5. TRANSFORMATION OF AGRICULTURAL ENVIRONMENT

5.1. INTRODUCTION

Agriculture is main stay of the majority of the people in developing countries of the world like India. For centuries agriculture has been a fundamental occupation of the nation. It has been feeding and is still feeding and will continue to feed the teeming millions of our country. It has also been providing variety of raw materials to the industries and also constitutes a large proportion to our exports. Thus contribution of agriculture is really great especially in the development of the economy. Thus over the period of time fundamental changes have been initiated in agricultural sector with the diversification of crops, changing the combination of crops, the adoption of modern inputs and agricultural techniques. At the same time substantial changes have been recorded in various agricultural aspects including land use pattern, cropping pattern, expansion of irrigational facilities with enhanced and diversified agricultural production together have been transforming the agricultural environment and landuse of the region.

Agricultural transformation is a type of ecological form closely related to the spreading of new ideas and innovations, transformation here refers to the changes in the form of agriculture by adopting the modern inputs, techniques and by orienting and gradually by reorienting it towards commercialization. This has not been observed in the study region as the

emphasis on agriculture is greatly reduced due to urbanisation and industrialisation.

There is no doubt that the agricultural occupation in certain areas of the region has been successfully transformed especially with the adoption of new innovations and technologies suited to this sector. In the country as well as in the study region significant changes have been made in adoptioning the agricultural innovations specially includes the contributions of engineering and refers mainly to inputs which have a physiological effects in increasing timeliness of field operations. The introduction of these innovations has increased the intensity of capital in agricultural production. On the other hand the natural as well as socio-economic environment of the region has been changed with the expansion of urban territory and expanding urban market for agricultural produces.

The pace of urbanization and industrialisation has played a major role in the transformation of agriculture and other associated activities. Urban centres and industrial centres have been accelerating the process by providing the modern inputs i.e. electric and diesel pumps, tractors, iron ploughs and threshers to enhance the functioning and the overall agricultural production. Urban centres have played a vital role in the development of modern technology, which is being intensively adopted by the agricultural sector in many ways. High yielding variety of seeds, fertilizers, pesticides, modern inputs and the economic profitability not only has attracted the farmers but has also encouraged them for the adoption of improved practices. With the help of these modern inputs farmers have successfully changed the existing cropping pattern as per the emerging demands of the urban centre. They have been motivated for adopting the

market oriented agriculture. Impact of systematic agriculture development and various other changes too can be seen in rural urban fringe of the study region. As a result available inputs have largely been used for commercial farming.

Transformation of agricultural environment here refers to the changes in the shape and forms of agriculture by using modern inputs techniques and by orientating it towards the commercialisation. Transformation of agriculture in the regions has been one of the most emerging feature of last four decades. The generalisation on emerging changes, however include many complex variations in processes, attitudes, responses and the participation of the rural people representing the sample villages of the Ahmedabad City Taluka region.

Here an attempt has been made to assess the level of agricultural transformation which has taken place with the adoption of irrigation, chemical fertilizers, HYV seeds, modern inputs, soil conservation and crop protection methods in the Ahmedabad region.

5.2. LANDUSE PATTERN

Land is one of the most important resource of any region. When man uses the land it is called landuse and its type of distributional panorama is called landuse pattern. The agricultural land resources have always played a vital role since time immemorial engaging the largest proportion of the inhabitants of the world. (72, Husain,1982, p.92).

To a great extent the economic status and the progress of a region and/or a country can be gauged by assessing how its land is being used and is properly maintained. The land of a region is considered as a fixed resource

and as extensive assets with many uses, which in the long run yields diminishing returns. Thus the land usage should be in an optimum way by any progressive region and/or country and it becomes possible in a planned manner. (162, Rao,1989, p.28). The main aim of the landuse study is to understand the distribution of land under various uses in the specific geo-physical and socio-economic environmental conditions, and also to improve the cultivation of land, based on scientific methods and techniques without creating conditions causing environmental degeneration.

It has been observed that changes in the landuse pattern of rural-urban fringe area reflects of the changes being made in natural, economic, social and cultural structure of the study region. Rapid technological changes being adopted have created new needs which demand more land as well as new modes of land utilization. In last 25 years land utilization in the study region has witnessed a major changes alongwith the growth of population, diversification and expansion of industrial and other related economic activities. Thus with the marginal adjustments between the land resources and expanding economic activities have caused widespread environmental degeneration in various areas of the region.

With the growing pressure due to the population and economic development, not only the pressure on the available land has increased but the marginal lands too are being cultivated with the induction of modern scientific and technological innovations. As a result use of agricultural land have been gradually but intensively diversified to a higher level.

With the study of landuse pattern, one can know the distribution and use of land in different categories. Similar changes have been witnessed with the

growth of population, and non-agricultural activities. This has struck the transformation of environment.

5.2.1. CHANGING PATTERN OF LANDUSE

To find out the expanding effects of Ahmedabad city Taluka on the nature and composition of agricultural landuse and production, data related to agricultural activities were collected as per the questionnaire designed for the purpose from the villagers residing in the sample villages.

