27	34	29	43	32	36	18	28	50
5 - 6 "	9	27	22	19	31	10	11	6	10	16
7 - 8 "	3	9	20	17	23	-	-	5	8	5
9 - 10 "	3	9	10	8	13	2	2	-	-	2
10 above	-	-	2	2	2	-	-	-	-	-
Total	33	100	117	100	150	87	100	63	100	150

Source : Field survey 1989.

χ^2 test :-

Family Planning practices :-

significant at .05 level.

df = 5, n^2_t = 11.07

n^2_c = 28.8

Null hypothesis is rejected.

Non practices of family planning :-

significant at .05 level.

df = 6, n^2_t = 12.59

n^2_c = 27.2

Null hypothesis is rejected.

কৃষিতে আধুনিক প্রযুক্তির ব্যবহার এবং জমির উর্বরতা বৃদ্ধির প্রভাব

ক্রমিক সংখ্যা _____

প্রকল্পকারীর নাম _____

তারিখ _____

উত্তর দাতার পরিচিতি (গৃহকর্তার পরিচিতি)

১। নামঃ

২। ঠিকানা :

গ্রামঃ

ইউনিয়ন

উপজেলা

জেলা

৩। বয়স :

৪। শিক্ষাগত যোগ্যতা : ১) নিরক্ষর ২) প্রাইমারী ৩) মাধ্যমিক ৪) এস.এসসি ৫) এইচ.এসসি ৬) ডিগ্রী
ও +

৫। ধর্ম : ১) ইসলাম ২) হিন্দু ৩) খৃষ্টান ৪) বৌদ্ধ ৫) অন্য কিছু

৬। পেশা : ১৯৮৯

১৯৭৭

প্রধান

অপ্রধান

(কৃষি, চাকুরী, শ্রমিক, ব্যবসা ইত্যাদি)

৭। মাসিক আয় : ১৯৮৯

১৯৭৭

টাকা

৮। পরিবার পরিচিতি

ক্রমিক নং পরিবারের সদস্যের নাম পরিবার প্রধানের সঙ্গে সম্পর্ক পু/স্ত্রী বয়স জন্মের সন বৈবাহিক
অবস্থা শিক্ষাগত যোগ্যতা পেশা ধর্ম জন্মস্থান

জমি সংক্রান্ত প্রশ্নাবলী :

৯। আপনার নিজস্ব কোন জমি ছিল বা আছে

১৯৮৯

১৯৭৭

হ্যাঁ

না

১০। জমির পরিমাণ (যদি থাকে/ছিল)

১৯৮৯

১৯৭৭

কৃষি (একর)

প্লট

অকৃষি(একর)

প্লট

১১। নিজ গ্রামে জমির পরিমান

১৯৮৯ ১৯৭৭

একর

প্লট

১২। আপনার জমি কি আপনি নিজে চাষ করেন/করতেন

১৯৮৯ ১৯৭৭

হাঁ

না

১৩। আপনি কি অন্যের জমি চাষ করেন/করতেন

১৯৮৯ ১৯৭৭

হাঁ

না

১৪। যদি অন্যের জমি চাষ করেন/করতেন তবে তার পরিমান

১৯৮৯ ১৯৭৭

একর

প্লট

১৫। আপনার জমি কি বর্গা দেন/দিতেন

১৯৮৯ ১৯৭৭

হাঁ

না

১৬। যদি জমি বর্গা দেন/দিতেন তবে তার পরিমান

১৯৮৯ ১৯৭৭

একর

প্লট

১৭। আপনি যে জমি চাষ করেন তাতে পরিবারের সদস্য ছাড়া অন্য লোক নিয়োগ করেন বা করতেন

১৯৮৯ ১৯৭৭

হাঁ

না

১৮। যদি লোক নিয়োগ করেন বা করতেন তাহা কিরূপ

১৯৮৯ ১৯৭৭

দৈনিক

মাসিক

বাৎসরিক

সাময়িক

সেচ ও বীজ সংক্রান্ত প্রশ্নাবলী :

