Gujarat Infrastructure Development Board
8th Floor, Block 18, Udyog Bhavan
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Final Report

Volume I State of Development and Identification of Potentials

Study on Potential Development of Kutch, Gujarat

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Dalal Mott MacDonald
501- Sakar II, Nr. Ellis Bridge
Ahmedabad 380 006
India
Tel: +91-792657555

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Mineral Resources

Kutch is an extremely rich region for non-metallic minerals. The region has the largest reserves of limestone, kaolin, bauxite, silica sand and bentonite in Gujarat and these reserves are also significant as far as India's reserves for these minerals are concerned. Kutch has the largest number of mines under lease in Gujarat. In 2002-03, 628 mines and quarry with an area of 7974 hectares was leased mineral production and Kutch is the largest contributor of royalties earned from leased mines in Gujarat.

Production

Figures of production of different minerals in Kutch show that the mining and mineral industry has grown significantly after the year 2000. Today, it is the largest producer of kaolin, lignite, bentonite and salt in Gujarat. Limestone, silica sand, kaolin and gypsum which form an important ingredient for cement and ceramic industry are all produced in Kutch. Production of these minerals has grown at an average 15 percent per annum from 1995-2002.

Recent Industrialisation

Till late 1990s, Kutch hardly experienced any industrialisation based on its mineral resource base. But gradually mineral based industries are developing in the region. Sanghi cement plant was the first major mineral based industry established during the late 1990s. Recent data exhibits that around 23 percent of the total investment flowing into the region is in the mineral based industries.

Potential Remains Unexplored

But mineral strength of the region is yet not exploited fully. For e.g. Although the region possesses much more limestone reserves than that of the southern-coastal districts of Saurashtra, there is only one major cement industry in the region in comparison to five in southern-coastal Saurashtra. Similarly much awaited alumina plant has yet not been established and still raw bauxite is being exported to developed countries. There is also scope for glass and glassware and ceramic and porcelain industries. Such industries and successive ancillarisation can change dynamics of regional economics within a very short period of time.

Moreover, the presence of state of the art ports and logistics and good reserves suggest a strong potential for mineral based industries in the region. But it is extremely important to upgrade the road and rail transport infrastructure in the areas, where mines are located.

Agriculture

Semi-arid climate with very scanty rainfall does not support extensive and water intensive agriculture in the region. However, black soil types in the south and western coastal areas and red loamy soil types in eastern parts provide considerably better conditions for agriculture. Only 12 percent of the total area in the region is cultivated. But considering 4 percent fallow land and around 36 percent uncultivated land, total land can be converted into agricultural land is a massive 40 percent of the region's total.

Oil Seeds, the Most Important

Various oil seeds are extremely important for the region. Kutch is not a significant producer of food grains. Among various oil seed crops, groundnut, castor seeds and rape and mustard seeds are the most important crops in Kutch. Among the food grains, pulses are the most important and mug production is significant. Bajra or millet is the only important cereal produced in the region.

Groundnut is an important crop in Kutch. Kutch is the sixth district in production and sixteenth in productivity in 2001-02. But trends from 1998-99 show that it is much more consistent in production than the top Saurashtra districts; in average annual productivity in this period the region is number one. There is much more scope to improve yield, which is very low in comparison to the world's top 10 high yielding countries. Israel the number one produces almost four times higher than the region. Edible oil is the most important product from groundnuts followed by preparation of peanut butter, candy, salted and roasted nuts. There are varieties of industrial uses; from manufacturing of pains to cellulose for making rayon and paper.

Castor is a major crop in Kutch and in the neighbouring Banaskantha districts. Castor oil is a valuable purgative and extremely versatile and unique in its composition. In 2001-02, Kutch produced 12 percent of the total castor seeds in Gujarat and was ranked 3rd among the districts in the state. Banaskantha and Mahesana being first and second collectively produced more than half of the total in the state. Kutch-Banaskantha-Mahesana belt is not only an important castor seeds producing region in India but also in the world. But in sharp contrast to the production part, yield of castor seeds in Kutch is not satisfactory. It was ranked at 16th place among the districts in Gujarat in 2001-02. Castor Oil is regarded as one of the most valuable laxatives in medicine and is also important for various industrial uses from soaps, hydraulic and brake fluids, inks, coatings and perfumes, candles, caprylic acid, etc.

Mustards and rape seeds are also important. In production of rape and mustards seeds, share of Kutch in Gujarat's total production have fallen from 6 percent in 1998-99 to less than 2 percent in 2001-02. Banaskantha and Mehsana, the top two districts produced more than 90 percent of the Gujarat's total production.

Pulses are also important

Average annual pulses production from 1998-99 to 2000-01 put Kutch in overall eight position among the districts in Gujarat. But Kutch produced less than five times of what Vadodara (ranked 1st) produced. The region also suffers from low pulses productivity.

In mung production, Kutch produced almost double than what Mehsana (ranked 2nd) produced during 1998-99 to 2000-01. But Kutch has seen a high fluctuating trend in mung production. But productivity of mung is very low in Kutch. It is an important ingredient in Chinese foods such as mung bean soup or sweet and pungent pork or fen-si. In India, mung is used to prepare 'dal' a popular Indian pulse-curry, fried or roasted for preparing instant food items, or crushed to prepare powder to use as an ingredient in various snacks and other foods. In the eastern region there is massive demand of raw mung used as an important food in the religious and other ceremonies.

In 2001-02, Kutch produced 6.5 percent of the total millet in Gujarat. Semi-arid climatic conditions with lack of rainfall and irrigation and high temperature in the region favours millet production in the region. Millet is consumed in the form of fermented or non-fermented breads, porridges, boiled or steamed foods, and (alcoholic) beverages. In the USA, Australia, and Europe, millets are also grown to feed cattle and birds.

Spices are USPs of Kutch

Kutch is very important for production of few of the spices. It is one of the largest producers of the unique spice crop isabgul. More over various other spices ranging from cumin to coriander is being produced in Kutch. Isabgul or Psyllium husks are separated in husk form and 85 per cent of the processed Isabgul from India is exported. Banaskantha, Kutch and Mahesana are the major Isabgul producers in Gujarat. Isabgul or Psyllium Husks is one of nature's best sources of soluble fibre. It has been used for centuries as a natural colon cleanser and for supporting bowel regularity. It's also a valuable nutritional tool for maintaining a healthier cardiovascular system. Retail price for 500 mg of finished medicinal Psyllium Husks is around $6 to 8 in western markets.

Horticulture a New Opportunity

Kutch produces varieties of fruits. The region exhibits its monopoly in India in production of fruit crops such as dates. It produced 99 percent of Gujarat's dates in 2000-01. In the same year it was also ranked 4th in both production of papaya and coconut among the districts in Gujarat. Moreover, Kutch produced more than 6 percent of the chiku as the 6th largest producer in Gujarat. Mango cultivation is increasingly becoming popular and maximum is being exported.

Extensive Livestock and Fisheries Development Potential

Livestock breeding is a very important agriculture allied activity in Kutch. Traditionally Kutch is famous for livestock related activities and rural folk is highly dependent on it. When there were 9 cross breed cattle in Kutch per thousand persons, Gujarat as a whole has 7. Number of buffaloes per thousand population is almost double than that of Gujarat's.

Although having around 330 km long coast line fishing is not an important activity in the region. There are only 3308 fishermen and only 1 percent of the total population depends on fishing and fishery related activities.

Infrastructure Development and Mechanisation are the Key Issues

Irrigation is a necessity for agriculture in Kutch, but due to lack of infrastructure and rainfall a meagre 37 percent (187 thousand ha) of the gross cultivated area has been brought under various sources of irrigation. Moreover, there is variations across the talukas; Nakhatrana where almost 85 percent of the gross cropped area is irrigated, while in Rapar the figure is as low as 13 percent. Irrigation has been planned in an additional 37 thousand hectare of land under the Sardar Sarovar Narmada Project and approximately 200 thousand hectares through various other schemes in Kutch.

Irrigation in Kutch is ground water dependent. 87 percent of the total irrigated area depends on ground water sources and out of which 85 percent on traditional wells. Area under canal irrigation is the highest in Nakhatrana (more than 6000 ha), then in Bhuj (5600 ha) and in third in Lakhpat (4500 ha).

Kutch is lagged behind other districts in Gujarat in terms of mechanisation in agriculture. Spatial distribution of utilisation of various agricultural utilities exhibits sharp intra-regional variations. In terms of total numbers of major agricultural equipments and machineries, Bhuj is ranked at the top position among the talukas in Kutch closely followed by Mandvi. But number of tractors is the highest in Mandvi. Lakhpat and Gandhidham are the two talukas, where use of agricultural equipments is the least. In comparison to other districts, consumption of fertiliser in Kutch is very less. Kutch is ranked at 16th rank in consumption during Kharif season, while at 14th place in consumption during the Rabi season in 2001-02. But position of Kutch improves when considered consumption of fertiliser per cultivator.

Human Resource Base

As per 2001 census, population of Kutch was 1.58 million, constitutes 3.13 percent of population of Gujarat. Average annual compound growth rate of population was 2.29 percent, slightly higher than that of state's growth rate (2.07 %). Intra-regional distribution of population reveals that out of the ten talukas, Bhuj is the most populous and Lakhpat is the least. From 1961 to 2001 growth rate of Gandhidham taluka has been the highest, followed by Bhuj and Lakhpat.