HANSPURA – AGRICULTURAL FIELD

ODHAV – AGRICULTURAL FIELD

HANSPURA – BARREN FIELD

HATHIJAN – AGRICULTURAL FIELD ALONG SARDAR PATEL RING ROAD

Photo Plate 5.1 – Ahmedabad City Taluka Region: Status of Agricultural Fields

Source: Photographed by Scholar

HATHIJAN – BURNT CROPS

VASTRAL – SARDAR PATEL RING ROAD DIVIDING AGRICULTURAL FIELDS AND NEW CONSTRUCTION

HANSPURA – CHANGE OF LANDUSE

HATHIJAN – FIELDS ALONG SARDAR PATEL RING ROAD

SARKHEJ OKAF – BARREN LAND

ODHAV – CHANGE OF LANDUSE

PIPLAJ – INDUSTRY AT THE BACKDROP

PIPLAJ – BARREN LAND

Photo Plate 5.2 – Ahmedabad City Taluka Region: Status of Agricultural Fields

Source: Photographed by Scholar

Table 5.1 - Ahmedabad City Taluka: Comparative Change in Landuse over the years

Taluka	Years	Total Geographical Area	Forest area	Barren and Uncultivable Land	Land under non agriculture use	Cultivable waste land	Permanent fallow land	Current fallow land	Other fallow land	Net sown area	Area sown more than once	Gross sown area
District	1969-70	850726	0.11	10.90	6.41	3.42	2.83	2.39	2.82	71.13	3.72	73.77
District	1976-77	856256	0.81	8.90	7.20	2.79	3.96	7.61	2.98	65.75	5.24	69.20
District	1982-83	856563	1.34	8.44	7.29	2.82	3.90	8.21	0.75	67.25	4.47	70.26
District	1986-87	852310	1.35	8.44	7.74	2.76	3.86	18.07	0.75	57.04	5.50	60.18
District	1996-97	852310	1.34	8.43	8.35	2.68	3.84	8.89	0.47	66.00	8.10	71.35
District	2002-03	774834	1.36	8.54	8.63	3.39	3.60	8.97	0.20	65.30	9.91	71.78
City	1969-70	24760		1.98	34.52	4.54	2.89	4.71	6.27	45.09	4.51	47.12
City	1976-77	28672		1.20	48.54	3.92	1.64	23.92	0.95	19.83	30.10	25.81
City	1982-83	28673	0.00	1.20	50.89	3.92	1.64	19.27	0.02	23.07	4.17	24.03
City	1986-87	24420		1.41	60.85	4.61	1.92	7.74	0.02	23.45	6.29	24.93
City	1996-97	24420		1.06	69.88	2.46	1.52	11.05		14.03	2.25	14.35
City	2002-03	24420	0.00	1.06	74.57	2.46	1.52	7.45	0.00	12.94	2.53	13.27
Daskroi	1969-70	69902		3.52	7.24	2.66	8.18	3.27	2.55	72.59	11.93	81.25
Daskroi	1976-77	69885		1.01	8.40	1.39	8.07	7.78	3.44	69.92	14.59	80.13
Daskroi	1982-83	69887	0.00	1.01	8.44	1.39	8.07	12.06	0.80	68.24	12.72	76.92
Daskroi	1986-87	69887		1.01	11.45	1.50	8.07	33.11	0.64	44.22	6.47	47.08
Daskroi	1996-97	69887		1.01	11.54	1.50	8.07	4.09		73.79	28.27	94.65
Daskroi	2002-03	69887	0.00	1.01	11.85	1.36	8.07	6.34	0.00	71.37	24.44	88.81

Source: District Statistical Outline for Ahmedabad District; 1960 - 2003

5.3. STATUS OF AGRICULTURE

The status of agriculture in sample villages has drastically changed in reference to the level of urbanisation influenced the villages in the last four decades. Asarwa was the first to become the urbanised village with the establishment of cloth mills in early 50's and Danilimbda followed the path.As a result gradually cultivation was discontinued resulting decline in netsown area in most of the villages after they were merged in AMC with the expansion in 1986 (Table 5.1), some of them being Vatva, Odhav, Kali, Ranip, Ghodasar, Ghatlodiya and Memnagar. Major conversion of agricultural land to non-agriculture was done due to the market boom of nineties coveringJodhpur, Vejalpur, Ghatlodiya, Bodakdev, Ghodasar, Memnagar, Odhav and Ranip villages with the implementation of various TP schemes. As a result approximately only 30.0 per cent of cultivable land has remained with the farmers that too in Shilaj, Tragad, Vastral, Piplaj and Saijpur Gopalpur villages. Government has been instrumental for the large scale conversion of agriculture land in Kotarpur village where initially British converted the land for camping and later on remaining agriculture land was converted by AMC to meet the requirement of water works and other projects.

In the villages of Hanspura, Hathijan, Lambha, Piplaj, Saijpur Gopalpur and Sarkhej Okaf 55.0 per cent of total land still under agriculture is managed by cultivators and agricultural labourers. The pace of development has not remained same in Sarkhej Okaf where only 30.0 per cent of the land has been sold. The selling of remaining land too has begun in recent years. At present only 5 to 10 per cent farmers are depending on agriculture. Visalpur on the other hand is still retaining its rural character and has not

been affected by urbanisation. Here about 50 per cent big farmers areowning agricultural land and at least 30-40 bighas are owned by individuals.

During the field work it has been noticed that old fallow lands are being converted at a faster rate as compared to the current fallow land. Almost the complete old fallow land has been sold practically in all sample villages. Still in every village some of the agricultural land still belongs to big farmers who have kept their land as fallow land a waiting for better returns. In Ghatlodiya alone about 155 bigha belong to 4 families followed by Ghodasar, Piplaj, Vatva and Vejalpur with 14-15 bigha, Vrindavan farm of 500 bigha, 50 bigha owned by individual farmers and 20 bighs alone belongs to an MP respectively.