- ১৯। কোন সালে আপনার এলাকায় আধুনিক সেচ ব্যবস্থা চালু হয় _____ সাল
- ২০। যখন আপনার এলাকায় সেচ ব্যবস্থা চালু হয় তখন আপনি আপনার জমিতে সেচ দিয়েছিলেন?
হ্যাঁ না
- ২১। না দিলে তার কারণ
ক) প্রয়োজন ছিল না
খ) নিজের জমি সেচ এলাকায় পড়ে নাই বলে
গ) সেচ সম্পর্কে ধারণা ভাল ছিল না
ঘ) বেশী খরচ পড়ে বলে
ঙ) অন্য কিছু
- ২২। কোন সাল হতে আপনি সেচ দেওয়া শুরু করেন ----- সাল
- ২৩। সেচ দেন এমন জমির পরিমাণ
১৯৮৯ ১৯৭৭
নিজ গ্রামে
একর
প্লট
অন্য গ্রামে
একর
প্লট
- ২৪। জমিতে সেচ দেওয়ার প্রথম বছর একর প্রতি ধানের উৎপাদন----- মন
- ২৫ক। আপনি কি উচ্চ ফলনশীল বীজ ব্যবহার করেন? হ্যাঁ না
- খ) যদি করেন তবে কোন ফসলের বীজ ব্যবহার করেন এবং কি পরিমাণ
আমন ইরি সরিষা আলু গম পিয়ারাজ অন্যান্য
১৯৮৯
১৯৭৭

শস্যের নিবিড়তা

- ২৬। আবাদী জমির পরিমাণ :
১৯৮৯ ১৯৭৭
এক ফসলী
দুই ফসলী
তিন ফসলী
তার চেয়ে বেশী

২৭। উৎপাদন (একর প্রতি)

ফসল ১৯৮৯ ১৯৭৭

আমন

আউশ

বোরো

ইরি

সরিষা

আলু

গম

পিঁয়াজ

অন্যান্য

সার ও কীট নাশক ঔষধের ব্যবহার

২৮। আপনি জমিতে কি কি সার দেন/দিতেন

১৯৮৯ ১৯৭৭

রাসায়নিক সার

গোবর

সবুজ সার

খেল

ছাই

অন্যান্য

২৯। রাসায়নিক সার সম্পর্কে আপনার ধারণা কিরূপ ছিল/আছে?