Trend Based Estimation

Population in the region will reach approximately 1.81 million in 2011 with an average annual compound growth rate of 1.5 percent, when the population of Gujarat will be 60 million. Urban population in Kutch will be approx 0.54 million in the same year. Gandhidham is the largest urban centre in the region with a population of approximately 152 thousand in 2001 and is the centre for commerce and industry. Bhuj the district head quarter of Kutch is the second largest in the region with an approximate population of 136 thousand and is also a growing city.

Density and Sex Ratio

Gross population density in Kutch is only 34 persons per sq km (Census of India, 2001), which is the lowest and almost one seventh of the same of the state. Taluka-wise variation of density again reveals concentration of population only in few talukas.

From 1911 to 1971 sex ratio of the district was above 1000. But since than ratio is changing and in 2001 it became 942; still slightly higher than the state's figure at 920. Mandvi taluka has highest females per 1000 males i.e. 988 and Gandhidham has the lowest i.e. 892.

Literacy is the Key Issue

The Census of 2001 reveals that literacy rate in Kutch was 59.1 against state's 69.1. In a comparison with the other districts, Kutch possesses a lower literacy level. Within Kutch, Mandvi taluka has the highest rate at 69.93, while Rapar has the minimum i.e. 39.7. Female literacy rate in Kutch was only 48.6 in the same year. Kutch has very high percentage of people without formal education, which is 42 percent of the total literates. Again half of the total literates in the region attained only matriculation and a less levels. There are less than four percent of the literates with more than a graduate degree and above. As per 1986-90 data, net enrolment rate of age 6-11, in Kutch was 71.48 percent, which is lower against state's 74.4. Dropout rate (class I-IV) for years 1986-90 was 42.74 (Hirvey and Mahadevia, 1999).

Workforce Participation and Composition

Workforce participation rate in the region was 38.3 percent, against the state's 41.9 percent. The percentage of main worker to the total population is 31.46, which is one of the lowest in the state. The proportion of marginal workers is as high as 6.8 percent. Kutch contributes 2.85 percent of the workforce of the state. In comparison to other districts Kutch exhibits a lower share of cultivators in main workers. The decade of 1991- 2001 observed a negative growth in cultivators in the region. The average annual growth rate of cultivators during the decade was -0.85, against state's 0.35. The region contributes approximately 7 percent workers in household industries in Gujarat, which is a typical characteristic of the regional population. In the last decade workers in household industries have increased with an average annual compound growth rate of 9.7,

Gandhidham taluka has the minimum proportion of cultivators, agricultural labourers and household workers due to existence of the port and port related and industrial activities, which have been further

enhanced during recent years through influx of further investments in industries and port related activities. Contrast can be seen in Rapar, which has the highest proportion of cultivators and a large share of agricultural labourers.

Industrial Development

Industrialisation in Gujarat did not have major impact on Kutch till the year 2000. In Gujarat total 6656 industrial projects were sanction under IEM, LOP, LOI from 1991 to 2000 in that share of Kutch was only 134, which was only around 2 per cent. Though Gujarat is the second most favourite destination for industries but within the state industrial development took place only in five districts; in Ahmedabad, Vadodara, Bharuch, Surat and Valsad, which has increased regional inequalities. Around 73 per cent of the total industrial projects implemented after August 1991 in the state were in these districts. Surat ranked top among other districts of the state with 19 per cent of total projects implemented in the state followed by Bharuch, Vadodara, Ahmedabad and Valsad. In other regions North Gujarat and Saurashtra region had received 11 and 9 per cent industrial projects.

Growth since Liberalisation and Special Incentives

There is clear cut evidence of increase in influx of investments after adoption of open market polic ies in the early 1990s. In Gujarat, as a whole from 1983 to 1990, projects worth of only INR 98.10 billion were cleared and out of it only projects worth of INR 0.13 billion were in Kutch which was around 0.1 per cent of the total investments in Gujarat. On the other hand, after liberalisation industrial projects worth of INR 2806.26 billion were sanctioned in Gujarat and out of which projects worth of INR 149.92 billion were in Kutch which was around 5.34 per cent. After the special incentives are provided for Kutch in the year 2001, industrial progress attained a new momentum. After 2001 in Gujarat projects with a total investment of INR 612.61 billion were sanctioned and out of it projects of INR 179.55 billion (till August 2004) were in Kutch, which is a remarkable 29 percent of the total investment in Gujarat. This figure has crossed INR 200 billion in January 2005.

Projects already commissioned have provided employment to 12988 persons and project under implementation will provide employment to around 72494 persons. During August 1991 to 2000, estimated employment in the industrial projects in Kutch was a total of 5710 persons. On the other hand, the same after 2001 in a span of four years was 5527 persons, which was considerably high. Kutch is one of the significant receivers of FDI in the state. In terms of number of project Kutch was positioned at 9th among the districts in Gujarat. But in terms of investment, Kutch was positioned at 4th position among the districts with a total investment of INR 74.23 billion. Ahmedabad district had received the highest number of FDI projects and the lowest was in Surendranagar district.

Rate of implementation of FDI projects is higher in Kutch as compare to the state level figures. In Kutch rate of implementation of FDI projects is 79 per cent whereas in Gujarat it is 71 per cent. Out of 24 projects approved in Kutch 12 are already implemented and 7 projects are under implementation phase. FDI approvals received in Kutch are in Vegetable Oils and Vanaspati, Electronic s and Mineral based industries.

Emerging Product Groups and Spatial Distribution Pattern

Within past three years, there is extensive change in the industrial mix in the region. There were only seven basic types of industries in the 2000, which has increased to a total of 14 different types in 2004 and became a total of 17 different types when the projects under implementation are considered. Non-

metallic minerals, and chemical and chemical products, wood products, beverages, paper products, rubber and plastics and electrical machineries, textile and garments product are the major industries.

Prior to the year 2000, industries in Kutch were mostly concentrated in Bhuj and Gandhidham talukas, however there were few standalone industries in other talukas, e.g. Sanghi Cement in Abdasa. But there is an interesting spread of this concentration towards Bhachau and Anjar talukas after 2001.

Growth of Small Scale Industries

Kutch is positioned at 16th in term of registration of small-scale industries in Gujarat. In 1992, registered small-scale units were 2294 and have increased to 5513 in 2004. Comparison shows that growth rate in Kutch is 8.2 per cent, which is higher than state's growth rate of 6.6 per cent. Total investment in small-scale industries in the district is approximately INR 1005.3 million and total employment is around 31898 in 2004. Bhuj and Gandhidham are the leading talukas in registration of small-scale industries. Around 62.2 per cent of the total registered industries in Kutch are in these two talukas. Data from the District Industries Centre (DIC) exhibit that up to March 2004 around 5513 small-scale industries are registered in Kutch. Gandhidham was ranked 1st with 2088 small-scale industries, followed by Bhuj with 1341, Anjar with 865. In Lakhpat is the taluka with the least concentration of small scale units; it had only 30 registered small-scale industries. Along with Lakhpat, Abdasa and Rapar taluka are other two talukas backward in terms of development of small-scale industries. Composition according to the product types of small scale industry exhibits 12.9 per cent units in chemical and chemical products, 12 per cent in cotton textile, 6.8 per cent units in metal products, 7 per cent in wood products and 6.1 per cent in glass, clay and cement products.

Small Scale Industrial Clusters

There are total 9 small industrial clusters in Kutch. Clusters of common salt industries are in Mundra, Bhachau, Anjar and in Gandhidham (380 units), printing of cloth is in Anjar (32 units), spinning, weaving and finishing of mill cloths in Bhuj and Mandvi (218 units), printing publishing of books, journals industries in Bhuj (31 units), diamond processing in Anjar (35 units) are the major clusters. According to the Census of Industries 1999 total investment in all these 9 clusters was INR 122.2 million and total production was worth of INR 151.2 million.

Production from SSI

Total production in small-scale industries in Gujarat was INR 102.23 billion and in that share of Kutch was only INR 1.61 billion, which is around 1.57 per cent. In Kutch production from hosiery and garments was the highest at around 20.32 per cent of total production. Second was in wood products, which was around 11.71 per cent of total production.

Exports from Kutch

In terms of exports, Kutch was ranked 13th in Gujarat with a total export of INR 19 million from 8 export oriented units. Export to total production ratio in these 8 units was 23.8 per cent only, which was far below than the average in Gujarat at 50.32 percent.

Industrial Estates

Gujarat Industrial Development Corporation has 11 industrial estates in Kutch, in which, there are 2 in Bhuj taluka, 2 in Gandhidham taluka, 2 in Mundra, 1 each in Nakhatrana, Rapar and Anjar taluka. Total area under these industrial estates is 531.39 hectares and out of that 166.97 hectare is developed with infrastructure and 76.89-hectare of land is already allocated to the industrial units. Available land

for allocation is 90.08 hectare and recently GIDC had required 188.46-hectare land in Mundra taluka for industrial estate.

Special Economic Zones

After conversion of Kandla EPZ into an SEZ substantial growth is experienced in the zone. Presently there are 139 units mostly for garments and textile products, light engineering products and chemical and allied products. Zone's export has reached at INR 10.72 billion in 2003-04. It is evident that if expanded and infrastructure investments are made in a planned and integrated way, due to locational advantages Kandla SEZ can contribute largely to regional economic development.

Mundra Special Economic Zone is an ambitious mega-project promoted by Adani Group covering a 100 sq km of land near the Mundra Port. The group is planning to invest more than INR 20 billion for the project and currently initial project planning is being carried out. It has been recently seen that many large multi-national and national groups are interested to invest in Mundra SEZ. With a large amount of land and planned state of the art infrastructure provisions, by attracting massive amount of investments, Mundra SEZ is capable of changing economic dynamics of the region.