5.4. CROPPING PATTERN

It is the cropping pattern, which is easily susceptible to change alongwith the changes being recorded in agricultural methods, techniques and even the objectives for initiating the modernisation of agriculture. The cropping structure, specially the cropping pattern in a particular region is determined by the soil fertility, soil texture, structure, components of climate, temperature & moisture and also due to changing composition of the socio-economic variables like land tendency, size of holdings, availability of irrigational facilities and the use of modern inputs and accessibility to the market centre.

Without considering the agricultural characteristics like cropping pattern, agricultural planning cannot be formulated. It is a dynamic phenomenon and is changeable, with the induction of modern technology as per the

requirements of the urban society. In fact no cropping pattern is good and stable for all times to come (72, Hussain, 1989, p.116). This also applies to the region under study.

The characteristics of landuse and cropping pattern are influenced by the industrial activities to a large extent. There have been two types of changes in agricultural environment due to expansion of non-agricultural activities i.e. establishment of industries, expansion of commercial activities and urban landuse in the region. One of these is the conversion of agricultural land into non-agricultural uses, and the other is the shift from food crops in to cash crops. Similar changes have been recorded in various sample villages representing different parts of the Ahmedabad city taluka region. Increasing use of modern inputs like irrigational facilities, chemical fertilizers, HYV seeds, pesticides and improved agricultural implements together have played an important role in transforming the cropping pattern in the region.

5.4.1. MOST COMMON CROPS

Wheat in winter, rice in monsoon and bajri in summer are most widely cultivated in different sample villages. While Jowar, bajri, moong, moth and touver are also grown by selective farmers in the sample villages. Vegetables too are grown by farmers having adequate supply of water, while others are forced to take only one Kharif crop due to the non availability of adequatewater during Rabi season. In many villages farmers are using their land to grow only grass commonly known as Lackho. This is how they keep their option open to sell the land as an when one

gets the best price without loosing the returns from the land. Some important crops are grown in sample villages include **Jarayat**; spices, monsoon crops, vegetables; **Bagayat**; fruits, vegetables; **Kayari**; rice , wheat; **Kyari**; Rices, wheat and **Goranu**; jowar, bajri, kathod, kapas in varing conditions prevailing in the villages of the study region.

5.5. IRRIGATIONAL FACILITIES

Irrigation is said to be the oldest applied science used by men across the world. However in the recent past it has emerged as one of the most important component of modern agriculture. It has been accepted that among the modern inputs essential for agricultural development gradually irrigation has become indispensable. The use of irrigation is conditioned by several variables, while low rainfall and its vagaries necessitate the development of artificial means of water supply. Irrigation also becomes essential to have the maximum benefits of the chemical fertilizers, and to some extent, high yielding variety of seeds. On the otherhand, the supply of water is conditioned looking to the nature of terrain, availability of adequate water, resources, and above all the prevailing socio-economic-political situation in the region. The facility of irrigational network being created in Ahmedabad district, city Taluka and Daskroi taluka over a period of time involving the government respective panchayats and private sector has been tabulated in the Table no. 5.2. the table clearly emphasises the increasing role of tubewells, borewells over the surface water source being used to meet the expanding demands.

Table 5.2 - Ahmedabad City Taluka Region: Irrigation Facilities in District, City and Daskroi Taluka

Taluka	Year	Total Irrigated Land (hectares)	Percent Of Irrigated Land To Net Sown Area	Government Canal	Private / Panchayat Canal	Tank	Tube Well	Borewell	Other Facilities (Including Borewell)	Area Irigated More Than Once
District	1960-61	113815	7.36	41.16	0.00	2.93	54.52	0.00	0.00	4.77
District	1964-65	68670	11.5	35.82	1.68	14.11	48.30	0.00	0.08	1.60
District	1969-70	79836	13.1	217.98	0.88	5.31	69.11	2.90	0.00	2.32
District	1976-77	71305	13	37.58	0.00	2.37	46.13	39.08	1.25	26.39
District	1982-83	105274	18	37.14	0.00	1.00	37.47	35.16	0.00	11.63
District	1986-87	108921	22.41	28.90	0.00	0.38	40.66	0.00	41.36	11.29
District	1996-97	155046	27.56	25.30	0.00	1.42	35.68	0.00	0.00	19.72
District	2002-03	141238	25.4	14.16	0.00	1.64	41.27	0.00	0.00	20.18
City	1960-61	7875	24.04	55.33	0.00	3.81	40.86	0.00	0.00	0.00
City	1964-65	3148	25.4	30.30	36.66	0.00	33.04	0.00	0.00	0.00
City	1969-70	2330	20.4	23.35	30.04	2.92	43.69	0.00	0.00	17.08
City	1976-77	2522	44	13.05	0.00	0.00	50.52	32.67	35.29	31.52
City	1982-83	1446	22	8.99	0.00	0.00	61.13	39.28	0.00	9.41
City	1986-87	1163	20.31	14.62	0.00	0.00	50.13	0.00	47.29	12.04
City	1996-97	1959	57.16	0.00	0.00	0.00	25.37	0.00	0.00	4.95
City	2002-03	1583	48.86	0.00	0.00	0.00	28.43	0.00	0.00	5.05
Daskroi	1960-61	26306	17.91	46.34	0.00	0.00	53.66	0.00	0.00	0.01
Daskroi	1964-65	15473	30.2	67.72	0.00	3.62	28.47	0.00	0.00	5.96
Daskroi	1969-70	19129	386	29.37	0.00	1.18	72.07	0.00	0.00	2.68
Daskroi	1976-77	20002	41	48.07	0.00	0.00	37.84	43.95	0.00	29.85
Daskroi	1982-83	29451	62	60.95	0.00	0.00	18.68	32.26	0.00	11.88
Daskroi	1986-87	21392	69.23	60.96	0.00	0.00	21.65	0.00	24.64	7.25
Daskroi	1996-97	43747	84.84	27.73	0.00	0.00	54.17	0.00	0.00	27.05
Daskroi	2002-03	38423	61.9	0.00	0.00	0.00	32.84	0.00	0.00	24.72

