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Linking Industrial Growth with Rural Economy:
A Case Study of Ankleshwar Industrial Estate in Gujarat

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Abstract

Industrial Estate Programme is one of the important policy interventions for promoting industrial development in the backward regions. The experience, in most parts of the country however, suggest that it is generally difficult to develop industrial estates in backward regions, and if developed they remain more or less, as islands of growth with perpetuating backwardness in the peripheral regions. To overcome this, Government of Gujarat had initiated a Project Linkage Approach with special emphasis on providing employment to the local community. This paper tries to examine the impact of industrial growth on the peripheral economy of one of the largest industrial estates in the southern part of Gujarat. It is observed that while industrial growth has exerted positive impact in terms of workforce diversification, literacy and level of urbanisation etc. its impact on rural agricultural economy is rather limited, as the employment linkages have benefited mainly the landless households. This is perhaps because a large proportion of the industrial employment is of a non-permanent and informal nature, which is not attractive enough for members of the landed households. Strengthening the local linkages therefore, would necessitate improving the conditions of employment on the one hand, and enhancing basic investment in agriculture on the other.

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I. INTRODUCTION

1.1 Induced Industrial Growth

Rapid industrialisation has been viewed as a prime mover of the economy in Gujarat. Separated from the erstwhile Bombay state in 1960, the policy makers had soon realised the need for preparing a sound industrial base so as to avoid the backlash effect from Bombay - the then growing industrial capital of the country. Widening this, rather narrow, industrial base by tapping the potential industrial capital (which otherwise would shift to Bombay because of the geographical as well as cultural links with Gujarat)[1] was thus the immediate policy concern in the state. A two-pronged approach consisting of (a) launching large scale enterprises that were almost absent in the core sectors like power, cement, fertilisers, oil & natural gas etc.; and (b) developing physical infrastructure through industrial estates, especially for small scale industries, was thought to be the crucial strategy for promoting industrial growth in the state. It was expected that while the former will create nucleus of growth in select places, the latter will spread the industrial base across wider space including the rural backward regions.

Over time the state has achieved major strides in terms of various facets of industrialisation. These are, higher rate of growth compared to that for all India; changing commodity composition from the traditional products (i.e. textiles) to non-traditional (i.e. chemical industries); a dynamic scalar structure with interlinked large and small scale sectors [Shah, 1990]; and spatial diversification with emergence of the "silver corridor" in coastal Kachchh-Saurashtra region, which hitherto, was industrially backward [Hirway, I. and A. Shah, 1998].

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[1] During the erstwhile Bombay state, Gujarati entrepreneurs had a very strong hold on the Industry Associations like Bombay Chamber of commerce. Such linkages could play a crucial role in deciding destination of the potential industrial investment.

1.2 Islands of High Growth

The pattern of industrial growth though, impressive in several ways, has remained selective in geographical spread and also isolated from the peripheral economies. At times, the growth has also acquired extractive or exploitative character vis-a-vis the local economies. For instance, by 1996 about 62 per cent of the total investment and 46 per cent of the employment in manufacturing sector in the state was concentrated in the top three districts [Awasthi, 1998]. The share of the three districts at the bottom is about one and three per cent respectively.

Apart from regional disparity, the recent trends in some of the mineral based industries suggest that while the industries draw on the important natural resources like land and water - that are generally scarce in the region, their contribution to local economies is rather limited. Most of these industries are capital intensive in nature and have forward linkages that operate beyond the regional boundaries [Hirway, I. and A. Shah, 1998]. This industrial growth is likely to have generated significant negative externalities in terms of environmental degradation, unplanned urbanisation, cultural invasion and consumerism. In the process, the socio-economic fabric of the peripheral economy is likely to have further disintegrated rather than getting strengthened through expansion of economic opportunities and productive investments in the region.

The above scenario seems to have emerged despite the fact that the two-pronged approach for inducing industrial growth had laid special emphasis on developing rural backward regions. Pertinently, the strategy has failed to generate a proper percolation mechanism mainly because of its lopsided approach, which focused merely on physical infrastructure without linking it with the social needs of formation of human capital and natural resource development for enhancing agricultural base. The present scenario in Gujarat thus reflects a typical dilemma of a developing economy, experiencing rapid industrialisation and, at yet not able to evolve a mechanism for ensuring sectorally as well as regionally balanced growth. It is therefore, useful to understand the pattern as well as the process through which

industrial growth exerts its influence - both positive as well as negative on the peripheral economy.

The present study tries to look into these aspects in the specific context of the industrial estate programme, which ideally, could have worked as a policy instrument for strengthening the local linkages, and helped in mitigating the adverse impact of industrial growth in the surrounding physical-social environment.

1.3 Industrial Estates in Gujarat: Genesis and Evolution

With the central focus on creating physical infrastructure, the Government of Gujarat initiated the industrial estate programme (IEP) by incorporating Gujarat Industrial Development Corporation (GIDC), an autonomous organisation, in 1962. The economic rationale underlying the establishment of an industrial estate is to create a minimum quantum of social overhead capital without which directly productive activities cannot take place (Hirschman, 1958). If established properly, industrial estate can provide strong inducement to investment because of the potential scale as well as agglomeration economies (Sanghavi, 1979; Pradhan, 1985).

In India, the idea of IEP was initially floated by the erstwhile Bombay state, which tried to encourage Poona Municipal Corporation for developing an industrial estate, to help dissipate the growing concentration around Bombay city. While this idea did not materialise in Poona, it however encouraged the then Government of Saurashtra state, now part of Gujarat, to develop an industrial estate in 1955 at Rajkot - the first such initiative in the country [Sanghavi, 1979]. After the formation of the state, the programme was further activated, and Gujarat became the leading state in its implementation. The immediate focus was on attracting industries from Bombay and other places to southern parts of Gujarat, having locational advantages for industrial growth [Nagaiya, 1971]. As a result, the first few industrial estates were located near the prime locations like Ahmedabad, Rajkot and also near the entry points from Maharashtra[2]. Subsequently, the programme was spread widely

[2] The choice of Vapi is particularly significant in this context. For further details see, Gorter (1996).

across the state with a dual objective of (a) expediting the growth in the `high potential' regions; and (b) initiating industrial activities in the rural backward regions.

In the long run, GIDC has made significant achievements, both quantitatively as well as qualitatively. Starting with only one estate in 1962, the total number of estate has gone to 230 of which 122 estates were fully developed by 1995-96 [GIDC, 1996]. Together these estates had about 21,000 units of which approximately 16,000 were functioning with an estimated employment of about 2.8 lakh persons [GITCO, 1996]. Till 1995-96, GIDC had acquired about 21,000 hectares of land, which works out to be slightly more than 0.2 per cent of the net sown area in the state. This was used to develop 12,291 industrial sheds along with 12,822 housing units.

In terms of regional spread however, the achievements were fairly limited. Although, the IEP covered all the 19 districts in the state, the spread was quite uneven. Table 1 provides district-wise distribution of the total 230 estates by status of development, size and locations. It is observed that of the 122 fully developed estates, more than one third are located on the Baroda-Valsad tract. In terms of number of units, the region's share in 1995-96 was 56 per cent, which increased significantly from 35 per cent in 1987. To an extent this suggests better health of the units as indicated by higher proportion of functioning units in this region. Moreover, there were 49 medium and large estates of which 43 per cent belonged to the above region. The trend, of late, however seems to be changing in favour of Saurashtra-Kachchh region. This is reflected by the fact that of the 108 estates in pipeline (i.e. developing+sanctioned), 48 estates are to be located in this newly emerging "Silver Corridor" (40 in the West zone+8 in Kachchh). Of course, most of these (i.e. 36 out of 48) are smaller estates. Overall the regional scenario depicts a highly concentrated pattern of IEP. For instance, it is estimated that[3] about 35 per cent of the industrial units, 44 per cent of the employment, 49 per cent of the investments and 50 per cent of the production has taken place in the top five states with respect to each of these indicators [GITCO, 1996].