Industry-Port Linkages

Recently developed industrial base in the region is increasing leveraging on the existence of the countries second largest port Kandla and one of the most modern port and container terminal at Mundra. Profile of wood and wood product and edible oil industries provide good examples revealing such a strong relationship.

Tourism Development

Although having unique geomorphic and historic-cultural assets and attributes, Kutch is not yet a very attractive tourist destination. On the other hand, in comparison to few other states, Gujarat as a whole is not an attractive destination in India. Destinations in Kutch only exhibit the general trend available in the state and are not developed.

Archaeological Tourism

With the discoveries in Dholavira potential of Kutch for archaeological, historic and research based tourism has increased up to a great extent. But yet the site has not attracted tourists in large-scale due to lack of publicity, proper documentation and related infrastructure facilities. The unique selling propositions at Dholavira are its 5000 years old town planning, excellent water harvesting and management systems, amphitheatre, the unique signage in its gate, its lifestyle and archaeology etc.

Ecological Tourism

Ecological tourism is an important aspect of the industry. Kutch provides extremely unique ecological regimes creating vast potential in this sector. The Great and the Little Rann of Kutch and their associated features such as Banni Grass lands are unique physical features in the world. Wild ass sanctuary, breeding grounds for flamingos, traditional huts and handicrafts are other important attractions in the areas.

Urban, Heritage and Port Based Tourism

The historic Bhuj with many monumental buildings, lakes and the old fort is also a medium sized city. The recently implemented urban development plan and other urban infrastructure development initiatives have added much more potential for urban-recreational tourism in the city. Similarly

Mandvi, with its historic port, traditional ship building yard, local handicrafts, beaches and palaces is another potential attractive destination in the region.

Kutch has great potential of port based and business tourism, which has not been sufficiently exploited yet. The state of the art ports, Kandla and Mundra and rapid development of Gandhidham near Kandla can act as catalysts for development of port based, business and urban-recreational tourism.

Religious and Nature Tourism in Western Kutch

Lakhpat, Koteshwer and Narayan Sarovar situated in the extreme western part of the country are important religious destinations and surrounding areas also have potential of ecological tourism. Koteshwer, Narayan Sarovar and Mata-no-math are important religious places. The Chinkara Sanctuary located in the proximity to Narayan Sarovar is the home of the Chinkara (Gazella gazelle) of the Indian Gazelle and Naliya/Lala Sanctuary is famous for the Great Indian Bustard. Jakhau with views of the mangroves and natural lagoons is a small port in proximity.

Other Potential Attractions

Moreover, the extinct volcano Dinodhar, which is the highest point in Kutch, 2300 years old Nani Rayan Excavation site, camel breeding farm at Wandh, Dinosaur fossil available in the region, etc have potential of being good tourist spots in future.

Tourist Flow Patterns

Tourist inflow in Kutch, in major destinations was 156 thousand (2003-04). A major portion (73 percent) of the tourists visiting Kutch is from different parts of Gujarat itself, 26 percent from other parts of India and only 1 percent are foreign tourists. Approximately 51 percent of the tourists visiting Kutch visit Bhuj, while Gandhidham receives 37 percent and Mandvi 12 percent (2003-04). Among other destinations Dholavira receives around 5000-6000 people every year. 3 major destinations in Kutch have a total of 59 hotels (July, 2004), providing a total of 2451 bed capacity. The highest numbers of hotels are located in Gandhidham catering an increasing need of business and industrial activities followed by Bhuj and Mandvi.

Executive Summary: Potentials and Sectoral Actions

Dalal Mott MacDonald has been retained by Gujarat Infrastructure Development Board (GIDB) to prepare Kutch Potentiality Report. As per the Terms of Reference spelt out, consultants were to prepare this study report by carrying out detailed resource mapping of the region and eliciting responses from wide cross-sections of stakeholders (i.e. Peoples representatives, Policy makers, Industries operating in the region, etc) through focus group meetings and discussions.

The study was to be carried out in following two distinct phases:

- **Part 1** : Resource Mapping
- **Part 2** : Potential Identification and D evelopment Action Plan

The Part 1 report on Resource Mapping was submitted earlier and presentation was made to GIDB subsequently. During the presentation, consultants' attention was drawn by the review committee, i.e. to accord more emphasis on identification of specific potentials in various sectors of economy and effective action plan to realise the identified potential.

This report on Part 2 adequately covers:

- Potentials in various sectors of economy
- Action Plan
- Impact on Investments and Employment

For identifying growth imperatives and possible growth options for the region, consultants have thoroughly analysed the current situation of the region in terms of:

- Relative strengths and weaknesses in various sectors of importance
- The pace of development in different sectors (Agriculture, Industry, Infrastructure, Social)
- Readiness and preparedness of the region to capitalize the opportunities emerging at regional, state, national and global level

Based on the resource mapping exercise and analysis of various responses / ideas gathered during the focus group discussions and field survey conducted in Kutch, consultants have developed evaluation matrix for identifying growth drivers for the region. The evaluation matrix indicates assesses the overall impact potential of each sector (in short, medium and long term) on regional growth on the basis of favourable and unfavourable factors. Interpretation of these could lead to identification of growth drivers for the region and subsequently possible development options for the region.

The broad outcome of the evaluation has been shown in the table below:

Identification of Growth Drivers

Sector	Overall Impact	Comments
Agriculture	**Short Term :** Low **Long Term :** Low to Medium	Possibility of bringing Agricultural Revolution virtually not existent at the moment. However, this sector holds importance as it engages sizeable population.
Industry	**Short Term :** Medium	

Sector	Overall Impact	Comments
	Long Term : High	Most impediments are addressable to a large extent. Possibility of creating exponential growth if synergistic infrastructure issues are also addressed.
Infrastructure	**Short Term :** Medium **Long Term :** High	Most impediments are addressable to a large extent if appropriate models for development and financing are devised. Infrastructure development is crucial for the development of other economic segments also.
Tourism	**Short Term** : Low **Long Term** : Medium	Top end tourism may not be possible to develop. However, some thrust is essential as this sector has high employment generation potential.
Trade/ Business/ Services	**Short Term** : Medium **Long Term :** High	Most impediments are addressable to a large extent. Possibility of creating exponential growth if synergistic industry & infrastructure issues are also addressed.

From this analysis, following crucial inferences have been drawn:

- All the sectors one or the other way are important and can not be excluded from the development thrust. For instance, Agriculture and Tourism may have low potential for providing accelerated growth but they definitely contribute in terms of addressing livelihood issues of sizeable population of the region.
- Though Industry, Infrastructure and Trading sector, each holding immense scope and potential for accelerated growth of the region, the extent of growth depends on the extent to which synergistic linkages among these are simultaneously addressed / exploited.

Based on these inferences, it can be concluded that the approach to development should be multi-pronged and should not be limited to specific sectors / sub-sectors. But at the same time, the focus and thrust ought to be accorded to major growth drivers holding potential for accelerated growth.

With this understanding, the major growth drivers identified for the region are:

➔ Promoting industrialization through:
  - Focusing on industries based on local resources
  - Attracting New Industries or consolidating existing industrial base
  - Cluster Development
  - Special Economic Zones
  - Integrated Area Development Program
  - Port based industrialization
  - Attracting mega projects in the region and dependent ancillary projects

➔ Strengthening port infrastructure and linkages to develop the region as an important logistic hub and trade / business centre

➔ Strengthening of Infrastructure (Industrial, Urban & Social)

➔ Policy Level Initiatives

Development needs and potential for Infrastructure sector need to be ascertained based on assessment of current situation and estimation of strengthening and specific infrastructure needs emanating from the development process.

Since, Agriculture & other primary sector, Tourism, Handloom and Handicraft sector engages sizeable population, it is imperative to identify potential opportunities in these sectors too.

Consultants have attempted to identify potential in various sectors and assessed likely investment flow in the region in a medium term (i.e. 10 years time frame) and its probable socio-economic impact on the region. Subsequent section covers these aspects as well as specific action plan for each sector.

This volume basically covers potential in Agri-Primary, Industry, Tourism and Trade sector. Potential in Infrastructure sector has been covered in a separate volume.

Summary of Agriculture and Allied Sector Development Potential

Kutch is the largest district in Gujarat, in terms of land area, covering almost 23 percent of the state land area. However, Gross Cropped Area (GCA) is 5.01 Lakh hectares which is only 5.18 percent of the state's Gross Cropped Area.

Kutch has large Cultivable and Current Fallow land area (3.48 and 2.56 Lakh Hectares) of 6.04 lakh hectares, which is almost 120 percent of the Gross cropped area of the district (In case of state this is only 28 percent of the GCA). Present Net Irrigated Area in the district is 1.31 lakh hectares, which is only 3.77 percent of the State's Net irrigated area of 34.75 lakh hectares. Kutch is a perennially water starved region due to limited and uncertain rainfall and inadequate irrigation infrastructure.

Kutch possesses 2.56 lakhs (2001) workers engaged in agriculture, which is almost 42 percent of the total workforce. But the region is facing problem of increasing land / water salinity due to over exploitation of ground water resources. Moreover, there are limited manpower availability- sparse population in many talukas. Development in agriculture and allied sector affected due to frequent migration of native population from Kutch, with their animals during draught periods. Due to limited financial resources with small and marginal farmers, there less adoption of high-tech agriculture practices in the district.

Kutch is having longest coastline 406 Km, approx. 25 percent of total coastline of Gujarat. This is a significant advantage for marine fisheries development in the district.