Source: District Statistical Outline for Ahmedabad District; 1960 - 2003

However, with the continued improvement in the irrigational methods and the expansion of irrigational network, the relative importance and the hecterage of rainfed agriculture has gradually declined with the development of irrigational facilities, enhanced frequency and their intensity. The traditional irrigational methods has undergone a process of transformation. Irrigational facilities are attempted to make agricultural production safe against drought by providing the required quantity of water as and when required. From the less effective to the inanimate energy sources, traditional means of irrigation, like tube wells, diesel and/ or electric pump sets and canals. Increasing improvement in the nutritional standards, the rapid growth of population and multiplication of industrial production the requirement of food production and agricultural raw materials has steadily increased. It became necessary to introduce some new hybrid crops in order to achieve the objectives of rural development and successfully raising the agricultural growth. The changing objectives necessitate that the modern irrigation technology needs to be adopted.

Because of improved modern irrigational facilities cropping pattern in and around sample villages of the study region has successfully been commercialised. Being an important input irrigation also provides some sort of insurance against the failure of rains in the region. Some of the villages in the region normally, produce only one crop in a year due to the non-availability of irrigational water. In the region high percentage of agricultural land is mainly irrigated by wells and tube wells, owned by farmers.

The main objective of the study is not only to examine the relationship but also to gauge the impact of urbanisation on the development of irrigational

facilities and also to understand and study the changes being made by the agricultural environment.

Numbers of analytical studies have been concluded that still substantial increase in agricultural area and production to a large extent has been achieved in our country, with adequate and greatly assumed dependable irrigational facilities being made available in respective areas, considering the intensity of demand. In addition to this, assured irrigation encourages the adoption of certain agricultural innovations like chemical fertilizers and manures, new varieties of seeds and pesticides etc. These innovations certainly require assured and high doses of irrigational water, and to some extent the region under study also has the similar facilities.

The main sources of irrigation available in the study region include surface water and the supply of ground water. While its frequency mainly is determined by the rainfall regimes, topographic features, terrain and the type and nature of soil.

5.5.1. IRRIGATION METHODS

5.5.1.1. BOREWELLS

The region has monsoon-based agriculture and at times practice to use private borewells as a common source in the area. Farmers with more land do have their own borewells, which at times being rented out to the small farmers on hourly basis. Ground water now is around 215 –245 meters deep which is hardly economically feasible for cultivation. Ghodasar had the benefit of Kharicut canal from all sides of the village

and gets water supply through small channels with 20-25 no.in the village. Vatva is being benefited from Narmada canal and Kharicut canal. Kotarpur villagers use water from Sabarmati River. However restrictions are being imposed by AMC and villagers have forced to discontinue the cultivation of vegetables. Farmers of Piplaj and Saijpur Gopalpur villages use the water from Sabarmati River with help of **fighter pumps**. On the other hand irrigation has always been a problem in Shilaj, Tragad and Vastral villages where people use personal borewells for cultivating limited land while rest of the land has been sold off. Visalpur has recorded an increase in production using the Narmada canal at times without proper permission of lifting water with the help of pumps has become a common practice.

5.5.1.2. TUBEWELLS

Tubewell based irrigation has extensively been used to exploit the available ground water. It has many advantages over the surface irrigation through canals. As it does not involve, expenditure on the storage of water and also on its distributional network. Tube well irrigation does not involve the loss through submergence of large areas of valuable land as reservoirs or creating disturbances as well as the ecological imbalances as are caused by large scale irrigation projects. It is so because private tube wells

serve on small areas of land and the farmers bear the operational cost and decides to use the system when water is really required for the crops.

From the farmers point of view the use of ground water through tube well irrigation is certainly a better option than the surface irrigation because this entirely remains under their own control. Through the tube well water is placed at the disposal of the farmers is and frequently used as and when required.

5.5.1.3. CANAL

Irrigation through canals is adopted where sufficient ground water as well as surface water is not available to meet the irrigational needs. Though it is a major activity but still is not in everybodys reach, that is why government has been gradually developing and maintaining the canal based irrigation system to ensure the supply of water to farmers as per their requirements. Various irrigational schemes have been planned and implemented, where the surface water is stored in rivers, streams, tanks, ponds or in other sources. The supply of water, to demand areas, or to those areas where distribution is possible through the canals. However to a great extent the terrain of the area has been controlling the construction of canals. Still wider area remains out of its reach and associated advantages.