[3] These estimates however refer to a sample of 16,000 out of the total 21,000 industrial units in all the estates. The method of sample selection, however, is not very clear. To that extent the estimates can be treated as tentative.

Notwithstanding the regional concentration, GIDC has made special efforts to reach rural backward regions. For instance, of the total 230 estates, 96 are located in the rural areas. What is striking is that nearly half of these rural estates were located in the industrially developed tract between Baroda and Valsad. This suggests that the IEP, at least in the developed regions, does have significant scope to influence the economies in the peripheral regions. In fact, GIDC, overtime, has undertaken various measures to strengthen the positive impact of IEP on the rural economies. Some of the important measures include promotion of the first generation entrepreneurs, development of township with provision of basic amenities, recruitment camps, and product specific clustering especially for rural artisans and environmental protection measures.

Despite the special efforts to spread the impact of IEP in the peripheral region (both extensively as well as intensively), the achievements at least till the early seventies, were not encouraging[4]. The experience in Gujarat suggest that the IEP might be a useful policy instrument for promoting industrial clusters in the selected high potential regions at a faster rate than otherwise. Moreover, the units located in these prime locations do perform better than those in the other estates thus, consolidating the existing potential for agglomeration economies. However, the programme has not been effective in terms of shifting the industrial location to the backward regions having low potential for growth[5]. In a way this confirms the

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[4] For instance, Kashyap *et al* (1976) observed that "industrial estates in Gujarat, rather than being integrated with the local economy, showed material use linkages that were far flung and in no way different from the large scale enterprises. In particular the large industrial estates and those located near the major industrial centres were generally found to be linked with the national economy.... This made us to doubt the efficacy of industrial estates programme for promoting the development of backward regions as such". A similar observation was also made in a study by Index-B (undated) which noted that although industrialisation in the backward talukas had helped to realise sectoral shift in the local economy, the employment and investment linkages were rather weak.

[5] This has been evidenced by the fact that many of the industrial estates in the backward regions have remained almost non-functioning; the industrialists might have shown initial interest only to tap the incentives and subsidies. But, later on

general experience that industries cannot be developed "anywhere and everywhere". It becomes all the more important to realise that industrial growth, wherever it takes place, should create intensive impact at least in the peripheral economy which in turn, can generate further impetus for growth within the rural agricultural economies. Realising the significance of generating the effective percolation mechanism, at least in the limited peripheral area, Government of Gujarat initiated a Project Linkage Approach on a pilot base, in 1981. This was the maiden effort, in terms of comprehensive approach for development of peripheral economies, and hence, a landmark in the evaluation of IEP in Gujarat.

1.4 The Project Linkage Approach

The Project Linkage Approach was a pro-active response to an empirically observed reality that although, industrial development in various concentrated pockets of the state generates substantial employment opportunities for un/semi-skilled workers, these opportunities however do not reach the unemployed youth even in the immediate periphery of industrial estates. *Prima facie*, the approach has two important limitations. First, it takes a rather simplistic view of the industrial labour market especially the significance of migratory labour and prevalence of labour contractors. For instance, it was assumed that if adequate availability of skills, transportation and housing facilities are ensured, demand for local labour could be created by persuading the employers. This in fact overlooked the complexity of the existing segmentation as well as the exploitative nature of the labour market both in the organised as well as unorganised industrial sectors[6]. The second limitation pertains to the narrow context in which linkages are defined. While it emphasises the significance of income multiplier, it however assumes that the additional income, apart from meeting basic consumption as well as welfare needs, will automatically induce productive investments in agriculture and allied activities. This approach

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failed to start their production units. Industrial estates in Bamanbore and Dhoraji are some of the recent instances in this context.

[6] It is widely recognised that a substantial part of the workforce in the organised industrial sector belongs to informal labour force.

overlooked the fact that private investment in agriculture needs to be preceded by basic investments in land, irrigation, input-supply and information support services. In absence of this, farmers especially those operating under uncertain agronomic conditions, may not prefer to channelise their savings in agricultural sector. Rather, there are greater chances that a sudden flux of cash income may lead to conspicuous consumption or, at best promote self-employment in tertiary sector. The situation could be still worse if large number of farmers lose their land for industrial uses.

The project linkage approach therefore, should be viewed as only a first step towards a comprehensive strategy of regional development with industrial growth as the major driving force. This could be achieved provided, co-ordinated efforts are put up by the various agencies viz; government departments, GIDC, industries associations and village panchayats or people's organisations.

It is in this larger context of industrial linkages that the present study tries to examine the impact of Ankleshwar Industrial Estate, which is one of the largest industrial estates, located in the erstwhile backward tribal region in Bharuch district. By now the estate has acquired a fairly matured stage in terms of its age and size hence, offers a good case study for understanding the linkages in its peripheral economy. The analysis is based mainly on primary data collected from households in two villages - one on the fringe of the industrial estate and another at a distance of about 10 kms from the estate. In all 114 households were covered under the survey.

The paper is divided into four sections including the introduction. Section 2 deals with the changing profile of the region surrounding the Ankleshwar industrial estate. The purpose is to examine in a comparative framework, the extent to which changes taking place in the study region is different from that in the other industrially developed pockets in Vadodara and Valsad districts, which also have large chemical based industrial estates. Section 3 presents the findings of the household survey. Section 4 summarises the major findings and draws policy implications.

II. INDUSTRIAL DEVELOPMENT IN ANKLESHWAR: A COMPARATIVE ANALYSIS

This section seeks to examine evolution of Ankleshwar Industrial Estate (AIE) in a comparative perspective. The idea is to understand (a) what was the socio-economic milieu within which the AIE was set up and, how it has changed over time? (b) What were the major factors/events that shaped the particular trajectory of the AIE's growth? and (c) Is the developmental pattern experienced by the AIE different from the other industrial estates? This analysis will help us in not only placing the case study in its right context but, will also help in understanding the larger processes of which the growth of the AIE is an integral part. This is important in order to gauge the impact of the policy interventions especially, GIDC's role in promoting industrial growth and its percolation into the peripheral economies.

2.1 Ankleshwar Industrial Estate: Trajectory of Growth

Ankleshwar Industrial Estate was set-up by GIDC in 1971. It is located in the tribal-backward region of Bharuch district in South Gujarat. Apart from being an erstwhile industrially backward district, the region is also characterised by subsistence agriculture. This is due to two important factors: (i) adverse agro-climatic conditions with a large proportion of land affected by salinity; and (ii) substantial tribal population with marginal landholdings with limited access to the forest resources within the region. As a result, the district, till before the advent of industrial growth sector, was marked by high incidence of inter-district migration. Providing employment opportunities to a large segment of under-employed agricultural labourers and the educated youth from the peripheral region was one of the important objectives for setting up the industrial estate in this region. Given the availability of water (from Narmada river) and proximity to the sea (hence, a convenient outlet for effluent disposal), the location was strategically selected for establishing chemical based industrial units in the estate (Index-B, undated). To an extent, the AIE was planned to extend the outreach of the upcoming Vapi Industrial Estate, which was emerging as a major concentration of chemical industry, finding an alternative location from Bombay (Pieter, 1996). Although, the estate was designed mainly for locating medium and large scale chemical units, it also attracted

a large number of small scale and tiny units in the traditional industries like textiles, engineering, and food products (Shah, A. and V. Kathuria, 2001). Together these industries were expected to generate significant employment opportunities - direct plus indirect.

Initially, the AIE took a longer time to pick up the momentum of growth. For instance, during the first six years, i.e. till 1977-78, there were only 31 units, employing around 600 workers. Compared to this, the growth in the subsequent four years was fairly rapid. By 1982, the number of units had increased to 257, which is almost eight fold, along with a ten-fold increase in employment. The momentum of growth continued further and by mid eighties, the AIE became the fourth largest estate (in terms of number of functioning units) in Gujarat. In 1995-96 AIE had moved to the third rank in terms of number of units; and second in terms of value of investment, production and number of employees. The first rank in terms of all these parameters however, is still retained by Vapi Industrial estate.