Present Status of Agriculture Development

Agriculture development is mostly concentrating in five talukas of the district. Despite having constraints, Kutch has made significant achievement in the areas of oil seeds (Groundnut, Rapeseed and Castor seed) production and quality cotton production (Conventional, BT and Organic cotton). Though, at state level it has small contribution it has also produced 79735 MT of cereal crops and 8874 MT of pulses crop (1999-2000).

Potentials for Agriculture Development

- Development of oilseeds (Castor seed, Cotton seed, Groundnut, Rapeseed and Sesame) crops and improving its productivity with availability of irrigation in existing and additional areas.
- In non-food crop there is potential for development of cotton (conventional, BT and organic) crop in larger scale.

- Since, Kutch has most of the land free from use of chemical fertilizers and pesticides, there is potential for organic cereals and pulses crops, provided that necessary irrigation facilities are available in the district.

Required Actions for Agriculture Development

- There will be availability of water for 37,000 hectares of land from Kutch Branch of Narmada Canal, as per plans of the state irrigation department and Narmada Nigam. Furthermore, there is also possibilities of getting additional water in Kutch Branch of Narmada Canal, due to relatively lower demand in monsoon period in canal upper end areas, and this surplus water can be stored in high land areas of Kutch for distribution to other water starved areas through link canals, or pipelines or storing in lakes/ check dams or by releasing in seasonal rivers. There is estimated potential of irrigating approx. 80,000 hectares of land from this water. Thus, there is potential of increasing net area under irrigation by 1, 17000 hectares, which is almost 90 percent of the present net area under irrigation. This will certainly be a leap forward in development of Kutch.
- Recycle part of the 200 MLD drinking water proposed to be supplied to Kutch, for reuse in agriculture irrigation and fodder growing for animal rearing.
- Continuing support for use of micro irrigation techniques will optimise use of water and make available water for increased crop areas in Kutch.
- There is need for improvement in soil quality, specifically reduction in salinity in many areas, to increase the productivity of land.
- Setting up of value added processing units in Kutch will increase the market potential for agriculture commodities being produced in Kutch and thereby to increase the net realization of agriculture produce in the district.
- Imparting training in high tech agriculture in Kutch will increase the agriculture productivity with the increase in irrigation facilities.
- Creating Kutch as a hub for organic products will open up newer market opportunities for farmers in domestic and export markets.
- Appropriate marketing infrastructure for agriculture produces (incl. for organic produce) and thereby increases the net realization of agriculture produce in the district.

Agriculture Development, Potential Projects

- Value added processing units for oilseeds and cotton processing as local raw material is available in Kutch.
- Oil and oil cake based industries like vegetable oil refineries and cattle feed units in Kutch
- Creating marketing infrastructure for organic certified produce to enhance the organic cultivation in Kutch.

Agriculture Development, Expected Impact on the Economy

Development in agriculture will have significant impact on economy as larger section of workforce (42 percent) is involved in this activity. Development in agriculture will also support indirectly development in allied sector like animal husbandry, which will have further positive impact on development of economy of Kutch, especially in semi-urban and rural areas.

Present Status of Horticulture Development

Despite having constraints Kutch has made significant achievement in the area of horticulture development specifically, Mango, Date Palm and Papaya cultivation in fruits, Isabgol and Senna cultivation in medicinal plant cultivation.

Kutch has 1440 Hectare area under Mango (mainly Kesar) cultivation; with 10 MT / hectare average productivity it produced 14400 MT in 2001-02. Kutch has 99 percent area of Date Palm cultivation of state. It produced 59046 MT, with approx. 6MT/ hectare productivity. Kutch is producing approx. 37 percent of total Isabgol production of Gujarat, i.e. 7128 MT in terms of quantity. Kutch is also having 7000 hectares of land under Senna cultivation, which is approx. 35 percent of total crop area of India. Kutch has favourable agro-climatic condition for Senna as it grows naturally.

Potentials for Horticulture Development

- Potential of further enhancing of Mango cultivation area as irrigation will be available in more areas,
- There is also potential for increasing area under the Date palm in Kutch.
- Potential for increasing the productivity of Mango and Date palm in Kutch by taking integrated actions in improving agronomy practices as well as providing efficient extension services for horticulture development in Kutch.
- Potential for improving the productivity of medicinal crops like Isabgol and Senna by adopting improved package of agronomy practices suitable for Kutch.
- Potential for development of Mango, Date Palm, Papaya, Isabgol and Senna, amongst existing horticulture crops.
- Potential for development of Aloe Vera, Henna, Jojoba, Amla, and Pomegranate as new horticulture crops in Kutch.
- Due to availability of vast fallow land there is also potential for development of new horticulture crop like Jatropha, which is the raw material for bio-diesel.

Required Actions for Horticulture Development

- Ensure availability of necessary farm inputs, pre and post harvest farm technology and training for the cultivators in newer technologies. Also provide quality planting material at competitive cost by creating nursery facilities in the district and arranging supplies from other government nurseries.
- Create value added processing facilities in the district which in turn will create market for increased horticulture produce and ensure remunerative prices for cultivators.
- Assured buy back or contract farming will increase the cultivation of horticulture crops. Amend APMC act to cover all horticulture crops and also to facilitate the contract farming in the district. Also encourage growers to produce export oriented horticulture produce.
- Provide training to youths from rural areas for cultivation of potential horticulture crops and encourage them for cultivation under Employment Generation Scheme (EGS) as similar way in Maharashtra.
- Funding agencies like NABARD, NCDC and NHB should support projects of horticulture development in Kutch on priority basis.
- Create necessary post harvest infrastructure: pack house, pre-cooling units.

Potential Horticulture Development Projects

- 6000 MT Mango Pack house with pre-cooling
- 20,000 MT per annum Dates Processing unit
- 3000 MT / Per annum Isabgol and Senna processing units
- Organic produce marketing infrastructure

Horticulture Development, Expected Impact on the Economy

- It will improve per hectare income in Kutch as horticulture crops gets higher realisation as compared to other agriculture crops.
- It will generate new direct and indirect employment opportunities for youths specifically in the rural areas and will provide alternate source of income.
- This will open up opportunities in food processing and for value added processing.
- Mango, Isabgol and Senna being export oriented crops; it will help in earning valuable foreign exchange for the country.
- Jatropha will provide a renewable source of energy in the form of Green Fuel – Bio-diesel.

Present Status of Animal Husbandry Development

Animal husbandry is the second largest employment provider in Kutch after main agriculture. 'Banni' in buffalo, 'Kankrej' in cow and ox, 'Patanwadi' in sheep and 'Kutchi' in goat are proven important breeds of Kutch. Due to perennial shortage of water, animal husbandry sector is adversely affected. It also results in seasonal migration of livestock breeders with livestock.

Due to large area of the district and scattered villages, distribution of animal breeding and healthcare facilities is difficult. There is also shortage of staff in animal husbandry department of state government for providing vital animal healthcare extension services.

Animal Husbandry Development Potentials

- Potential for development of local Buffalo breed 'Banni', which is famous for its higher milk out put and for development of cattle stock in Kutch, as local breed 'Kankrej' cow and bull are famous for their quality.
- Sheep and goat rearing is being done by nomadic tribes of Kutch and with proper planning of extension services there is potential for development of these animals for milk, wool and meat purpose.
- Potential for development of smaller project of value addition in animal husbandry based processing industries in Kutch. Due to larger size of the district it is not possible to have larger centralized facilities, instead it is more appropriate to have localized smaller primary processing units.
- Possibilities for rearing animals for production of organic milk should be explored in Kutch. This can also provide opportunity to have milk products from organic milk, which has demand in domestic and export markets.

Required Actions for Animal Husbandry Development

- Integrate modern animal breeding techniques with age old experience of local caste and tribes which are rearing quality animals in Kutch since centuries.
- Ensure vital inputs for animal husbandry development such as water, fodder, green pastures for grazing, cattle-feed and animal healthcare facilities.

- Encourage value added processing of animal husbandry products such as milk, wool, meat and leather to have enhancement of value of overall sector.
- Strengthen the state animal husbandry department's network in Kutch, which is unable to provide sufficient extension services due to scarcity of staff as well as longer distances in Kutch, due to large size of the district.

Potential Animal Husbandry Development Projects for Kutch

- Mini milk dairy for milk and milk products based on local milk supplies.
- Wool and mohair processing unit for producing Carpet, Blanket and Shawl quality wool.
- Small tannery unit for processing locally available leather.
- Animal waste based organic manure manufacturing unit will get ready market of organic crop cultivators within Kutch.
- Scientific animal breeding farm, specifically for 'Banni' breed development and 'Kankrej' cattle stock development will be providing basic infrastructure for animal husbandry development in Kutch.

Animal Husbandry Development, Expected Impact on the Economy

Animal husbandry development will have direct impact on the development of rural economy. It will generate employment and additional income for rural people including of women. Animal husbandry development will also provide organic manure for development of organic farming in the region.

Present Status of Marine Fisheries Development

Kutch significantly contributes to marine fisheries production of Gujarat. It is producing 12.10 percent (80,000 MT) of the state's production. Marine fisheries have 3 percent CAGR in Kutch and in last 5 years it has grown from 67000 MT productions to current 80000 MT level. In terms of value, marine fisheries industry of Kutch is of Rs.18500 Lakhs. Kutch has 52 landing points for fishermen and Jakhau is an important fishing port, receiving approx. 7.93 percent of the state's marine fish catch.

There is lack of basic infrastructure such as ice plant, refrigeration plants, cold storages, fishing net manufacturing unit, fishing vessel repair dry dock facilities etc. There is absence of value added processing; this also results in lower value realisation.