১৯৮৯ ১৯৭৭

ভাল

মন্দ

মোটামুটি

৩০। আপনি জমিতে প্রয়োজনমত সার দেন হাঁ না

৩১। দিতে না পারলে তার কারণ

৩২। আপনি নিম্নলিখিত পদ্ধতিগুলি ব্যবহার করেন/করতেন

১৯৮৯ ১৯৭৭

কীটনাশক ঔষধ

লাইন করে ফসল বোনা

উন্নত জাতের বীর ব্যবহার

ধান মাড়াই কল

ধান কাটা কল

ট্রাক্টর দ্বারা জমি চাষ

শস্য বোনা মেশিন

অন্যান্য

৩৩। কীটনাশক ঔষধের ব্যবহার সম্পর্কে আপনার ধারণা কিরূপ ছিল/আছে
১৯৮৯ ১৯৭৭

ভাল

মন্দ

মোটামুটি

৩৪। আপনি কি জমিতে সময়মত কীটনাশক ঔষধ দিতে পারেন হাঁ না

৩৫। না পারলে কারণ

লোন ও সমবায় সম্পর্কিত প্রশ্ন

৩৬। আপনি কি ঋণ গ্রহণ করেন/করেছিলেন
১৯৮৯ ১৯৭৭

হাঁ

না

৩৭। ঋণের উৎস কি ছিল?
১৯৮৯ ১৯৭৭

ব্যাংক

সমবায়

আত্মীয়

মহাজন

অন্যান্য

৩৮। আপনার এখানে কি সমবায় সমিতি আছে বা ছিল
১৯৮৯ ১৯৭৭

হাঁ

না

৩৯। আপনি কি সমবায় সমিতির সদস্য ছিলেন
১৯৮৯ ১৯৭৭

হাঁ

না

৪০। সমবায় সমিতি সম্পর্কে আপনার ধারণা কিরূপ ছিল/আছে

১৯৮৯ ১৯৭৭

ভাল

মন্দ

মোটামুটি

বিলাস সামগ্রী, খাবার পানির উৎস, পায়খানা ও বাড়ীঘর সম্পর্কিত প্রশ্ন

৪১। আপনার বাড়ীতে কি কি বিলাস সামগ্রী ছিল/আছে

১৯৮৯ ১৯৭৭

টেলিভিশন

ফ্রিজ

রেডিও

মোটর সাইকেল

টেপ রেকর্ডার

ভিসিপি

সাইকেল

অন্যান্য

৪২। আপনাদের খাবার পানির উৎস কি ছিল/আছে

১৯৮৯ ১৯৭৭

নিজের কূপ

অন্যের কূপ

সরকারী কূপ

নিজের নলকূপ

অন্যের নলকূপ

সরকারী নলকূপ

নদী

নিজের পুকুর

অন্যের পুকুর

সরকারী পুকুর

অন্যান্য

৪৩। আপনারা মলত্যাগ কোথায় করেন/করতেন

১৯৮৯ ১৯৭৭

কাঁচা পায়খানা

পাকা পায়খানা

আধাপাকা পায়খানা

খোলা জায়গা/কোপঝাড়

৪৪। আপনার কয়টি ঘর ছিল বা আছে

১৯৮৯

১৯৭৭

কাঁচা

আধাপাকা

পাকা

৪৫। আপনারা দিনে কতবার খান/খেয়েছিলেন

১৯৮৯

১৯৭৭

একবার

দুবার

তিনবার

চারবার

৪৬। গতকাল আপনারা কি কি ও কি পরিমাণ খেয়েছেন

সকাল

দুপুর

বিকেল

রাত

৪৭। আপনাদের অসুখ হলে সময়মত ডাক্তার দেখাতে পারেন/পেরেছিলেন

১৯৮৯

১৯৭৭

হ্যাঁ

না

৪৮। সেচ ব্যবস্থা চালু হওয়ার পর আপনাদের কৃষি উৎপাদন বৃদ্ধি পেয়েছে হ্যাঁ না

৪৯। কৃষি উৎপাদন বৃদ্ধির ফলে আপনাদের অবস্থার কি উন্নতি হয়েছে হ্যাঁ না

৫০। বিগত বার বৎসরে আপনাদের অবস্থার কি কোন পরিবর্তন হয়েছে হ্যাঁ না

৫১। পরিবর্তন হলে কি রকম

১) উন্নতি

২) অবনতি

৩) পূর্বের মত

৫২। অবস্থার পরিবর্তন হলে তার কারণ

গৃহীনির পরিচিতি

১। নামঃ

২। ঠিকানা :

গ্রামঃ

ইউনিয়ন

উপজেলা

জেলা

৩। বয়স :

৪। শিক্ষাগত যোগ্যতা : ১) নিরক্ষর ২) প্রাইমারী ৩) মাধ্যমিক ৪) এস.এসসি ৫) এইচ.এসসি ৬) ডিগ্রী
৫ +

৫। ধর্ম : ১) ইসলাম ২) হিন্দু ৩) খৃষ্টান ৪) বৌদ্ধ ৫) অন্য কিছু

৬। পেশা : ১৯৮৯

১৯৭৭

প্রধান

অপ্রধান

(গৃহীনি, চাকুরী, শ্রমিক, হস্তশিল্পী ইত্যাদি)