2.2 Growth in a Comparative Perspective

The growth of the AIE is particularly impressive in comparison with the other estates in the same tract between Baroda and Valsad, the major exception being Vapi. Table 2 provides comparative picture of the selected industrial estates in Gujarat. It is observed that between 1981-82 and 1995-96 the growth of AIE in terms of number of units has been fairly rapid not only in comparison to the already developed large estates in the region like Vapi and Makarpura but also in comparison with some of the relatively smaller estates like Umbargaon and Nandesari.[7] Moreover, in terms of area, the estate acquired larger land per unit as compared to Vapi, Umbargaon and Makarpura. To an extent, this reflects a planned approach for a comprehensive development of the estate, which more or less was based on the concept of a township.

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[7] An important factor, which deserves special mention at this stage, is the incentive policies, which in 1977 had included Bharuch district in the list of the backward areas eligible for special incentives and subsidies. Incidentally by then, these subsidies were withdrawn from Vapi and Umbargaon.

Another important feature is the higher proportion of large and medium scale units in AIE. *Prima facie*, this would imply (a) relatively less scope for the inexperienced/untrained labour force from the peripheral economy; and (b) special need for promoting skill formation processes to match the industry's requirements. Another major implication of having greater presence of the large and medium scale units in AIE is that, in the event of closure, of the industrial units, a large chunk of workers would become unemployed, all of a sudden. This is perhaps, what seems to have happened in AIE since the mid-nineties.

2.3 Changing Socio-Economic Scenario in the Region

The industrial growth of the major industrial estates in Baroda-Valsad region is likely to have influenced the socio-economic environment, which even otherwise, is undergoing significant changes over time. While it is difficult to establish a one-to-one relationship between these two processes, it may however, be useful to examine these changes in a comparative perspective so as to get a better understanding of the specific impact of AIE in the surrounding region. This sub-section looks at the secondary data of 1981 and 1991 for the three districts viz; Baroda, Bharuch and Valsad in a comparative framework. Subsequently, it compares the socio-economic profile among various talukas in Bharuch, and then among villages within the vicinity and at distance from Ankleshwar.

Comparison at District and Taluka Level

Table 3 provides information about the demographic variables, physical and social infrastructure and agricultural productivity for the three districts. The important observations emerging from the table are: (a) population growth is highest in Valsad followed by Baroda and Bharuch. This growth is positively associated with diversification of workforce reflected in larger proportion of workers in non-agricultural activities, which again, is highest in Valsad; (b) the increased opportunities for non-agricultural employment seems to have attracted in-migrants to these districts as indicated by the constant or lowering of sex ratio in these districts

as against a marginal increase observed at the state level; (c) the industrialisation process does not seem to have exerted significant adverse impact on net sown area; (d) there has been an increase in the average productivity of some of the major crops grown in these districts; and (e) there has been a significant improvement in the infrastructural facilities that are particularly better in the three districts vis-à-vis the state average.

Overall, the above observations suggest a positive impact of industrialisation in the region. The impact however, is more favourable in Valsad where relatively faster development was experienced both in industry as well as in agricultural sector. Compared to this, Bharuch is yet to catch-up in terms of most of the indicators (except for literacy rate) as compared to the other two districts. The evidence on relative growth does suggest that Bharuch is catching up with the other two districts in terms of the various developmental indices. What is more important is that the sectoral development (except for agriculture) is more broad based across talukas in Bharuch vis-à-vis Valsad (Table 4). It is observed that between 1981 and 1991, most of the talukas in Bharuch have improved the indices especially in the case of industrial development and education. This phenomenon is not so widespread in Baroda as well as in Valsad. This is reflected in the significant change in workforce structure among talukas in Bharuch as compared to that in the other two districts. Table 5 indicates that 6 out of the 11 (i.e. 45 per cent) talukas in Bharuch have experienced significant increase in non-agricultural employment. This compares better with the talukas in Baroda and Vapi districts.

Together the evidence suggests that Bharuch, which joined the process of rapid industrialisation in the early eighties, has picked up the momentum that the other two districts might have experienced in the previous decade. What is more important is that the process in Bharuch is more broad based than that in the other two districts as shown by the index of industrial development and diversification of workforce. What is concerning however, is the declining agricultural sector which was already weak in Bharuch vis-à-vis the other two districts. This is reflected in the fact that the district has relatively lower yields in the case of its major crops like jowar and cotton as compared to Baroda where they are grown on a larger scale.

Similarly, it has lower yield of paddy vis-à-vis that in Valsad which is mainly a paddy growing district (Table 3). Apparently, there are two important reasons explaining the weak agricultural base in Bharuch viz; low level of irrigation and poor land base, reflected in higher proportion of agricultural labourers vis-à-vis cultivators. Therefore, industrial development in this region might have helped in generating income and employment and developing physical and social infrastructure. This is reflected in terms of relatively higher growth in literacy rate in the district.

To what extent, industrialisation in Ankleshwar industrial estate has influenced development in the peripheral villages? This has been examined in the subsequent analysis.

2.4 Changing Profile of Villages in the Periphery of Ankleshwar Industrial Estate

The focus of this analysis is to compare the changes that have taken place among the villages of Ankleshwar taluka, grouped into three categories[8]: (i) in the immediate vicinity from which land has been acquired for the estate (category 1); (ii) in the radius of about 10-12 kms. from where large number of workers commute to the estate (category 2); and (c) the rest of the villages (category 3). This has been examined in the backdrop of the changing profile of Ankleshwar taluka vis-à-vis other talukas in the district.

Table 5 provides a comparative picture of the changes that have taken place between 1981 and 1991 among the talukas in Bharuch district. It is observed that Ankleshwar tops the list in terms of indicators like population growth and share of non-agricultural workers; it is next to Bharuch taluka in terms of urbanisation and literacy rate; and it ranks lower in terms of percentage of SC/ST population as well as worker population rate. To an extent the low worker population rate in Ankleshwar taluka could be explained by relatively smaller size of marginal workers that are more often associated with agriculture related activities. In fact, in 1991, the

[8] The number of villages covered under the three categories are: 10, 17, and 32 respectively.

proportion of marginal workers in Ankleshwar was only 1.5 per cent whereas it was 9 and 8 per cent in Vagra and Hansot respectively. Another reason for the lower work population rate might be higher growth of population contributed by relatively higher proportion of in-migration. A substantial decline in the share of scheduled castes and tribes in the total population indicate this.

The migratory population might have come mainly for industrial employment, which does not provide much scope for marginal employment to the other members of the households since these industrial workers have no links with the local agricultural economy. What is however, noteworthy is the fact that lower worker population rate as well as lower incidence of marginal workers were observed even during 1981, suggesting a relatively stronger industrial base vis-à-vis most other talukas (except Bharuch) in the district. The important aspect in this context is relatively faster shift towards non-agricultural employment along with the rapidly growing population in Ankleshwar taluka during 1981-1991.

To what extent this changing scenario has spread across the villages in Ankleshwar taluka? Table 6 shows that the 10 villages (i.e. in category 1) from which land has been obtained for the AIE experienced fastest rate of growth in population as compared to the other two groups. The lowest growth was recorded in category 3. Moreover, the data also suggests that the first two groups experienced higher rate of growth in number of households than that in total population. This is contrary to the situation in category 3 wherein growth in number of households is lower than that in the other two groups. Together these features may indicate higher incidence of in-migration in category 1 and 2. This seems to have resulted in significant difference observed in the case of literacy rate, which was more or less same (i.e. around 45 per cent) across the three groups in 1981 but increased sharply in the case of category 1 (82 per cent) as against category 2 (53 per cent) and category 3 (50 percent).

The occupational structure also shows rapid changes as a result of the industrial growth. For instance, non-agricultural employment has increased significantly in category 1 (85 per cent) followed by category 2 (76 per cent) and category 3 (71 per

cent). Along with this, the proportion of marginal workers has also increased though; it is still lowest among the villages in category 1 as compared to the rest.