5.5.1.4. OTHER SOURCES

The above study clearly explains that the region enjoys the availability of dependable irrigational facilities. As compare to other sources, dug wells and tube wells have emerged as the main sources of irrigation. Most of the farmers are owning their wells and tube wells. With the increasing need of irrigation and the advancement of agricultural technology the traditional methods of water lifting too have gradually been transformed. The process of water lifting has become operational with the use of electric and diesel pumps, and substantial increase in their number too is recorded

HANSPURA

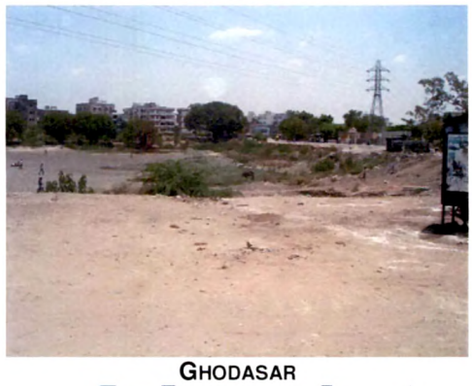
VISALPUR

ODHAV

VATVA

Photo Plate 5.3 – Ahmedabad City Taluka Region: Lakes

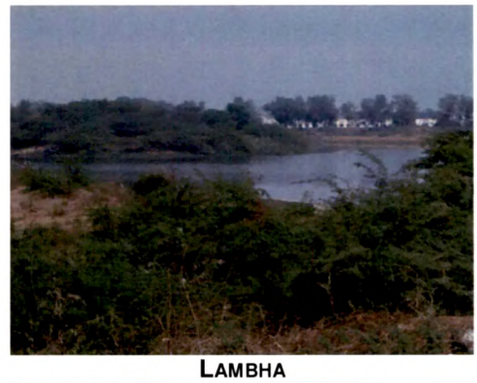
Source: Photographed by Scholar



GHODASAR

SARKHEJ OKAF

HATHIJAN



LAMBHA

SHILAJ

VASTRAL

VASTRAL

VEJALPUR

Photo Plate 5.4 – Ahmedabad City Taluka Region: Lakes

Source: Photographed by Scholar

5.6. MODERN AGRICULTURAL IMPLEMENTS

During the post independence era, the application of mechanical power in agriculture has emerged as a major technical advancement. Although mechanisation simply refers to the use of various devices such as power operated electric pump sets, diesel pumps, iron ploughs, threshers, sprayers and tractors etc. Through mechanisation multiple cropping and per unit farm performance of agricultural land has successfully been enhanced. Mechanisation has also led to the proper utilisation of inputs, like fertilizers, pesticides and water.

With the introduction of high investment, intensive agriculture and multiple cropping system has become essential to ensure that schedules of the farm operations are systematically followed to ensure maximum production with quality. This can only be achieved by using efficient and well developed agricultural machinery and implements. Mechanisation in agriculture is one of those factors, which has been responsible for variations in the level of productivity. The process of systematic and planned agricultural development has been able to enhance the area under cultivation and double cropping also became possible in the larger areas. As a result the overall agricultural production too has successfully been increased.

This is a known fact that the development of agriculture has become possible with the use of HYV seeds, chemical fertilizers, irrigational facilities and modern farm implements. With the diffusion of agricultural technology, gradually traditional methods of agriculture have been replaced by the improved and efficient modern agricultural practices. With

the use of selected traditional farm implements. In the recent years agriculture has been modernised with the use of tractors, threshers, iron ploughs and electric/diesel pumps etc. The impact of technology has positively helped in enhancing the agricultural production. The changes have also being recorded in the life style and living standards of the people living in the rural areas of region. There is a perceptible change in the pattern of land use and from the traditional agriculture, where mostly crops are grown for local consumption to market oriented cash crops. As a result of this in the recent years most of the farmers are inclined to grow market oriented crops with higher value. Earlier to the application of improved technology, the farmers were entirely dependent on nature. These changes have become possible with the use of modern inputs and can be noticed in various parts of the region.

5.6.1. USE OF FERTILIZER AND PESTICIDE

Most of the farmers use only Chhand (cow dung) as manure in agriculture fields, which is good without any side effects. Use of fertilizers and pesticides has been made in last 20 years. Use of various chemical fertilizers and pesticides has reduced due to high costs and nonavailability and to have the required quantity farmers pay additional cost.

Villagers of Hathijan, Kotarpur Lambha Sarkhej Okaf, Piplaj, Vastral, Shilaj and Tragad Villages are frequently using fertilizers to have the immediate benefits in crop production on the advise of gram savak. At times production declines due to the excessive use of fertilizers as has been observed in some

sample villages. Agriculture department has hardly shown any interest in last 2 to 3 years to help farmers as has been expressed by them. In the villages like Piplaj farmers are forced to use double the quantity of urea as compared to other areas to ensure the production.

5.6.2. ADOPTION OF MODERN INPUTS

The available modern methods have gradually replaced the traditional methods of agriculture being practiced in the region. The iron ploughs and/or tractors have replaced the wooden plough alongwith a pair of bullocks. The increasing number of threshers, harvesters and seed drills are being frequently used over the period of time and the adequate supply of water for irrigation in reference to the changing requirement has become the reality of the day across the region. Considerable increase in the use of modern farm implements too has been noticed, throughout the region especially in last 20 years. Some of the industrial units, located within the region are also producing modern machineries are being widely used by the farmers certainly play an important role in transforming the agricultural activities of the region.

Still wooden and/or iron ploughs are widely used for ploughing the agricultural land in the region by migrant farmers. However with the development of mechanisation wooden ploughs are replaced by the iron ploughs and has recorded a remarkable changes in their frequency. Iron ploughs are more durable as

compare to the wooden ploughs and the ploughing of the harder lands to more depth becomes possible. That is why iron ploughs have become more popular due to their reliability and capability among the farmers of the region. This is one of the main agricultural implement widely used throughout the region.

Pumps are the main equipment used for lifting the water. Electric and diesel pump sets are being used intensively in the region for regulating the distribution of water into the fields. With the electrification of villages the use of electric pumps has increased substantially. With the availability of free electricity and/or on subsidise rates being provided by the government. As a result electric pumps, have gradually replaced the diesel pumps. However in last few years due to the non-availability of adequate supply of electricity at the time of requirements farmers are forced also to maintain the diesel pumps also to ensure the supply of water in time and to ensure the production as well as the quality.