Potentials for Marine Fisheries Development

- Potential for development of ice plants/ cold storages, freezing plants etc and also for fish net manufacturing unit as nearly 1550 fishing boats are in operation in the coastal areas.
- Potential for development of fish seed hatcheries and shrimp farming along the coastal line in the Gulf of Kutch and in other potential areas such as Little Rann.
- There is also possibility of enhancing the marine fish production by providing basic infrastructure for development of marine fisheries.
- Potential for development of fish processing including units of fish powder and fish oil manufacturing around port areas.
- Possibilities should be explored for unit to manufacture organic manure based on marine fisheries industry waste.
- Potential for development of export oriented fish processing unit near the ports.

Required Actions for Marine Fisheries Development

- Suitable incentives for attracting private / public investments for fisheries infrastructure development projects.
- Allotment of land on priority basis for development of shrimp farming and fish hatcheries.
- To carryout a detailed feasibility for better fishing vessels, GPS for accurate navigation and support through remote sensing facilities for movement of fish lots.

Potential Marine Fisheries Development Projects

- Fisheries infrastructure projects like ice plants / cold storages and fishing vessel repair dry dock facilities at important fishing ports.
- Value added fish processing unit to manufacture dried / canned / frozen fish products, fish powder and fish oil units also have potential in Kutch.
- Setting up of fishing net manufacturing unit in Kutch particularly in main industrial area.

Marine Fisheries Development, Expected Impact on the Economy

Development of basic infrastructure for marine fisheries industry will enhance further marine fish production in Kutch. Development of marine fisheries in Kutch will provide employment to coastal area population, otherwise which is not having alternate source of income as coastal areas is also having high land salinity and not suitable for normal agriculture / horticulture activities.

There will be significant economic impact, with the development of basic infrastructure for marine fisheries development and in turn with development of value added Marine fish processing in Kutch. This will open up newer employment opportunities for youths and women in the area like it has provided opportunity in the coastal areas of Veraval and Porbandar in Saurashtra region.

Indirect benefit of employment generation for fishermen families will be important in terms of reducing ill-legal activities like smuggling and drug trafficking in the area. Fish net manufacturing unit can also generate gainful employment opportunities for fishermen families, including for women.

Industrial Potential

The industrial potentials have been identified in following areas:

- Local Resource Based Industry
- Incentive Induced Industry
- Mega Projects

Local Resource Based Industries

Salt and Salt based industries

Potential Areas	▪ Enhancing Salt Exports from Kutch considering favourable factors like best yield, possibility of enhancing area for salt cultivation, availability of ports ▪ Value added down-stream industries (i.e. Caustic-Chlorine, Soda Ash, Liquid Bromine and its derivatives)

Constraints	***Enhancing Salt Export*** ▪ Higher trade logistic costs compounded by Infrastructure bottlenecks ▪ Lack of appropriate institutional mechanism ▪ Poor quality due to use of obsolete technology ▪ Absence of large refineries ***Chlor-Alkali and Soda Ash*** ▪ Overcapacity & problems of chlorine utilization ▪ Lack of consuming end-use industries ▪ High Energy Cost
Action Agenda for Potential Development	***Enhancing Salt Export*** ▪ Expansion of salt pan areas / focus proximity to ports ▪ Enhancing port facilities & Creation of dedicated berths in the ports ▪ Increase loading rate to international standards ▪ Technology up gradation and creation of large refineries ▪ Siting new salt works in close proximity to port - minimise inland transportation cost ***Salt Downstream Industries (Caustic / Chlorine and Soda Ash)*** ▪ Allocating Lignite for captive power generation ▪ Developing large consuming industries in the region (i.e. Large Chemical complexes, Glass units, etc)

Minerals and Mining Based Industries

Potential Areas	▪ **Small scale value added projects** – Activated Bentonite, Organo clay, Catlitter, Processed Bentonite, Coated Silica, Precipitated Silica, Agate Display Articles, Dimension stone sizing, Marine Gypsum Washing. ▪ **Medium & Large Scale Value added projects** - Slip House, Blended Cement, Lignite based chemicals, Alumina House, Calcined China Clay, Paper Coating Clay, Metcoke from Lignite, Refractory Magnesia ▪ **Other Value addition Possibilities** - Zeolite-A (Detergent grade) and Proppant for well stimulation from low grade Bauxite
Constraints	▪ Coastal regulation zone notification 1991 and Environmental Impact Assessment Notification (1994) restrict exploitation of minerals within 500 meters from high-tide mark as well as minerals within sanctuary areas. ▪ Ceramic grade china clay, high swelling bentonite deposits, cement grade limestone are locked up within "Narayan Sarovar Chinkara Sanctuary and Wild Ass Sanctuary". ▪ No Broad-gauge linkage up to power projects and cement project sites. ▪ Shortage of qualified processors, erectors and technology suppliers. ▪ Distance from consuming markets of western sector. ▪ Shortage of water for china clay and silica sand processing units. ▪ Lack of analytical mineral testing laboratory within the district. ▪ Lack of judicious & balanced study reports for environment impact on mining activities for locked up mineral resources within sanctuaries.
Action Agenda for Potential Development	▪ Initiate judicious & balanced study (by multi-disciplinary committee) for the assessment of environment impact of mining activities for locked up mineral resources within sanctuaries. ▪ Identified inventory gaps for china clay, Bentonite, White clay, Silica Sand can be filled up by launching schemes for prospecting. ▪ Common Mineral Testing Laboratory can be erected by GMDC on a commercial scale on a no-profit-no-loss basis. ▪ Regularise the export of Bentonite, China clay, silica sand, low grade bauxite, a separate berthing facility at Kandla can be considered. ▪ Bentonite, China Clay clusters technology up gradation, personnel training, sponsored R&D projects can be taken up in co-operation of existing Association of individual minerals. ▪ "Mineral Wealth" District web site can be launched by the Government showcasing profiles of identified viable projects. ▪ Special package for transport subsidy on mineral value-added items of export can be considered.

- Royalty concession can be considered for processed minor minerals export
- A separate wing in the GMDC with mineral engineering experts be instituted to implement Value-added mineral product, enhance exports of processed minerals, sourcing and tie-up of high-tech mineral processing technology, sponsoring R&D trouble shooting projects and to attract suggested investments.
- Techno-commercial viability studies need to be carried out for specified Value-added propositions in minerals and mining sector.
- Export oriented Fly ash value-added projects (e.g. Tiles, Blocks, Cable-brick) can be considered based on Panandhro and Akrimota Power Project fly ash.

Handicraft Industry

There is impressive growth in handicraft exports from India. India exported US $1.9 bn in 2003. The exports grew 15% PA past 10 years. India, exported 10% of world's handicraft exports in 2001-02. North America, particularly the USA is the most lucrative market. USA's multiethnic and growing population unlike of Europe and Japan make the most lucrative market. 32% of Indian exports go to USA. India plans to double exports to USA by 2010

Problems and Potentials

Problems associated to this industry are: tourism industry is yet not developed to exploit maximum advantages; productivity is low – inferior technology use, treated as household industry and at household level.

Potentials are increasing due to increasing growth of Indian exports, available local skilled labourers, rich local tradition, SEZs, etc

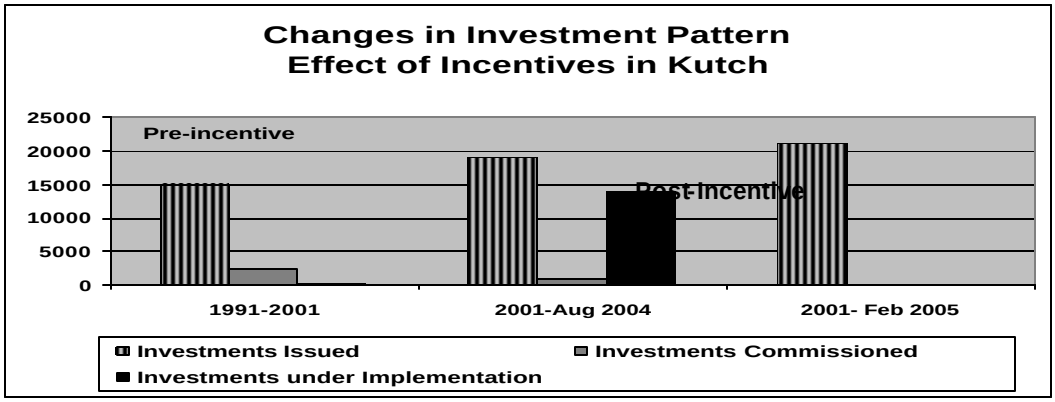
Recent Initiatives and Required Actions

Recent initiatives are impressive. E.g. Common Resource Centre, KNNA, Craft Park in Bhuj, CII – KNNA, Business Resource Centre of FICCI - CARE with NIFT tie up, etc have been created for handicraft development in the region.

Actions, required for development of handicraft industry are: integrated handicraft manufacturing design, training and trade centre within an SEZ, a new industry partnership, financing and marketing model, integration with tourism industry, take part in international shows such as Dallas Super Market Show, USA, Asian Gifts, Premium and Household Product Show, Hong Kong, Bangkok International Gifts and House Ware, Giftionery, Taipei, etc; strategic tie ups with companies such as Walmert, Sears, Zellers, etc, quality control with assistance from Handloom and Handicraft Export Council, NID, NIFT.

Incentive Induced Industry - Potential in Kutch

Analysis of the investment trends in the region clearly indicates the positive effects of incentive schemes.