The negative impact of industrialisation is observed in terms of increase in (a) area not available for cultivation, and (b) unirrigated area in category 1. Such changes however are not observed in category 2 and category 3. *A priori*, this suggests declining agricultural base in the villages from where land was acquired.

2.5 Major Observations

The analysis of industrial growth in Ankleshwar at various levels of comparison brings out certain important observations. These are: (i) Ankleshwar has been chosen for developing chemical based industry especially, in the medium and large scale sector, because of its strategic location for providing an outlet for industrial affluent in the nearby sea coast. In comparison to Vapi, its choice was important because of the poor agricultural base, which necessitated greater need for workforce diversification. Given the increasing concentration in Vapi, which is located in the extreme south, an induced development in Ankleshwar is viewed as an opportunity to extend the spill over effects of industrialisation towards the mainland Gujarat especially in the backward tribal belt. (ii) This kind of planned initiative has succeeded fairly well with the result that Ankleshwar Industrial Estate has achieved the second rank, among all the 122 fully developed industrial estates, in terms of employment, investment and production. (iii) The rapid growth of Ankleshwar industrial estate has given further impetus of growth in Bharuch district resulting into faster rate of workforce diversification as well as increased literacy rate, reaching closer to the levels in Baroda and Valsad; and increased urbanisation. (iv) The industrial growth in Bharuch appears to be more broad based with larger proportion of talukas in Bharuch experiencing such diversification vis-à-vis the two other districts. And (v) the impact of industrial growth in and around Ankleshwar has been spread among large number of villages in the talukas.

The induced industrial growth in Ankleshwar seems to have resulted into a dynamic process that may potentially help develop the tribal backward economy of Bharuch.

Though, much of this would depend on (a) sustainability of industrial growth as well as the resultant employment; (b) extent and nature of negative externalities, especially environmental degradation; and (c) linkages with the rural economy in the peripheral region.

III INTERFACE WITH THE RURAL ECONOMY: FINDINGS OF THE HOUSEHOLD SURVEY

This section examines the impact of industrialisation on rural households in the villages surrounding the estate. This has been captured through a sample survey of 114 households from three villages - two in the immediate vicinity (or periphery) of the AIE; and one located at a distance of about 10 kms. The households were selected by following a stratified random sampling method, using ownership of land as the stratum. The idea was to select 30 households, from landed and landless category, in each of the two (sets) of villages. The actual sample however, deviated from the original scheme especially, in the villages in category 1, because a large number of the landed households with small or marginal holdings had already pledged their land to the big landlords. Hence, these households were treated on par with the landless. Given the distortion in the actual sample, the analysis has focused more on the land-ownership category of the sample as a whole rather than making inter village comparisons. The idea was to examine the nature and extent of the impact at household level rather than to generate quantitative estimates of such impact in the peripheral economy. The latter, of course, would require a more rigorous approach involving a comparative analysis of `before-after' and/or `with-without' situations across the households having otherwise comparable socio-economic characteristics. Such comparison was not feasible because of (a) absence of base line data at the household level; and (b) difficulties in obtaining responses from an adequately large number of households due to the intra-village conflicts with respect to households' interface with the on-going processes of industrialisation.

3.1 Sample Households: Some Important Features

The sample of 114 households was divided more or less evenly across the two categories of villages - 63 (i.e. 55 per cent) in category 1; and 51 (i.e. 45 per cent) in category 2 (Table 7). In terms of tribal households, the distribution was fairly uneven across the village categories. Whereas, the tribals constitute only 32 per cent of the sample households in category 1, their share was as high as 74 per cent in category 2. The relatively higher proportion of tribal population in category 2 is further reflected in terms of relatively larger family size in Piprod (Table 9). Nearly one fifth of the households had more than seven members in the family as compared to the average family size of 5.6 among the sample households. Similarly, the proportion of illiterates was higher in Piprod as compared to the villages in category 1. 31 per cent of population in the sample households (above the age of six years) were illiterate in Piprod, which was fairly significant. Finally, the sample was tilted towards landed vis-a-vis landless households so as to capture the impact on agriculture. 73 per cent of the sample households had cultivated land. Among those having land, a fairly large proportion of households (i.e. 77 per cent) in category 1, had a holding of more than 5 acres. This proportion was only 27 per cent in the case of Piprod.

3.2 Impact on Households

Industrial Employment

The incidence of industry related employment was moderate; with 52 out of the 114 (i.e. 46 per cent) respondents reporting that at least one member in their household was working in industry related activities at the time of the survey, which were 69 workers. Table 8 provides distribution of the 52 households reporting the industry-related employment. It is important to observe that these households constitute a large proportion among the landless vis-à-vis the landed households. If we treat the small/marginal households in the village category 1 as virtually landless, the proportion of landless households with industry related employment might still be higher. Similarly, their proportion was higher among the ST/SCs as compared to that among the other households (Table 8).

Besides these 69 workers, another 43 workers were engaged in other non-agricultural activities. Thus, a total of 112 out of 396 persons in the labour force (i.e. leaving aside those who were categorised as children, students and the old/disabled persons) were mainly engaged in the non-agricultural activities. This works out to be 28 per cent of the labour force. However, there were about 131 persons, especially female, reported to be mainly engaged in household chores (or as unemployed). If we exclude them, the actual workforce turns out to be 265 out of the total population, 643. Considering the workforce to be 265, the share of non-agricultural employment was 42 per cent (Table 9).

The distribution of workers across major occupation groups showed that the proportion of workers in the industry-related activities was higher in Piprod vis-à-vis other villages. This could be due to the higher proportion of landless as well as small or marginal farmers in the sample. The evidence therefore, suggests greater significance of industrial employment among these economically worse-off people. The relatively better-off landed households, especially in the nearby villages, however, may not find such employment worthwhile as most of the industry-related employment is of `informal' type i.e. without permanency and the associated legal benefits. In fact, the higher reservation price among the landed household was clearly revealed through their expectation for getting a grey-collar job on a more or less permanent basis. The fact that the industry did not offer these jobs on a larger scale is the major bone of contention among these households. While the medium and large-scale units in the AIE are creating these kinds of jobs, getting them is more difficult because such recruitments were often made through formal procedure of advertisement involving greater competition. Compared to this, the unskilled workers were employed mainly through informal processes and more recently through labour contractors. These terms of employment were found to be less attractive to the landed household in non-tribal categories.

Income from the Industry

We tried to gauge the extent of income earned from non-agricultural employment. Table 10 presents the distribution of households by levels of income earned from

such activities. It was observed that two-thirds of the 112 workers received an annual income of less than 18,000. This is a kind of income, which an industrial worker may get by working for 25 days in a month with a wage rate of Rs. 60 per day. Obviously, a large proportion (60 per cent) of the workers, even in the industry-related employment, failed to get such an income. The average annual income earned by all the 69 workers engaged in industry related activities was marginally less than Rs. 18,000 though, the average income earned by permanent or regular employees was fairly moderate i.e., about Rs. 29,000 and about Rs. 18,600 respectively (Table 11). Incidentally, the average income of about Rs. 18,000 per annum was just about the income-level set for defining the poverty line for rural households at current prices. Obviously, these income levels are positively related with the status of employment. The low level of income is obviously related to the contract and casual employment as compared to the permanent/regular employment.

Agricultural Productivity and Income

The major sources of benefits, for the landed households, might be through (a) increased prices of land for non-agricultural uses; and (b) other avenues of generating income from certain unscrupulous activities. Both these phenomena were reported in Jitali. In fact, that was one of the major reasons for non-response during our primary survey in the village. While it was difficult to capture these kinds of employment/income impacts on the rural households (as they are seldom reported at an individual level), we may examine the other impacts like changes in agricultural practices, agricultural income, ownership of assets etc.