Frequent use of tractors has positively helped in ploughing the hard agricultural lands with increased depth. During the green revolution induction of tractors on large scale has become main instrument in transforming the agricultural land. Tractors are costly as compared to other agricultural implements that is why only farmers with large landholding have opted to use tractors. On the otherhand the use of tractors normally depends on the nature and size of the land holdings.

5.6.3. HIGH YIELDING VARIETY

Adoption of high yielding varieties of seeds, chemical fertilizers, pesticides and insecticides mainly depends upon the availability of irrigational facilities. Better assured returns from the HYV seeds depends on the efficiency of the irrigational system. The HYV seeds require more irrigational water as compared to traditional seeds. Hence adequate water has to be made available at various stages of plant growth e.g. germinisation, milk forming, tilling, flour formation and grain filling to achieve the best quality with optimum yield. The HYV seeds give the desired results even if fertilizers are not applied, but have to be supported by proper irrigational facilities. This is how without irrigation the use of other modern inputs become ineffective.

With the expansion of the urban activities the composition of agricultural practices too has changed. Industrialisation has helped in transforming agricultural activity as the commercial and scientific agriculture. With the application of modern improved technologies, the existing traditional methods of agricultural practices have gradually been replaced by the commercial agriculture supported by modern inputs. New modern agricultural technologies include the use of increased number of farm machineries and other agricultural implements, virtually are the outcome of the speedy industrialisation and urbanisation.

It is a well known fact that seeds are an essential input of agriculture. Without some technical knowledge there is hardly any difference between the HYV and local (traditional) seeds. More technical knowledge is required for using the HYV seeds, supported by fertilizers, pesticides, irrigation and modern implements. Thus, the use of HYV seeds is controlled by socio-economic as well as environmental factors. The acceptance of HYV is the result of the interaction between man with his Geo-physical, socio-economic and cultural environment.

Among the economic factors, which to a extent influences the use of HYV seeds include the hi HYV seeds are costly than the local seeds that is why the pace adopting HYV by the small and marginal farmers has been very slow. Among the social factors, education, awareness and technological knowledge have become the main controlling factors. The educated farmers have adopted the improved seeds in the areas where irrigational facility exists and agricultural land is fertile.

5.6.4. USE OF MODERN INPUTS

With the adoption of high yielding varieties of seeds irrigation becomes the first and the foremost requirement as the main supportive input, which requires a systematic and scientific water management. Dependency on ground water and canals too has increased. With the availability of electricity it has been made easy with the use of electric pumps. With adequate water is made available for irrigation alongwith required chemical

fertilizers, insecticides, pesticides and other important inputs collectively helps in enhancing the total production in the area.

Dependency on ground water and canals too has increased. With the availability of electricity the use of electric pumps has become easy.

5.6.5. USE OF CHEMICAL FERTILIZER

Use of chemical fertilizers in agriculture has emerged as an essential component irrespective of the availability of irrigational facility. Organic fertilizers like sewage treated material and cow dung are used even without proper irrigation. The use of chemical fertilizers like Urea, Super phosphate and D.A.P. in last few decades certainly has helped in enhancing the production but requires dependable supply of adequate water through developed irrigational network. Thus the frequency and intensity of their use mainly depends on the availability of water. High yielding varieties of seeds require both adeuate availability of water and fertilizers at a proper time and in adequate quantity. Hence the use of chemical fertilizers is either restricted to the crops grown during the rainy season or where irrigational facilities are available during the Rabi season.

5.7. LANDUSE, POLLUTION AND DEGRADATION

With the growing population and to meet the increasing demands for food and other requirements pressure on the agricultural land too has been increasing. To have the maximum from the available agricultural land, available modern inputs and technologies have been successfully adopted by the people. However, over the period of time certain environmental problems too have emerged in various parts of the region. The rich agricultural land has gradually been polluted and/or degenerated and at places even degraded due to the excessive use of irrigation, the increasing use of polluted water for irrigation, imbalanced and excessive use of chemical fertilizers and pesticides and improper and intensive use of modern machinery. Dumping of agricultural and urban wastages on the adjoining agricultural fields also has resulted the degeneration of agricultural land causing decline in crops yields as well as quality of crops.

Increasing problems related to availability of the labourers in the area too has forced the farmers to start using tractors and other machinery to facilitate agricultural activities. The excessive and intensive ploughing of the land has enhanced the removal of the upper layer of productive soil due to the accelerated erosion and/or weathering. As a result decline in the thickness of the agricultural land and soil, loss of fertility and ultimately the productive capacity of agricultural land has become evident in many villages.

In most of the villages fertilizers and pesticides are being used without any discrimination and the production is being adversely affected. Fertilizers have become the necessity of the day in the market-oriented commercial

farming. During the cropping season farmers gradually enhance the quantity of chemical fertilizers to be used in the recent years. Unfortunately the output has start declining. This clearly indicates the decline in the fertility of soil ultimately affecting the agricultural output as well as the quality of products.

The urban and industrial wastes dumped on the agricultural land generate various insects and germs and are affecting the quality and quantity of the agricultural crops grown in the villages. Due to the deteriorating environmental conditions it becomes difficult to protect the crops from various enemy insect and germs, which are frequently growing. Thus it has become essential to use different types of strong pesticides for protecting the crops. Unfortunately with the frequent and excessive use of various types of pesticides pests have become resistant and the agro-environment has also been adversely affected. As a result with the excessive use of pesticides even the useful friendly pests of soils too have been adversely affected and/or destroyed and the quality of soil is affected. On the other side, with the repeated use of the similar pesticides even by the small farmer pests and insects have gradually become resistant.