Analysis of the recent investment trends reveal that the sectors / product groups which have attracted majority of investments are:

- Chemicals
- Edible Oil
- Salt Refinery
- Metcoke
- Wood Products
- Basic Metals
- Steel Pipes
- Edible Oil
- Industrial and Electrical Machineries
- Paper Products
- Food Products
- Metal forming and fabrication

Though the investment attracted in the region is significant, the potential yet to be tapped fully. There are several important sub-sectors, which have strong presence elsewhere in Gujarat have yet not established in Kutch. The list of these sub-sectors along with possible reasons for their phlegmatic response to incentives is given below:

Sub-sectors	Possible Reasons
▪ Dyes and Dyestuffs ▪ Chemicals and Petrochemicals	▪ Generally these industries concentrated near market & cluster ▪ Water / Power Intensive
▪ Pharmaceuticals	▪ Getting attracted to HP & Uttranchal for more attractive incentives (i.e. additional IT Benefits)
▪ Textile Processing ▪ Garments ▪ Gems and Jewellery	▪ Backward Linkage & Manpower based ▪ Infrastructure weaknesses ▪ May get attracted to SEZs

Development potential among some of the above sub-sectors along with action agenda have been summarized below:

Sub-sectors	Potential Projects	Possible Reasons
Textiles	Export oriented, highly labour oriented or less water intensive projects (in / near proposed Textile / Garment Zone of Mundra SEZ) like: ▪ Woven Labels ▪ Denim fabrics ▪ RMG Units ▪ Readymade Knitwears	▪ Special Textile / Garment Zone meeting specific infrastructure requirements of industries be planned in the SEZ. ▪ Also need to attract Large Textile and garment Export Houses to Mundra or Kandla SEZ ▪ Setting up of textile / Garment manufacturing training institutes in the region to develop local capabilities

Sub-sectors	Potential Projects	Possible Reasons
	▪ Grey Cotton Fabric ▪ Cotton Spinning	▪ Cotton Weaving and Spinning yarn projects are power intensives and may some concessions be granted.
Chemicals and Petrochemicals	▪ Very wide range of chemical projects (in organic, Inorganic, Agro-chemical, Dyes & Intermediate, Bulk Drugs & speciality chemicals sector), which are export oriented & less water intensive can come up in Kutch.	▪ Special chemical estates to be developed in the vicinity of ports ▪ Implement few mega project (like LNG Terminal, Refinery or Mega Chemical Industrial Estate) to trigger fast development of chemical sector in the region.
Gems and Jewellery	Projects which are export oriented, Labour-intensive and utilizing local skills for making traditional jewellery like: ▪ Studded Gold Jewellery ▪ Machine cast Gold Jewellery ▪ Diamond Polishing Units ▪ Gems & Jewellery Park	▪ Special Gems and Jewellery Zone meeting specific infrastructure requirements of industries be planned in the SEZ. ▪ Setting up of extension centre of Diamond Training Institute in the region to develop local capabilities ▪ Air linkage is very crucial for the exports of diamond and Jewellery. Immediate attention is required in this direction.

Mega Projects

There are umpteen instances of catalysing / invigorating the regional growth through few ambitious mega projects, besides projects harnessing local strengths and resources. Mega Chemical Industrial Estate (MCIE) and LNG Terminal are the kinds of mega projects, which appear appropriate for the Kutch.

Mega Chemical Industrial Estate (MCIE)

Concept	MCIE is an integrated chemical and petrochemicals estate offering following advantages: ▪ Synergy in function & co-siting ▪ Efficient inflow of raw materials and outflow of finished products ▪ Cost competitiveness ▪ Assured supply of utilities ▪ FDI inflows (through participation of large MNCs) ▪ Environment friendly and less polluting
Concept Genesis	▪ Ministry of Chemicals and Fertilizers' recent initiative to set up MCIE in India on the lines of globally successful model ▪ Gujarats' vanguard position in chemical and petrochemical ▪ Mundra appearing to be a potential location for MCIE
Critical Locational Factors for MCIE	▪ Availability of vast wasteland for such development if the project is planned as green-field project ▪ Availability of existing estate, which can possibly be redeveloped ▪ Nearness to all weather port with suitable conditions – Natural draft, Weather / Tidal Conditions, existing capacity of the ports, Scope for expansion etc ▪ Nearness to Refinery, Petrochemical complex or source of feedstock ▪ Proximity to demand centres ▪ Environment Sensitivity of the region ▪ Availability of Power/ Gas / Water / Rail & Road Infrastructure ▪ Social Infrastructure

Suitability of Kutch as a Potential Location for MCIE	▪ Vast wasteland available for green-field development ▪ Kandla and Mundra appear most amenable along with Dahej. Other locations in South Gujarat are already saturated and does not have much room for expansion and remodelling them would be a complex task ▪ Ports of Kutch (especially Mundra and Kandla) most appropriate in terms of amenable conditions, i.e. Natural Draft, All weather conditions, suitable for Panamax Vessels, Crude carriers ▪ Absence of refinery in Kutch should not be construed as constraint as Refinery can be a part of MCIE as refining capacities needs augmentation ▪ Logistically, ports of Kutch are most appropriate location for importing Crude / Naphtha / LNG for the complex. ▪ Except for few pockets falling under forest and sanctuary, overall the region is environmentally less sensitive because of sparse population, non-cultivable land. ▪ Fewer issues of displacement and resettlement, because of sparse population and remoteness ▪ The issues pertaining to Industrial Infrastructure (i.e. Power, Water, Road connectivity, etc) are addressable ▪ The issues pertaining to Social Infrastructure are addressable and can be taken up in the course of development process
Action Agenda for Potential Development	▪ Identified potential sites near ports where MCIE can be set up ▪ Prepare a conceptual plan and feasibility report for MoCFs' consideration. ▪ Identify potential developers interested in the proposal.

LNG Terminal

Concept Genesis	▪ Renewed interest of setting up another LNG Terminal on the west coast (British Gas at Pipavav and HPCL at Mundra) ▪ State Govt. has already initiated work on LNG terminal likely at Mundra or pipavav ▪ Availability of several sites amenable for constructing LNG terminal on Kutch coastline ▪ There would be demand for Natural Gas as fuel / feedstock for large / mega chemical complex (if it takes shape in the region), power project and desalination plants
Amenability of Project in Kutch	▪ Several amenable sites available in Near Mundra (Between Navinal Island and Bocha Creek) ▪ Important LNG projects in Middle East (i.e. Ras Laffan, Qatargas, ADGAS, Oman LNG) can be convenient sources for Kutch LNG Terminal
Possible Constraints	▪ Large front-end investment is required. ▪ Calls for consortium of investors / developers ▪ Need to form a buyers consortium of assured markets & a long-term agreement with them - typically for 20 years or more with "take or pay" clause. ▪ Long term commitment for payment in foreign currency. ▪ Need to devise an innovative formula for pricing LNG, which can maintain its competitiveness, at least over the period of contract.

Action Agenda for Potential Development	▪ Identify prospective site for the LNG Terminal and associate power plant. ▪ The case for locating LNG Terminal in Kutch needs to be made stronger by combining it with large power plant and mega projects like MCIE. ▪ Work out detailed feasibility of the proposal. ▪ Initiate dialogue with developers (i.e. British Gas, Indian Oil) who have expressed their desire to set up LNG terminal on the western coast
Project Size, Configuration and Project Investment	▪ Project Size : 2.5 MMSCD along with 500 MW Power Project ▪ Proposed Investment : Rs.1600-1700 Crores

Proposed Actions for Overall Industrial Development

Sub-sector wise specific action plan and agenda have already been covered under each sub-sector discussed in previous sections. Following are actions recommended impacting industries across all sub-sectors, for consolidating current pace of industrialization and attracting further investment in Industry sector.

- Land allocation /allotment permissions to be accelerated / and streamlined.
- Upgrade roads and connectivity further and also extend the rail connectivity in the region.
- Special attention / institutional arrangement may be put in place for allocating water allocation to industries, including to Industrial Estates
- Extend Sales tax exemption / deferment for a longer period at a stretch to attract mega and large projects
- Similarly excise exemption time limit be extended for a longer period at one go to facilitate planning of Large Trigger Projects—say for 5 years
- In addition, grant electricity duty exemption/ concession for 5 years to select industries which are power cost sensitive including for captive power plants, may be with limits linked to investment, employment and local content in terms of man and materials.
- Transport subsidy to select industries say salt and minerals which together account for employment of 50000 to 60000 workmen
- Seek Income Tax exemption for (select) industries in Kutch
- Promote LNG terminal and LNG based power Plant
- Encourage desalination plants put up by large / mega industries and estates
- Promote 2-3 more specialized industrial parks and trading centres providing full infrastructure facilities besides 2 SEZs.