Agriculture, as reflected by the sample households, was at a fairly subsistence level. This was reflected in terms of small size of landholdings, limited irrigation and low cropping intensity. For instance, 21 per cent of the households have less than 2 acres, and another 12 per cent have less than 5 acres of land as noted earlier. Similarly, only 10 out of the 83 landed households have irrigation facility - the rest depend only on rainfall which is quite scanty i.e. <700 mm. This has led to a situation of a single agriculture crop in Kharif season with subsistence crops like Tur

(pulses) and Jowar. More remunerative crops like cotton and groundnut are seldom grown. It may also be noted that only 11 out of the 75 households (i.e. 14.7 per cent) who had carried out cultivation during 1997-98 reported having changed their cropping pattern during the last five years. About 8 farmers, mainly the tribals from Jitali, did not cultivate their land during the reference year.

Fertiliser Use

Limited access to irrigation and predominance of subsistence crops resulted into high incidence of non-use of chemical fertilisers especially, for the two major crops viz; Tur and Jowar (Table 12). It is observed that around 45 per cent of the farmers growing Tur and 29 per cent of those growing Jowar did not use any chemical fertiliser during the reference year. The incidence of non-use however, is higher among (a) the households not having industry related employment; and (b) in the case of Tur, which is relatively less responsive to fertiliser as compared to Jowar. This suggests that a part of the cash income from industrial employment is diverted to purchase cash inputs for a crop, which is the main source of foodgrain consumption (i.e., Jowar) among the workers' households - many of them belong to the socio-economically weaker sections of the society.

Yield and Income

A relatively broad based use of chemical fertilisers particularly, on Jowar, seems to have resulted into better yield among those households who obtained industry-related employment (Table 13). Contrary to this, yield of Tur, a relatively more market-oriented crop is higher among the households, not having such employment. To an extent, higher yield of Tur might be a reflection of greater preference for this market-oriented crop among the households, who are generally better off in terms of land-ownership and income from agriculture. In fact, this might be one of the important factors explaining their non-involvement in industry related employment.

Table 14 provides estimates of agricultural income which is higher among those not having industry-related employment as compared to those who have access to such employment. This is further reflected in terms of higher incidence of food grain self-sufficiency among these households (45 per cent) as compared to the other households (37 per cent). Together these evidences lend support to our earlier contention that the main reason for seeking industrial employment is the relatively weak land or agricultural base. Conversely, those having stronger base on these counts do not find the nature of industrial employment attractive enough. We will get back to this issue at a later stage.

Asset Base

The difference in economic base between the two sets of households (i.e. with and without industry related employment) is further reflected in terms of composition of assets owned by the sample households. For instance, whereas the households having industry-related employment have better ownership of some of the assets like television, radio, fan, bicycle and tractor (for transportation) etc., the other set of households have better ownership of agriculture related assets like bullock, cow buffalo and also some of the more expensive consumer durables like refrigerator and motor vehicles.

Therefore, the above analysis does indicate some positive impact of industrial employment in terms of the use of cash inputs like chemical fertiliser and ownership of consumer durables - among the households having industrial employment, despite their relatively weak socio-economic status in terms of the tribal identity, ownership of land and education. What is however, discouraging is that the phenomenal industrial growth in Ankleshwar has hardly exerted any significant impact on the subsistence agriculture in the peripheral villages. This is reflected in terms of (a) limited and almost stagnant irrigation facilities; (b) limited adoption of chemical fertiliser; (c) static cropping pattern; (d) very low level of yields; and (e) shrinking area under cultivation because of the conversion of land for housing and also, the practice of keeping the land fallow which was observed among the tribals in Jitali.

However, industrial employment is confined only to a sub set of the rural households, of which a large proportion is likely to be landless or marginal farmers. In this situation industry-agriculture links are likely to remain weak especially because the genesis and the nature of industrialisation is fairly alien to the region's rural economy [9].

Conceding that shrinkage of agricultural land, at least in the peripheral villages is almost inevitable; increasing emphasis has to be laid on the measures that improve land productivity in the region. The present levels of yield e.g. of tur and jowar is significantly lower not only in relative sense i.e. compared to the district average which was about 50-70 per cent higher than the average yield reported by the sample farmers, but also in an absolute sense of deriving food grain self-sufficiency at the household level. Obviously, only half of the landed households reported that their agricultural produce was sufficient to meet the food requirements. Therefore, the need is to get out of this subsistence syndrome in agriculture. The way to achieve that effectively is to improve the basic investments in land and water resources. Before we discuss the role that the industry can or should play in this process, it might be useful to examine some of the direct impact of industrial employment on the workers' welfare.

3.3 Direct Impact of Industrial Employment

This section deals with a sub set of 52 households who had benefited from employment in the industrial activities in AIE. The idea is to capture the quality of employment in terms of other benefits that the workers may have received besides their daily wages.

As noted earlier, industrial employment to a large extent, is more in the mode of informal arrangements. For instance, of the 69 workers employed in the industry related activities, only 15 were on the payroll of their employer and eligible for the benefits that go along with the industrial employment. Another 12 were employed

[9] For further discussion on this issue see (Hazell, *et al*, 1991).

on a more or less regular basis but were not on the payroll of the employers. The remaining 42 (i.e. 61 per cent) workers were either employed through labour contractors or as casual workers. These workers, obviously, were quite vulnerable to insecurity of employment. In what follows we describe the status of employment benefits that have been received by these workers.

At the outset it may be noted that only about 39 per cent of the 69 workers had received some kind of benefits from the industrial units. These benefits were: Employees State Insurance Scheme (ESIS) (22), bonus (25), paid holidays (25), provision of uniforms (25) and transport support (24). Besides these, some of the workers also reported benefits like help for children's education (17) and housing accommodation on the work premise (8).

Apart from these usual benefits, 17 workers reported that occasionally they borrow money from their employer to meet some difficult situations in the family. Usually, such borrowings are interest free and work as bondage between the worker and the employer. Incidentally, only five workers had currently borrowed money though, no one reported refusal of such requests by their employers.

Hospital facility was yet another benefit reported by sample households in both the categories. One-fourth of the households with industry related employment reported going to Modi Hospital, a charitable hospital in the AIE, only 20 per cent in the case of the households not having industry-related employment reported the same. In all, 27 households reported that they generally go to the Modi Hospital in the event of sickness in their family. The evidence suggests a very limited coverage of the various welfare measures offered by the industry.

3.4 Industrial Pollution

Pollution has been reported as the major concern among the workers' households. 75 per cent (of the 52 households) in this category reported that they face hazardous situations due to pollution at their work place. Though, nobody had reported pollution related sickness in the family, which might be due

to the social taboo in reporting such diseases.

However, conceding that 20 per cent of India's chemical production is from Gujarat, on a proportionate basis one can argue that the AIE is producing nearly 25 per cent of the chemical pollutants in the states (Shah and Kathuria, 2001). What is however, disturbing is the fact that several of the medium and large units having their own treatment plants tend to violate the official norms. Similarly many of the small-scale units have, so far, refrained from joining the common treatment plant on the estate. This pollution control remains fairly inadequate. This is why industrial accidents and general deterioration in air-water quality were mentioned very frequently during our discussion with the villagers. Particularly, quality of drinking water was considered as the major negative externality caused by the chemical industry besides smoke and foul smell in the air. The households reporting deterioration in quality of drinking water, however was only a minority i.e., 25 per cent of the sample. The phenomenon appears to be more acute in some of the villages (e.g. Piraman), which are on route to the unlined channel carrying the `treated' industrial effluent. What seems to have happened is contamination of ground water through the seepage of this canal besides, the illegal disposal of the industrial effluent by small and also by time of the medium and large-scale units.