The dumping of urban waste in and around the agricultural fields the yield has been adversely effected. Fine-grained particles of wastes being dumped on the agricultural land are gradually decayed and are mixed with the soil is percolating with rainy or irrigation water into the lower layers of soil polluting the soil even at the protected layers. Polythene and other harmful materials and products too are mixed with soil. Gradually such diversified wastes generate harmful germs and agricultural crops are adversely affected with infection. The burning of wastes, polythene,

collected by the local people from the agricultural field also creates air pollution. The incident of land pollution has been reported from the region. The inadequate and improper drainage also causes water logging which brings salts and mineral on the surface and gradually makes the land saline and barren. With the use of hard water for irrigation problem of saline and alkaline has become more evident in the recent years. With the excessive use of irrigation, the upper layer of fertile soil is removed, whereas in some areas of the region the problem of water logging too has increased. Degeneration of soil fertility due to water logging too has become a common feature due to frequency of irrigation supported by electric/ diesel pumps without considering the drainage problem and that of soil salinity and alkalisation too is becoming more evident in certain parts of the region. As the water evaporates, it leaves behind salt particles at the top of upper layers of the soil and start causing soil pollution not only to the natural vegetation but also to the agricultural crops ultimately disturbing the prevailing eco-system of the region.

During the field survey it has been recorded that most of the farmers have not shown much interest in using the chemical fertilizers and pesticides to enhance the crop production. Of course they use polluted water for irrigation due to the easy accessibility and do not use fertilizer and pesticide. Thus emergence of diseases in the crops and decline in their fertility as well as production has been noticed in different areas of the study region.

On the other hand with the increasing pressure of urban centres to provide the space for various expanding activities gradually the agricultural land

has been transformed into non-agricultural land to meet the needs of residential and/or commercial areas as has been recorded from the region.

As compared to the emerging problems the gap between the crop in the sample villages gradually has recorded a declining trend in agricultural production and their hecterage. Farmers have also expressed that in last few years the production of certain crops has not increased inspite of the repeated use of HYV, fertilizers and pesticides. In fact due to the frequent and excessive use of various inputs in a highly unsystematic way the available agricultural land has start degenerating due to the increasing pollution. Even in certain pockets it has degraded and fertility of the soil has declined. With the frequent use of these inputs not only the quality of soil is effected but the quality of available water too has been effected. Chemical fertilizers and pesticides, which are being used, and are dissolved with the irrigation and rainwater reaches to the nearby water bodies and pollutes the water.

In some of the areas even the sewage water is being used for irrigation due to the non availability of freshwater and their has a harmful effect on the water bodies of the nearby areas. As the waste water is also harmful for the aquatic life which are useful for the survival of natural vegetation and human existence along these sources. It has also been found that due to excessive use of wells and tube wells for irrigation, decline in the water level has been reported, and the shortage of water in villages is becoming a regular feature.

With the increasing pressure of population and their demands, agricultural environment has been transformed. The cropping pattern of the region gradually has shifted

To meet the expanding demands for various crops farmers of the region have start using highly, advanced technologies to ensure the enhanced and better agricultural output. However along with these achievements some of the hazardous problems causing agro environmental degeneration too have emerged due to the accumulated effects of the modern inputs and technologies. Thus, efforts have been made to control the side effects of the modern inputs on environment as well as on human health. Proper guidance should be provided by the government and the use of organic fertilizers and environment friendly pesticides have to be encouraged to control the negative effect of chemical fertilizers and pesticides so far intensively used by the local farmers to enhance the agricultural yields.

5.7.1. LANDUSE CHANGES

The trend of land conversion started since 1932 when various mills were established the eastern side of Ahmedabad. Initially the land was given on lease and later was rented out. The rent that was decided at that time was far more than agriculture production and the money earned from it. Land was initially sold considering the social obligations and other financial needs as sustainability in cultivation became difficult. This process slowly started affecting other villages like Danilimbda and increased with few consecutive droughts. Ghodasar also saw industrial growth, agriculture got subsequently reduced due to pollution in Kharikut canal. This reduced land value and landuse remained only residential. In Kali village land was given to Railways, Digvijay Cement & Gujarat Steel Tube Company. Kotarpur Agriculture land was taken over by AMC for Kotarpur water

works and later was sold to Airport Authority of India, villagers whose land was taken were not given proper compensation for the land. Odhav land was taken by Vyapari Maha Mandal and Odhav GIDC at the rate of 60 paisa to 1.5 Rs./m^2 from the framers and has been further sold to individual industrial units at astronomical prices. In Tragad 20 years back 1.08 km^2 was acquired by housing board and, nothing happened so the land went back to farmers who have now benefited due to the escalated land prices. Vastral is divided by Sardar Patel ring road and has seen development on the western side of the road while eastern side largely remains suitable for agriculture is also neglected. With the formation of TP schemes farmers fear the Final Plot system that they would lose their land they have started selling land at very cheap rate. It is observed that if the land in not sold by the farmer then there is no change in the progress of TP scheme, i.e. first buy cheap land from farmers who are ignorant about TP schemes and is sold at higher prices. Vejalpur too has seen this phenomenon change where landowners have suffered and are now forced to work as unskilled labourers on their own land after they sold land at very nominal rates through brokers, etc or to people who bought land for investment purpose are now the real beneficiary of the price rise in the area.