৭। মাসিক আয় : ১৯৮৯

১৯৭৭

টাকা

৮। আপনি কি অন্যের বাড়ীতে কাজ করেন/করতেন

১৯৮৯

১৯৭৭

হ্যাঁ

না

৯। আপনি কি আপনার বাড়ীতে কাজ নিজে করেন/করতেন

১৯৮৯

১৯৭৭

হ্যাঁ

না

১০। আপনাকে সাহায্য করার মত কোন লোক নিয়োগ করা আছে/ছিল

১৯৮৯

১৯৭৭

হ্যাঁ

না

১১। আপনি প্রতিদিন কতঘণ্টা কাজ করেন/করতেন

১৯৮৯

১৯৭৭

ঘণ্টা

বিবাহ সম্পর্কিত প্রশ্ন

১২। আপনার কত বৎসরে বিবাহ হয়েছে

১৩। আপনার কি একাধিক বিয়ে হয়েছে হাঁ না

হা হলে

প্রথম সাল

দ্বিতীয় সাল

তৃতীয় সাল

তদুর্ধ্ব সাল

১৪। আপনার একাধিক বিয়ে হয়ে থাকলে পূর্ববর্তী স্বামী কিভাবে হারায়েছেন

১৫। আপনি বিয়ের কতদিন পর স্বামীর সহিত বসবাস করছেন মাস বৎসর

১৬। আপনার কি কখনো কোন সন্তান হয়েছে হাঁ না

১৭। আপনি কি এখন গর্ভবতী হাঁ না

১৮। গর্ভধারণের তালিকা :

গর্ভের ক্রমিক নং আপনার সন্তানের নাম বয়স লিঙ্গ জীবিত/মৃত মৃত হলে কতদিন বেচে ছিল

১৯। আপনার কয়টি জীবিত সন্তান আছে/ছিল

১৯৮৯

১৯৭৭

ছেলে

মেয়ে

২০। আপনার পিতা/মাতার কয়টি জীবিত সন্তান হয়েছে ছেলে মেয়ে

২১। আপনার পিতা/মাতার শিক্ষাগত যোগ্যতা

পিতা

মাতা

২২। আপনার দাদা/দাদীর কয়টি জীবিত সন্তান হয়েছে ছেলে মেয়ে

২৩। আপনার দাদা/দাদীর শিক্ষাগত যোগ্যতা

দাদা

দাদী

২৪। আপনার শ্বশুর/শ্বশুড়ীর কয়টি জীবিত সন্তান হয়েছে ছেলে মেয়ে

২৫। আপনার শ্বশুর/শ্বশুড়ীর শিক্ষাগত যোগ্যতা

শ্বশুর

শ্বশুড়ী

২৬। আপনি কি জন্মনিয়ন্ত্রন পদ্ধতি সম্পর্কে জানেন বা জানতেন

হ্যাঁ
না
১৯৮৯

১৯৭৭

২৭। আপনি ও আপনার স্বামী কি কি পদ্ধতি সম্পর্কে জানেন বা জানতেন এবং ব্যবহার করেন/করতেন

১৯৮৯

১৯৭৭

২৮। জন্মনিয়ন্ত্রন সম্পর্কে আপনি/আপনার স্বামীর ধারণা কেমন ছিল/আছে

১৯৮৯

১৯৭৭

ভাল

মন্দ

মোটামুটি

২৯। জন্মনিয়ন্ত্রন সম্পর্কে আপনি কিভাবে অবগত হয়েছেন

১৯৮৯

১৯৭৭

৩০। জনসংখ্যাকে কি আপনি সমস্যা মনে করেন

১৯৮৯

১৯৭৭

হ্যাঁ

না

৩১। কয়টি সন্তানকে বেশী মনে হয়না বা হতো না

১৯৮৯

১৯৭৭

৩২। সন্তানদের আপনি কিভাবে দেখেন

১৯৮৯

১৯৭৭

ক) সমস্যা

খ) শ্রমশক্তি

গ) আয়ের মাধ্যম

ঘ) অন্য কিছু

৩৩। আপনি/আপনার স্বামী কখনো বাচ্চা হওয়া বন্ধ করা বা গর্ভ দেবী করার জন্য কোন পদ্ধতি ব্যবহার করেছেন হ্যাঁ না পদ্ধতিটি