Unfortunately, there are no scientific evidences on contamination of water in these villages. This is surprising because none of the concerned agencies, including the environmental activists, have tried to get the water sample tested independent of the Government's regular machinery. What is more unfortunate is that the official data are not made public. The issue therefore, is left to baseless debate. It may however, be noted that groundwater in most of the peripheral villages was already brackish even before the setting up of the AIE. Hence, many of these villages were already linked with a state supported drinking water scheme namely, the Southern Bara Scheme. In spite of this, if people are reporting deterioration in the quality of drinking water, it needs to be examined more carefully. At present very little efforts are being made in this direction; those, which are made, have rarely been shared with the village

committees[10].

What, in the ultimate analysis is the impact of industrialisation? And how do people in the peripheral rural areas perceive this industrialisation? This is discussed below.

3.5 People's Perceptions

The rural society seems to be almost equally divided on the issue of desirability of this kind of industrial growth in the region. Whereas 49 per cent of the sample households suggested that the industries are `desirable,' 51 per cent were not in favour. Nevertheless, among those who indicated desirability, more than one-fourth was from the households, not having industry related employment.

These perceptions could be understood more clearly in the light of the two sharply defined questions pertaining to the `benefits' and `damages' caused by the industrial growth in the region. Obviously, the respondents who reported having received some benefits were mainly those who had industry related employment. Conversely, those who reported damage due to the industry were mainly those, which did not get such employment. What is however, noteworthy is that only 19 per cent of the workers' households reported having faced some kind of damages, which were caused by the industrial activities. The remaining 81 per cent of the workers' households did not report any incidence of direct damage to them. On the other hand, 24 per cent of the non-workers' households reported that no damage has been done to them due to the industries; rather, they have gained from the industrialisation. The damages reported pertain mainly to the impact of pollution on land, water[11] and human health.

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[10] As part of this exercise, the Ankleshwar Industrial Association (AIA) has taken up the initiative for getting the water sample tested.

[11] In order to verify the incidence of contamination a small effort has been made by GNFC by testing soil and water samples from the selected locations from the villages on route Amalakhadi.

Of course, these are perceptions, which often get vitiated in a primary survey like this, which tries to probe into various qualitative aspects. Therefore, in order to verify the responses on `benefits' and `damages', a further question was asked as to what do they expect from the on-going processes of industrialisation. Obviously, the most important expectation was getting employment on a permanent/regular basis! This was followed by the need for proper disposal of industrial effluent. There were also suggestions that industries should be kept at a reasonable distance from the village settlements so that the negative externalities could be avoided.

It may however, be noted that the expectations, even for employment, were reported from both workers' as well as non-workers' households though, more in the case of the former. Contrary to this, expectation about the pollution-control was expressed by the non-workers' households. Strangely, only 7 out of the 111 responding households (i.e. 6 per cent) indicated that they did not expect anything from the industry. This proportion however, was much smaller than the proportion (51 per cent) of households who perceived that the industrial growth in the region was not desirable! This would imply that they recognise the importance of the industry provided, it generates better employment and reduced pollution.

IV. CONCLUDING OBSERVATIONS

The foregoing analysis provides a vivid picture of the impact of industrial activities on rural households. Since the size and composition of the sample was somewhat distorted from the original scheme, comparison across the two categories of villages i.e. within and outside the immediate vicinity of the Ankleshwar Industrial Estate was less relevant. The analysis therefore, was focused mainly on comparison between the two sets of households i.e. with and without land and industrial employment.

The survey results clearly indicated that the industrial employment was negatively associated with the household's land-base. Those who were landless or small/marginal farmers had greater chances of getting into this employment. 45 per cent of the households and 42 per cent of the actual workforce among the sample households got industrial employment. This was fairly moderate, given the fact that the sample had a relatively larger representation from the landed households, which generally finds this employment unattractive.

Despite this moderately good coverage of industrial employment, the industrial growth however, has made only marginal impact on the household's farming activity - it helped increasing the adoption of a purchased input i.e. chemical fertiliser which, in turn, brought better yield in the case of the major cereal crop i.e., Jowar. But for this, agriculture continues to remain at subsistence level with limited irrigation, low spread of fertiliser use, and above all, low levels of yields. Thus, industrialisation does not seem to have helped improving the conditions of agriculture in any significant manner. On the contrary, the agriculture base seems to be shrinking in the sample villages mainly because of (a) increased conversion of agricultural land for housing; and (b) access to cash-inflow, which has further dissuaded the tribal households to make any improvement in their agriculture.

The absence of linkages was mainly due to the fact that the employment benefit was largely accrued to the landless as well as marginal farmers, who in any case did not have many incentives to continue the farming activities. In fact, many of the tribal landed households generally did not belong to the category of the traditional settled farming community and had already leased out their land to the big farmers. Hence, employment-income linkages from the industry would have exerted very limited impact on agriculture. This is particularly so, when the material as well as production linkages in the AIE are fairly weak.

Given this scenario, the industry-agriculture linkages can be established only when it is able to offer better quality of employment so as to attract workforce

from both the landed as well as the landless households. At present, the labour market situation, which is characterised by (a) constant flow of unskilled labour and (b) segmentation due to the prevailing institution of the contract labour as well as the other statutory laws do not permit any major restructuring that could improve the quality of employment in the industrial sector. These linkages are likely to remain dormant till then.

The positive impact however, was found in terms of ownership of certain types of consumer durables though the impact was confined only to a limited number of households. This was because of the low quality of employment with a large proportion of the industry related workers earning less than Rs. 18,000 per annum. Similarly, only 27 out of the 69 workers employed in industry related activities had permanent or regular job. Moreover, the number of workers receiving benefits like ESIS, bonus, paid leave etc., was still smaller - the rest were almost like casual labourers. The pollution related hazards add further to the agony of the informal sector workers.

The irony was that almost 50 per cent of the households, especially, those who got employment, perceived that the industrial growth was desirable. It provided at least livelihood security to the landless and the marginal farmers. Among those who did not think that industrial growth was desirable, it was because they had not received any direct employment, possibly because of their relatively higher reservation price. This same set of households in spite of the `damage' or negative externalities of industrial pollution, still `expect' that the industry should generate employment for them on better terms.

While these are some of the normal expectations in an agrarian economy which still operates at a subsistence level, nevertheless, they also reflect certain structural anomalies in terms of persistent neglect of the agriculture based rural economy in a developmental process. Obviously, concentrated growth of industries, especially of chemical industries, can do very little to redress the conditions of this perpetual backwardness in such regions. Thus, all what it has done was to provide some leverage in terms of providing informal employment,

and thereby expanding the economic base of some of the rural households. The real task of strengthening the rural economy however, still remains largely unattended. While this would call for a multi-pronged approach, the industry's contribution may well be in terms of improving the employment-income linkages within the region, both quantitatively as well as qualitatively.

In addition to this, the industry may also contribute in terms of providing investible funds for improving the status of land and water resources in the region. This could be realised by working out various innovative mechanisms-financial, technological and institutional. This, of course, would require fresh thinking in the direction of linking up the industrial growth with rural development - the original idea behind the Project Linkage Approach.