Saijpur Gopalpur and Piplaj have seen many illegal process houses flourishing and are polluting the region has reduced crop production and the rate of land. Land is sold to industries only

where residential schemes are not proposed. Two to three new factories are being established in Piplaj. Some process houses include Shanti Process House, Advance Petrochemical, Orke Fabrics, Navyoug, Chiripal, Bharavnath Process House, Rajesh Process House, Ganesh Textiles, Shalin Textiles and Kankaria Textiles, etc. The region is confronting with some major problems like the depleting Ground Water level which has gone down from 122 meter to 245 meter, industries have many bore well which run 24 hours a day, Very high pollution levels in the air with black particulate matter floating round the clock. Shanti Process House was started 25-27 years back. Since then about 70 factories have been established on agricultural land of Saijpir-Gopalpur and Piplaj villages without proper permission. Reverse boring has become very common in factories, Groundwater is polluted and impact can be seen in the form of red colour and has a pungent smell. A lot of land is burnt and not even grass can grow during monsoon. Villagers were ignorant about the factory, what products were made and people are not aware of such changes. Due to pollution the production has reduced. People have stopped cultivating and as a result there is a growth of "ganda bawal" in the village land. In Vatva GIDC purchased the land from farmers at the rate of Rs10/sq.yard and now selling the same land for Rs 3000/sq.yard. Issue remains if the purpose of the land purchased changes then the land should go back to the original owner. Land acquisition officer in GIDC monitors the transaction

of the land is given on lease, if there is a change in size, motive then GIDC cannot sell the land. The agricultural land is from gam talav and the rest is with GIDC which has been sold at very low price to Government for the construction of highway.

Villages being benefited most include the ones located on the western side of Ahmedabad city namely Bodakdev, Ghatlodiya, Jodhpur, Vejalpur and Memnagar. Personal khadas of villagers were used for construction of residential schemes and commercial spaces. For example lakes of these villages are being filled up and used for various residential schemes, government buildings, roads and as party plots etc.

Initially farmers were not aware of the Development Plans and their implications on land rates. Builders had the advantage as farmers have been exploited due to the disparity in rates. Land belonging to R3 zone (construction of 150 sq yard in 1000 sq. yard space permitted) of Development Plan 2011 and TP schemes have under gone total change in landuse and is fetching handsome rates for every yard of land. Land racket exists between MP, MLA, baurocrats, ministers and brokers, etc who decide the degree of change that is coming in any village. Small farmers are left with nothing and sustainability has becomes a problem. They are forced to sell the land which government would buy after paying minor compensation to farmers. Livestock is facing grazing problem as the gaucher land has declined which has been taken over for slum relocation program.

5.8. DAIRY

The region under study has emerged as the major urban market for the various dairy products which are perishable in nature and requirement direct accessibility. That is why they cannot be transported to the long distance. That is why most of diaries and poultries developed around the urban centers are fully depend upon the availability of fast dependable transport facilities and urban market.

The expansion of the dairy activity has been favourably supported due to growing urban activities in the region. This has also been due to the availability of dependable transport facilities and accessibility with the market places and through metal roads. Thus, the above discussion clearly explains that the living environment of the rural area in the region has been transformed due to the increasing impact or urbanisation and modernisation.

The strong traditions of owning livestock in villages is seen to be fading out as has been witnessed in most of the sample villages. Reasons for this are many; along with increase in the level of urbanisation shrinking space is appearing to be a big problem for keeping them. There has been a pressure from the government which is converting goucher land of the village for different purpose, reduction in open space, illegal encroachments, thus reducing open pastures being used by cattle as grazing areas. On a personal level people are converting their cattle areas into small houses and rooms which are then rented out. Some villagers are sustaining with cultivation of grass only for namesake on agricultural land.

Maintenance cost of the livestock has been escalating in the recent years as cost of grass has gone up from Rs 2/kg to Rs. 10/kg. Similarly the kharkapass has gone up from Rs. 300 to Rs. 1000. resulting in selling of livestock, this is catching up in villages like Bodakdev, etc. Availability of these in quality and quantity, in the market in Ahmedabad is also difficult so it is bought from Khoraj. Average expenditure on buffalo is about Rs.300-400 and for cow is about Rs. 200. Veterinary doctor is in Kasindra, doctor from dairy in Changodar are also available at a fee of Rs. 50/visit.

There are still some villages where there is some profit like in Hanspura where milk is sold to Indira colony and Naroda, Visalpur has a co-operative society for collection of milk and in Saijpur Gopalpur milk is taken by private business men for reselling. In village like Sarkhej Okaf where land parcels are still large cattle are kept in the fields and are not used for ploughing but kept just for personal use. There are virtually no livestock left in Asarwa, Ghatlodiya, Ghodasar, Jodhpur, Kotarpur, Ranip, Memnagar, Vatva, Vejalpur villages. In these urbanised villages now people prefer dairy milk and other products. The villagers do face the severe problem of cattle being stolen especially in Asarwa and Kali villages. The stolen cattle are taken to Nandasan ahead of Bavla.

Over all the milk prices have gone from Rs.3-4/litre in the past to almost Rs.25/litre depending on the urban area it is accessible. In theses times the earning is about Rs. 25,000/monthly. Livestocks give good rate for milk but milk production has come down from 8-10litper day to 3-4 litre/day.

HATHIJAN

KALI

Photo Plate 5.5 – Ahmedabad City Taluka Region: Livestock

Source: Photographed by Scholar