৩৪। বর্তমানে যাতে বাচ্চা না হয় তজ্জন্ম আপনারা কি কোন পদ্ধতি ব্যবহার করছেন হ্যাঁ না পদ্ধতিটি

৩৫। আপনার/আপনার স্বামীর কোন অসুখ আছে যাতে বাচ্চা না হতে পারে হ্যাঁ না জানিনা

৩৬। আপনি কি আরো সন্তান চান হ্যাঁ না

- ৩৭। আপনি আর কয়টি সন্তান চান ছেলে মেয়ে
- ৩৮। এ বৎসর আপনার কি কোন সন্তান হয়েছে হ্যাঁ না
- ৩৯। আপনার শেষ সন্তান ধারণের আগে আপনি কি বাচ্চা চাচ্ছিলেন হ্যাঁ না ঠিক করিনি
- ৪০। আপনার শেষ সন্তান নেওয়ার পূর্বে আপনি কি কোন পদ্ধতি ব্যবহার করেছিলেন হ্যাঁ না
- ৪১। যদি হ্যাঁ হয় তবে কি পদ্ধতি ব্যবহার করেছিলেন-
- ৪২। আপনার শেষ বাচ্চা হওয়ার পর আর যাতে বাচ্চা না হয় সেজন্য কি কোন পদ্ধতি ব্যবহার করেছেন
হ্যাঁ না
- ৪৩। আপনারা ইচ্ছা মার্কিন বাচ্চ নিতে পারলে কয়টি বাচ্চ নিতেন ছেলে মেয়ে
- ৪৪। আপনি বা আপনার স্বামী সন্তান বন্ধের জন্য কোন অপারেশন করেছেন হ্যাঁ না
- ৪৫। আপনার সন্তানদের পরিচিতি
ক্রমিক নং নাম বয়স শিক্ষা পেশা/কাজ
- ৪৬। আপনার মতে ছেলেমেয়েদের কোন পর্যন্ত পড়াশুনা করা উচিত ছেলে মেয়ে
- ৪৭। আপনি কি মনে করেন আপনার ছেলে-মেয়েরা ঐ পর্যন্ত লেখাপড়া করতে পারবে হ্যাঁ না
- ৪৮। যদি না পারে তার কারণ
- ৪৯। আপনার বাড়ীর কেউ কি অন্য কোথাও চলে গেছে হ্যাঁ না
- ৫০। হ্যাঁ হলে কয়জন গেছে পুরুষ স্ত্রী
- ৫১। কোথায় গেছে
সংখ্যা নাম গ্রাম উপজেলা জেলা সাল

৫২। গ্রাম হতে অন্যত্র যাওয়ার কারণ

পুল ফ্যাক্টর

জমির অভাব

কর্মসংস্থানের অভাব

পরিবার বা গ্রামের লোকের

সংগে বনিবনার অভাব

অন্যান্য

পুল ফ্যাক্টর

চাকুরী

ব্যবসা

বিবাহ

লেখাপড়া

অন্যান্য

৫৩। অন্য কোথাও হতে আপনার বাড়ীতে এসে কেউ কি বসবাস করছে? হাঁ না

৫৪। হাঁ হলে, কতজন এসেছে পুরুষ স্ত্রী

৫৫। কোথ হতে এসেছে

সংখ্যা নাম

গ্রাম

উপজেলা

জেলা

সাল

৫৬। অন্যত্র হতে চলে আসার কারণ

পুল ফ্যাক্টর

জমির অভাব

কর্মসংস্থানের অভাব

পরিবার বা গ্রামের লোকের

সংগে বনিবনার অভাব

অন্যান্য

পুল ফ্যাক্টর

চাকুরী

ব্যবসা

বিবাহ

লেখাপড়া

অন্যান্য

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