Table 1: Development of Industrial Estates Across District, 1995-96

Districts/Zone	No. of Estates			Large & Medium Estates		Rural estates (Deve-lopment & other)	Land Deve.-lopment (Sq.mts (lakh)	Sheds construction (No.)	Func-tioning units (No.)
	Total	Fully deve-loped	Other	Fully deve-loped	Other				
I. CENTRAL ZONE	**50**	**35**	**15**	**16**	**4**	**10**	**-**	**3097**	**4313**
Ahmedabad	13	10	3	6	1	3	120.5	1899	2662
Gandhinagar	3	2	1	1	-	-	27.0	167	145
Mehsana	22	14	8	7	3	6	63.6	676	996
Kheda	12	9	3	2	-	1	37.2	355	510
II.SOUTH & EAST ZONE	**79**	**44**	**35**	**21**	**23**	**45**	**-**	**6837**	**9133**
Baroda	14	10	4	7	1	11	221.5	1259	1723
Panchmahals	12	5	7	2	1	6	27.7	324	408
Bharuch	25	13	12	5	9	18	198.8	1068	1687
Surat	15	8	7	3	6	9	764.6	1889	2204
Valsad	12	7	5	4	6	1	174.8	2297	3111
Dangs	1	1	-	-	-	-	-	-	NA
III.WEST ZONE	**71**	**31**	**40**	**12**	**5**	**25**	**-**	**2040**	**2429**
Surendranagar	12	5	7	2	-	6	26.2	265	357
Rajkot	17	9	8	3	3	5	65.1	615	693
Jamnagar	8	4	4	2	-	4	19.7	522	571
Junagadh	12	4	8	3	1	5	34.7	166	229
Amreli	9	2	7	0	1	2	2.9	87	67
Bhavnagar	13	7	6	2	-	3	27.7	385	512
IV.NORTH ZONE	**30**	**12**	**18**	**-**	**8**	**16**	**-**	**317**	**429**
Kachchh	12	4	8	-	5	5	3.9	110	109
Sabarkantha	7	4	3	-	1	3	4.9	86	135
Banaskantha	11	4	7	-	2	8	9.8	21	185
All districts	230	122	108	49	40	96	1164.7	12291	16304

Source: Gujarat Industrial Development Corporation, Annual Reports, Various Issues, Gandhinagar (Unpublished)

Table 2: Ankleshwar Industrial Estate in a Comparative Perspective: 1981-82, 1995-96

(Rs. in lakhs)

		Ankle-shwar	Panoli	Makarpura	Nan-desari	Vapi	Umbar-gaon	Gujarat
No. of Units	1981-82	257	23	689	185	680	302	7294
	1995-96	1100	350	1200	240	1500	755	16326
Land acquired	1981-82	1428	704	335	258	1129	279	8827
(Ha.)	1995-96	1557	1035	344	259	1125	325	10188
Sheds allotted	1981-82	382	6	587	115	652	406	6870
(No.)	1995-96	674	214	685	157	937	622	11844
Housing units	1981-82	619	-	594	187	152	975	6870
allotted (No.)	1995-96	(1621)*		(630)	(254)	(2882)	(1106)	
		1828	88	622	242	3562	1094	11533
Employment	1981-82	6144	281	11442	3181	18700	4055	125311
(No.)	1995-96	23100	5950	19200	3160	42000	20925	279997
								(311245)*
Employment per	1981-82	23.9	12.2	16.6	17.2	27.5	13.4	17.2
unit (No.)	1995-96	21.0	17.0	16.0	13.1	28.0	27.7	19.1
Production	1981-82	10549	154	5990	3260	20846	5207	16165
	1995-96	43912	17664	43500	10185	94576	18884	487123
								(2528960)*
Investment	1981-82	3824	220	2797	1404	12762	1985	63752
	1995-96	23518	11777	9384	5601	39360	5336	210952
								(2228396)*
K/Unit	1981-82	15.0	9.6	4.0	7.6	18.8	6.6	8.7
	1995-96	39.9	33.6	7.8	23.3	26.2	7.1	12.9
								(13.6)
O/Unit	1981-82	41.0	6.7	8.7	17.6	30.6	17.2	22.0
	1995-96	39.9	50.5	36.2	42.4	63.0	25.0	29.8
								(154.9)
Production per	1981-82	1.7	0.5	0.5	1.0	1.1	1.3	1.3
Unit of empl.	1995-96	1.9	2.9	2.3	3.2	2.2	0.9	1.7
								(8.1)
Production	1981-82	2.7	0.7	2.3	2.3	1.6	2.6	2.5
per unit of	1995-96	1.7	1.5	4.6	1.8	2.4	3.5	2.3
investment								(1.1)
Non-functioning	1981-82	-	-	-	-	-	-	-
Unit	1995-96	360	-	NIL	56	63	47	6585
% of medium +large units to total units 1995-96 (Range)		9.35	9.35	6.46	6.46	7.09	7.09	-
Housing units	1981-82	1621	-	630	254	2882	1106	9243
sanctioned	1995-96	NA	NA	NA	NA	NA	NA	NA
Constructed	1981-82	1111	-	630	254	1486	806	6341
	1995-96	2605	204	630	254	3562	1094	12822

Note: `*' refers to special estimates, viz; PCC, Hazira, IFFCO

Source: Gujarat Industrial Extension and Technical Consultancy Organisation Ltd. (1996)

Table 3: Socio-Economic Profile of Bharuch, Baroda and Valsad Districts 1981 and 1991

INDICATORS	BHARUCH		BARODA		VALSAD		GUJARAT	
	1981	1991	1981	1991	1981	1991	1981	1991
Population (`000)	1296	1546	2558	3090	1774	2174	34086	41310
Pop. density (per sq.km.)	143	171	328	396	338	415	174	211
% of main + mar. workers to population	37.3	37.2	33.4	34.6	36.4	38.5	37.3	40.2
Distribution of Main Workers								
Cultivators	22.8	26.7	24.2	26.2	31.4	34.5	37.5	33.4
Agri. Labourers	38.3	40.1	26.3	28.0	23.0	25.0	22.6	22.9
Other	28.7	33.1	40.7	45.8	38.9	40.5	39.9	43.7
Literacy rate	44.7	51.8	48.3	54.0	47.0	54.5	52.21	61.29
Distribution of Villages with Facilities								
Education	91.0	96.3	83.6	94.7	95.6	97.1	93.3	96.5
Medical	23.1	73.2	17.4	98.4	30.3	89.7	26.2	80.0
Drinking water	100.0	100.0	100.0	100.0	99.8	100.0	100.0	99.9
Post & telegraph	43.5	52.3	39.0	44.4	59.9	66.3	47.9	55.6
Communication	68.8	83.9	60.3	68.8	80.3	90.4	78.5	86.8
Appr. By pucca road	40.5	67.4	34.8	51.2	50.9	89.5	36.7	60.7
Power supply	40.6	95.2	59.2	96.9	68.3	99.9	61.3	98.0
No. of villages	1123	1116	1651	1639	821	821	18114	18028
% of cultivable area	66.7	58.7	80.4	71.5	64.8	58.3	54.0	55.2
% of gross irrigated area	7.9	13.7	13.9	21.4	11.5	20.8	23.14	27.28
Change in Yield								
Paddy	590	1660	620	950	1840	1820	1220	1330
Bajri	880	840	1000	1040	-	-	920	870
Jowar	840	810	970	850	1100	410	600	460
Maize	-	-	-	-	-	-	-	-
Cotton	740	1100	1280	1290	1760	-	1160	1310
% of urban population	18.6	21.3	37.2	43.0	21.9	24.5	31.1	34.5
Sex ratio	0.94	0.93	0.91	0.91	0.98	0.96	0.96	0.94
% of SC + ST population	49.1	49.8	31.4	32.8	57.7	57.4	21.4	22.3

Source: District Census Handbook, Bharuch (1991), Census of India, 1981 and 1991, Season and Crops Report, Government of India, New Delhi.