Tourism Sector Potential

Kutch is the biggest district in India in terms of area (over 45,000 sq.km). With a variety of ecosystems and most wonderful craft traditions in the country, Kutch has lot to offer in terms of tourist destinations. Kutch has complete package of tourist attractions like:

Tourist Attractions	▪ **Heritage** - Aina Mahal (Old Palace , Kutch Museum, Prag Mahal (New Palace), Cenotaph Complex, Mandvi and Dholavira. ▪ **Pilgrimage** - Swaminarayan temple, Lakhpat, Koteshwar, Bhadreshwar, Anjar ▪ **Wild Life**: Wild Ass Sanctuary, Chinkara Sanctuary, Narayan Sarovar, ▪ **Pleasure** : Marshes of Kutch, Mandvi Beach ▪ **Fairs and Festivals** - Dhrang Fair, Ravechi no Melo, Kutch Mahotsav, Navratri Fair at Mata no Madh, Nakhatrana Fair ▪ **Village handicrafts**: Bhuj, Anjar
Constraints and Challenges	▪ Poor Internal Roads and transport. ▪ High travel time to reach Kutch from places like Mumbai, Surat and Delhi ▪ Absence of Air-connectivity with Ahmedabad ▪ Service infrastructure in terms of Tourist Information Centres, Availability of trained guides, sign boards, Circuits etc. ▪ Non availability of entertainment and shopping Centres, Emporiums/Gift Shops, Parks/Gardens, Theme Parks etc. ▪ Non availability of good eating place and Restaurants/Eateries ▪ Scarcity of water. ▪ A five star accommodation/resort
Potential Projects for Tourism Development	▪ Circuits in Kutch connecting Little Rann Sanctuary, Dasada, Narayan Sarowar, Koteshwar, Mata-no-Madh, Bhadreshwar, Kera, Bhuj, Mandvi, Gandhidham, Wankaner, Konthkot, Village circuit of Kutch. ▪ Development of port facilities for docking of large Cruise liners. ▪ Deluxe and budget hotels. ▪ Road connecting Banni villages area (Khavda) to Dholavira. ▪ Tourist information centres and permanent handicraft shops/haats in line with Delhi Haat. ▪ Beach resort at Mandvi, Pingleswar, Suthali ▪ Unique Projects like Desert Car rally, Night Golf Club ▪ Develop temple town of Narayan Sarovar ▪ Encourage medical tourism (state of the art facilities available at Bhuj now) ▪ Privatisation of TCGL property at Mandvi. ▪ Development of Dholavira by connecting it with Bhuj and Banni villages, Sound and light show, accommodation and restaurants etc. ▪ Wayside amenities with Permanent Handicraft shops/haat in line with Delhi Haat.
Investment Potential	▪ Rs.500 Crores
Action Agenda	***Short Term*** ▪ Aggressive marketing of the kutch festival through print media in national newspapers, magazines (business & travel) and Television commercials. ▪ Restoration of damaged heritage properties like Aina Mahal, Museum, Chatardi and Jaisal toral Samadhi. ▪ Maintenance of Beach at Mandvi with involvement of private parties. ▪ Providing accommodation, food and water facilities at Dholavira. ***Medium Term*** ▪ RO-RO facility/Hover craft linkage facilities from Dwarka. ▪ Encourage cruises from Dwarka. Create facilities for cruises to dock. ▪ Improvement in the Banking facilities (acceptance of travellers cheques and credit cards is absent) ▪ Well designed and developed light and sound shows at important heritage

places like Dholavira and fort of Kutch-Mandvi be organised.
- Some unique projects ,i.e. Desert safari & night Golf Club in small and greater Rann of Kutch to be developed

Long Term
- Kutch to be developed as a separate brand for Gujarat Tourism

Trade and Logistic Hub

The rationale and prospects of trade and logistics hub in Kutch is evaluated below:

Rationale for Trade and Logistic Hubs in India

- Alarming pace of globalization and liberalization of markets is enhancing merchandize trade
- The share of India in the World Merchandise and Commercial Services Export is quite miniscule (about 0.7%) and is ranked below most other South East Economies
- The new Foreign Trade Policy 2004-09 unveiled by the Government hopes to double the country's share of global trade from 0.7 per cent now to 1.5 per cent in the not-too-distant future. Players in the trading sector have a crucial role to play to attain this objective
- Logistics and trading hubs is the key to China's tremendous export success, but remains India's weakest link.
- Few vibrant trade and logistic hubs is need of the hour.

Trade and Logistic Hub- Case for Kutch

- Kutch has a long coastline with number of minor, developing and major ports with most amenable port conditions
- Ports of Kutch are already handing more than 20% of total port traffic and this likely to increase to 25-30 % by next five year.
- It is located midway between the Western and Eastern markets and hence has a potential to act as transit point for international transshipment cargo and throws of potential for re-exports to some of the imported items for vast hinterland to countries in Gulf and middle-east.
- Adequate facilities available for handling container traffic (at Kandla and Mundra P&O Terminal)
- Vast hinterland of North West India, which can be served best by Kutch ports.
- Nearness to Middle East / Northern Africa
- Critical multi-modal connectivity already existing and also being upgraded.

Potential Activities in Hubs

Activities / Facilities / Services
- Warehousing space / facilities
- Office Building
- Facilities for Value addition activities like:
  - Pure Trading (Re-Exports)
  - Stock and Trade
  - Package Labelling
  - Packaging – Bulk to Bags
  - Sorting, Grading and Repacking
  - Manufactured exports from Hub units
  - Internal Re-labeling / Branding
  - Minor Processing of traded commodities

Products for Minor Value Addition and Distribution
- Clothing
- Agri. Commodities
- Edible Oils
- Oilseeds
- Pulses
- Textile Yarn, Fabrics
- Automobiles
- Chemical and Pharmaceuticals
- Polymers and Plastic Products
- POL Products
- Sorting, Grading and
- Electronic Items
- Marine Products
- Electronic Items
- Engineering Goods
- Machineries & Instruments
- Coals
- Textile Yarn, Fabrics
- Automobiles
- Chemical and Pharmaceuticals

Potential Investment in Kutch

In the wake of incentives accorded to Kutch region for industrial investment, several investment proposals have been received from various sectors. About 3.5 percent of investment projects have already been commissioned, while 43 percent is under implementation.

Table I. Table 9.47: Investment Proposals in Kutch

Status	Investment (Rs. Crores)
Investment Proposals	17955
Commissioned	602
Under Implementation	7295

Considering, the status of above announced projects and the opportunities identified in textiles, gems and Jewellery, Chemical (excluding Mega Chemical projects, Salt, Mineral and Agro based industries) and Metallurgical sector, the further investment potential of Rs.10000 -12000 Crores can be expected in these sectors. The corresponding employment generation possibility would be about 75,000 to 80,000.

The sectoral analysis leading to internalisation of potential has been summarised as Vision for Development of Kutch inclusive of industrial potential and possible requirement of infrastructure. An investment scenario emerges out through potential of various development initiatives in Kutch (refer Annex: A Vision for Development of Kutch).

Potential investments in the region is also attempted to estimate through internalising the recent trends of investments in industries. After the earthquake of 2001, the Government of India and the State Government of Gujarat have provided incentives with relaxations in excise duty and sales tax to promote rapid industrialisation in Kutch. Incentives given by the governments have facilitated a boom in the number of attracted industries and investments in the region, which was unprecedented. Data from the Industrial Extension Bureau (iNDEXTb) reveals that Kutch received an investment of INR 78.94 billion (commissioned and under implementation projects) only during August 2001 and June 2004. Looking at the trends of LOI, LOP and IEM issued from August 1991 to August 2004 it shows annual increase of 5 percent and investment has been forecasted. The forecasted figure has been adjusted with the present rate of implementation and finally it has been estimated that Kutch will receive investment of INR 320 billion by 2011 and will create employment opportunities for approximately 1.5 lakh people. From analysis of industries, by 2015 industrial investments is estimated at INR 430 billion and an employment of 1.7 lakh. Both the estimates are almost equivalent. This is sufficient to have major impact on socio-economic conditions and life of people in Kutch.

Sector-wise Investment Potential in Kutch

Sector-wise investment potential has been identified according to the sectoral analysis carried out in the previous chapters and also considering their relationships with sectors such as real estate and logistics.

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)		
(An Investment Potential in Industry, Trade & Infrastructure Sector)		
Sr	Areas	Rs. Crores
A	Industry	

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)		
(An Investment Potential in Industry, Trade & Infrastructure Sector)		
Sr	Areas	Rs. Crores
	Agro & Allied Industries	150
	Mining and Mineral based Industries (SSI & Medium Scale Sector)	1250
	Alumina Project	1200
	Cement Projects	4800
	Export Oriented (Apparel, Jewellery, Light Chemicals, etc)	5000
	Mega Chemical Industrial Estate (including Refinery)	15000
	Salt/ chlor alkali	450
	Down stream and ancillary	1000
	Other projects-incentives, Linkages, agglomeration (incl. Projects under implementation)	14000
	Sub-total(A)	42850
B	Energy	
	Power plants(Thermal)-2000 MW -including LNG based	8000
	Wind Power mills 500MW	2000
	Sub-total(B)	10000
C	Infrastructure	
	Corridor Roads (400 km)	1800
	Rural roads	150
	Railways	1000
	Airport s up gradation	500
	Water Infrastructure	3000
	Ports	3000
	LNG Terminal	1600
	Sub-total(C)	11050
D	SEZ & Industrial Estates	2000
E	Real Estate Development	3000
F	Logistics	
	Trade & Logistic Hubs(i.e. Tankages, Office Complexes, other facilities)	1200
G	Tertiary / services @15 %	10515
	TOTAL	80615

Sector-wise Employment Potential in Kutch

Establishing investments and employment relationships, the employment potential of Kutch is identified in the following pattern:

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)				
(Employment Potential in Industry, Trade & Infrastructure Sector)				
Sr	Areas	Investment (Rs. Crore)	Employment / Rs. Crore Investment	Employment Potential
A	Industry			
	Agro & Allied Industries	150	5.0	750
	Mining and Mineral based Industries (SSI & Medium Scale	1250	0.8	1000

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)

(Employment Potential in Industry, Trade & Infrastructure Sector)