Table 4: Distribution of Talukas According to Change in Development Index and Non-Agricultural Employment: 1981-1991

Indicators	No. of Talukas		
	Bharuch	Baroda	Valsad
Total talukas	11	12	8
Increase in Development Indices			
Agriculture	05 (128)*	03 (148)	06 (211)
Industry	10 (279)	07 (163)	05 (220)
Infrastructure	11 (254)	09 (291)	04 (381)
Education	10 (255)	03 (313)	03 (239)
Overall	06 (260)	05 (250)	03 (295)
Increase in the share of non-agricultural employment	(66.9)**	(54.2)	(59.5)
Upto 5%	3	6	5
5 – 10%	3	2	2
>10%	2	1	1

Note: `*' refers to mean value of sectoral indices for the districts in 1991
`**' refers to mean value of the share of non-agricultural employment for the districts in 1991

Source: Awasthi (1998)

Table 5: Changes in Talukas of Bharuch District - 1981 and 1991

Taluka	Growth in pop. (% per annum)	Indicators									
		WPR		Urbani-sation		SC+ST Pop.		Non-agri. Emp.		Literacy	
		1991 (%)	Diff. over 1981	1991 (%)	Diff. over 1981	1991 (%)	Diff. over 1981	1991 (%)	Diff. over 1981	1991 (%)	Diff. over 1981
Bharuch	1.83	33.9	1.3	48.2	2.7	26.4	-0.7	58.7	6.8	63.8	6.7
Ankleshwar	4.77	39.0	-0.9	41.1	7.2	34.8	-4.7	58.9	15.8	57.3	7.7
Hansot	1.57	51.8	5.2	16.5	1.4	39.5	1.4	29.3	3.5	55.9	3.9
Vagra	0.52	46.4	7.6	-	-	32.4	0.8	18.6	-9.6	54.2	4.3
Jambusar	0.37	41.5	4.2	19.2	1.3	16.8	-0.8	31.8	5.4	55.1	9.1
Amod	0.72	39.8	-1.7	16.7	1.6	34.3	-0.6	26.7	9.8	56.0	7.2
Jhagadia	1.81	46.6	-	-	-	68.7	1.3	19.9	0.5	44.4	6.3
Nandod	1.64	43.8	0.4	21.2	4.9	70.2	1.2	29.3	-2.9	49.9	8.0
Dediapada	2.96	51.8	5.4	-	-	95.6	1.6	8.3	-1.3	31.2	9.2
Sagbara	2.73	58.1	10.9	-	-	91.9	1.8	11.8	-2.6	36.5	7.5
Valia	2.33	50.5	3.1	-	-	77.5	0.3	19.8	7.5	42.9	7.6
Bharuch district	1.92	43.2	1.1	21.3	2.7	49.8	0.7	33.1	4.4	51.8	7.1

Source: District Census Handbook, Census of India, 1981 and 1991.

Table 6: Villages in Ankleshwar Taluka: A Comparison

Indicators		Groups of Villages		
		I	II	III
Population Growth- 1981-91(% per annum)		5.2	3.8	2.8
No. of HHs - Growth Rate 1981-1991 (% per annum)		5.7	4.9	2.5
SC+ST population (%)	1981	49.3	44.3	48.7
	1991	41.1	39.3	49.6
Literacy Rate (%)	1981	46.1	44.5	45.9
	1991	81.8	52.9	49.8
Proportion of main workers in	1981	40.1	40.1	39.7
total (%) population	1991	37.9	40.1	39.5
Non-agriculture	1981	70.1	70.7	67.4
Employment (%)	1991	84.8	76.0	71.1
Area not available	1981	1095	3251	4648
for cultivation	1991	1178	3175	3164
(Ha.)				
Unirrigated area	1981	5536	7826	16666
(Ha.)	1991	5744	5411	11824
Proportion of marginal	1981	2.5	6.2	7.9
to main workers	1991	3.6	10.7	10.5
No. of villages		10	-	-

Source: As in Table 5

Table 7: Distribution of Sample-Households by Village and Caste

Village by category	Scheduled Tribes	Other castes	All
I Near by			
Jitali	58.3 (14)	41.7 (10)	100 (24)
Kosamadi	15.4 (06)	84.6 (33)	100 (39)
Sub-total	31.7 (20)	68.3 (43)	100 (63)
II Distant			
Piprod	74.5 (38)	25.5 (13)	100 (51)
Total (I + II)	50.9 (58)	49.1 (56)	100 (114)

Note: Figures in parentheses indicate number of households

Source: Field Survey, 1999.

Table 8: **Proportion of Households with Industrial Employment by Size of Land Holding**

Land ownership (Acre)	Villages					
	Jitali & Kosamadi		Piprod		Total	
	%	No.	%	No.	%	No.
(a) Landless households	57.1	4	66.7	16	64.5	20
Upto 2	37.5	3	70.0	7	55.6	10
2.01 - 5	40.0	2	55.6	5	50.0	7
5.01 - 10	17.4	4	50.0	3	24.1	7
>10	35.0	7	50.0	1	36.4	8
(b) Landed households	28.6	16	59.3	16	38.6	32
(c) Total (a) + (b)	31.7	20	62.7	32	45.6	52
(d) All households		**63**		**51**		**114**

Source: Field Survey, 1999.

Table 9: **Distribution of Workers by Occupations**

OCCUPATIONS	JITALI & KOSAMADI		PIPROD		TOTAL	
	%	No.	%	No.	%	No.
I. Agriculture	59.8	79	55.6	74	57.7	153
1.1 Cultivation	48.5	64	19.5	26	34.0	90
1.2 Agri. labour	11.4	15	36.1	48	23.7	63
II. Industry	18.2	24	33.8	45	26.0	69
III. Other	22.0	29	10.5	14	16.2	43
3.1 Artisans	3.8	05	3.0	04	3.4	09
3.2 Driver	4.5	06	4.5	06	4.5	12
3.3 Miscellaneous	10.6	14	1.5	02	6.0	16
3.4 Domestic work	3.0	04	1.5	02	2.3	06
% of workers to population (workers)	37.5	132	45.7	133	41.2	265
IV. Non-workers	220		158		378	
4.1 HH work	86		45		131	
4.2 Student	105		58		173	
4.3 Children+old+ disabled	29		45		74	
V. Total population	352		291		643	

Source: Field Survey, 1999.

Table 10: Distribution of Workers in Non-Agricultural Activities Across Income Groups

Range of income (Rs)	Villages		
	Jitali & Kosamadi	Piprod	All
Up to 5000	12.0	6.4	8.9
5001 - 10,000	10.0	20.9	16.1
10,000 - 18,000	32.0	41.9	37.5
>18,000	46.0	30.6	37.5
All	**100.0 (50)**	**100.0 (62)**	**100.0 (112)**

Note: `*' refers to igures in brackets are number of workers engaged in non-agricultural activities

Source: Field Survey, 1999.

Table 11: Distribution of Households Having Industry Related Employment by Income Groups

Category of employment	Income Groups (Rs. `000)				All	Aver-age in-come
	< 5	5-10	10.1-18	> 18		
A. Industry						
Permanent	-	-	2	13	15	28.9
Regular	-	1	6	5	12	18.6
Contract	-	6	9	-	15	13.0
Casual	3	5	7	1	16	10.6
Sub-total (A)	3 (5.2)	12 (20.7)	23 (39.6)	20 (34.5)	58 (100)	17.6
B. Related Activities						
Casual	-	3	3	3	09	14.2
Self employment	-	-	-	2	02	55.0
Sub-total (B)	-	3	3	5	11	16.7
Total (A + B)	**3 (4.3)**	**15 (21.7)**	**26 (37.7)**	**25 (36.2)**	**69 (100)**	**17.5**

Note: `*' refers to income from the industry & related activities. Figures in parentheses indicate percentages

Source: Field Survey, Gujarat Institute of Development Research, 1999.

Table 12: Caste Wise Distribution of Households Using Chemical Fertiliser on Major Crops

Caste	Households not Using Fertiliser (%)	
	Tur	Jowar
ST/SC	61.5	36.0
Other	35.5	25.0
All	**45.1**	**29.2**

Source: Field Survey, 1999.

Table 13: Yield Among Major Crops

Caste	Yield (Kgs./Ha.)		
	Tur (N=71)	Jowar (N-65)	Cotton (N=13)
With industrial workers	465.63	510.76	-
Without industrial workers	525.25	492.54	-
All farmers	508.95	499.28	612.50
Area under the crop (Ha.)	181.70	111.68	26.71

Source: Field Survey, 1999.

Table 14: Agricultural Income by Household Categories

Village	Workers' household	Non-workers' household	All
Jitali	17,000	16,333	16,571
Kosamadi	19,000	20,192	19,939
Piprod	5,385	5,750	5,580
Total	**13,456**	**16,695**	**15,702**
(n)*	**(19)**	**(43)**	**(62)**

Note: `*' refers to no. of households who reported income during the agricultural year 1997-98

Source: Field Survey, 1999.

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