Sr	Areas	Investment (Rs. Crore)	Employment / Rs. Crore Investment	Employment Potential
	Sector)			
	Alumina Project	1200	0.5	600
	Cement Projects	4800	0.8	3840
	Export Oriented (Apparel, Jewellery, Light Chemicals, etc)	5000	2.0	10000
	Mega Chemical Industrial Estat e (including Refinery)	15000	0.3	4500
	Salt/ chlor alkali	450	1.5	675
	Down stream and ancillary	1000	4.0	4000
	Other projects-incentives, Linkages & agglomeration (incl. projects under implementation)	14000	4.0	56000
	Sub-Total (A)			81365
B	Energy			
	Power plants(Thermal)-2000 MW -including LNG based	8000	0.3	2400
	Wind Power mills 500MW	2000	0.3	500
	Sub-Total (B)			2900
C	Infrastructure			
	Corridor Roads (400 km)	1800	0.2	360
	Rural roads	150	0.2	30
	Railways	1000	0.2	200
	Airports up gradation	500		0
	Water Infrastructure	3000	0.5	1500
	Ports	3000	0.5	1500
	LNG Terminal	1600	0.3	480
	Sub-Total (C)			4070
D	SEZ & Industrial Estates	2000	2.0	4000
E	Real Estate	3000	0.5	1500
F	Logistics			
	Trade & Logistic Hubs(i.e. Tankages, Office Complexes, other facilities)	1200	3.0	3600
G	Tertiary/ services @15 %	10515	7.0	73605
	TOTAL	80615		171040

Development Plan Implementation Road Map & Strategy

Preamble

Consultants have identified specific areas of potential for overall economic growth of the region following a systematic process involving:

- Situation Analysis / Resource Mapping (i.e. SWOT analysis of the region)
- Identification of Growth Imperatives of the region (i.e. Growth Drivers)
- Identification of specific initiatives / opportunities in the areas identified as growth drivers

The potential identification exercise identifies potential opportunities in different sectors and initiatives required to exploit these opportunities. The identification exercise has no meaning unless these initiatives are translated into implementable action plan. Consultants have attempted to formulate a strategic road map indicating priority and implementation framework for identified initiatives.

The first and foremost task here is to accord appropriate priority to identified initiatives. According priority is a complex task and often a matter of debate as priorities may be different for different stake-holders. After lot of deliberations /consultations, consultants have devised an easily comprehensible model for prioritization of initiatives.

Prioritization Model

The phasing of Initiatives (i.e. Identified Projects and Actions) can be done on the basis of collective perception of the following three factors:

- **Extent of Private Sector Participation Level possible**

  The private participation alleviates the funding related bottlenecks and hence, consultants believe that projects amenable for private sector participation can be accorded higher priority. Amenability of privatisation (i.e. High, Medium or low) can be judged from few simple factors like demonstrated success somewhere else, risk-return perception of the project.

- **Overall Developmental Impact the project / Initiative is likely to bring**

  The overall development impact can be judged easily by several factors, like employment generation potential, associated social benefits, synergistic and triggering developments in other areas, etc.

- **Complexities involved in implementing the project / initiative, i.e. time and efforts required to remove the road-blocks**

  Assessment of complexities involved in the project can be judged by factors like capital intensiveness of the project, risks outweighing returns, implementation time, environmental sensitivity, approvals required, etc.

Each identified project / initiative has been judged against the above criterion and rated as High or Low. Possible scenarios generated by combination of ratings and priorities accorded to each scenario are explained in the table below:

Priority Matrix

Prioritization Criteria			Priority	Remarks
PSPL	DI	IC		
H	H	L	Top Priority	▪ *These projects / initiatives ought to be taken up immediately considering its favorable conditions from all possible angles.* ▪ *Implementation of these projects / initiatives would attract other investment and would be instrumental in paving way for / catalyzing further development*
H	H	H	Medium-High Priority	▪ *These projects / initiatives to be taken up in a reasonable timeframe considering its relative importance from the angle of developmental impact.* ▪ *Policy level intervention may be required to ease the complexities involved in the implementation.*

Prioritization Criteria			Priority	Remarks
PSPL	DI	IC		
L	H	L	Medium-High Priority	▪ *These projects / initiatives to be taken up in a reasonable timeframe considering its relative importance from the angle of developmental impact.* ▪ *Govt. support may be essential to further these projects /initiatives, since private sector response may be lukewarm.*
L	H	H	Medium Priority	▪ *These projects / initiatives to be taken up at the later stage of the development process (i.e. after 5-6 years) in a reasonable time-frame considering its relative importance from the angle of developmental impact.* ▪ *Govt. support in terms of grants, concessions, incentives and also policy level interventions may be essential to further these projects /initiatives, since private sector response may be lukewarm.*
H	L	L	Low Priority	▪ *These projects appear to be relevant to private sector only.* ▪ *Implementation of specific projects / initiatives may be left to private sector*
H	L	H	Low Priority	
L	L	L	Low Priority	▪ *May be avoidable projects.* ▪ *Can be taken up only at the opportune time when their need arise*
L	L	H	Lowest Priority	

Table below enlists various projects identified along with the accorded priority on above lines:

PROJECT PRIORITIZATION

Sr	Identified Projects	Criteria			Priority	Time-Frame				
		PSPL	DI	IC		Immediate	1-5 Years	5-10 Years	10-15 Years	Later
A	**Agriculture & Allied Sector**									
1	Value added processing units for Oilseeds and Cotton Processing	H	L	L	Low		●			
2	Organic Farming in Cotton, Sesame and Castor	H	H	L	High	●				
3	Oil and Oilcake based industries like edible oil refineries and cattle feed units	H	L	L	Low		●			
4	Mango Pack-house with pre-cooling	H	L	L	Low		●			
5	Dates Processing Units	H	L	L	Low		●			
6	Isabgol and Senna Processing Units	H	L	L	Low		●			
7	Mini Milk Dairy and milk products	H	L	L	Low		●			
8	Wool and Mohair Processing units	H	L	L	Low		●			
9	Small Tannery Unit	H	L	L	Low		●			
10	Organic Manure manufacturing unit	H	L	L	Low		●			
11	Scentific Animal Breeding farm specially for "Bunny" breed development and "Kankej"cattlestock development	L	H	L	Medium-High	●				
12	Cold Storage facilities for fishes	H	L	L	Low		●			
13	Fish net manufacturing unit	H	L	L	Low		●			
14	Fish seed hatcheries and Shrimp farming	H	L	L	Low		●			
15	Fish powder and fish oil manufacturing unit	H	L	L	Low		●			
16	Export oriented fish manufacturing unit	H	H	L	High	●				

Sr	Identified Projects	Criteria			Priority	Time-Frame				
		PSPL	DI	IC		Immediate	1-5 Years	5-10 Years	10-15 Years	Later
B	**Industrial**									
1	Mega / Large Chemical Complex	H	H	H	High			●		
2	LNG Terminal	H	H	H	High			●		
3	Large Desalination Project	H	H	H	High			●		
4	Large Salt / Salt Refinery Project	H	H	H	High			●		
	Mechanised Salt Handling Facilities at Kandla Port	H	H	L	Very High		●			
5	Dedicated Jetty for Salt Export	H	H	L	Very High		●			
6	Caustic Soda / Soda Ash Project	H	L	L	Low				●	
7	Liquid Bromine Project	H	L	L	Low				●	
8	Alumina Project	H	H	H	High			●		
9	Value added Mineral processing units	H	H	L	Very High		●			
10	Export oriented, highly labour oriented or less water intensive projects (in / near proposed Textile / Garment Zone of Mundra SEZ) like Woven labels, Denim Fabrics, RMG Units, Readymade Knitwears, Grey Cotton fabric, Cotton spinning:	H	H	L	High		●			
11	Wide range of chemical projects (in organic, Inorganic, Agro-chemical, Dyes & Intermediate, Bulk Drugs & speciality chemicals sector), which are export oriented & less water intensive	H	H	L	High		●			
12	Export oriented, Labour-intensive projects utilizing local skills for making traditional jewellery like: Studded Gold Jewellery, Machine cast Gold Jewellery, Gems & Jewellery Park	H	H	L	High		●			

Sr	Identified Projects	Criteria			Priority	Time-Frame				
		PSPL	DI	IC		Immediate	1-5 Years	5-10 Years	10-15 Years	Later
C	**Tourism Sector**									
1	Circuits in Kutch connecting Little Rann Sanctuary, Dasada, Narayan Sarowar, Koteshwar, Mata-no-Madh, Bhadreshwar, Kera, Bhuj, Mandvi, Gandhidham, Wankaner, Konthkot, Village circuit of Kutch.	H	H	L	High		●			
2	Development of port facilities for docking of large Cruise liners.	L	L	H	Low					●
3	Deluxe and budget hotels.	H	H	L	High		●			
4	Road connecting Banni villages area (Khavda) to Dholavira.	L	H	L	High		●			
5	Tourist information centres and permanent handicraft shops/haats in line with Delhi Haat.	L	H	L	High	●				
6	Beach resort at Mandvi, Pingleswar, Suthali	H	L	L	Low			●		
7	Unique Projects like Desert Car rally, Night Golf Club	H	L	L	Low			●		
8	Develop temple town of Narayan Sarovar	L	L	L	Low			●		
9	Encourage medical tourism (state of the art facilities available at Bhuj now)	L	H	L	High		●			
10	Privatisation of TCGL property at Mandvi.	H	L	L	Low		●			
11	Development of Dholavira by connecting it with Bhuj and Banni villages, Sound and light show, accommodation and restaurants etc.	L	L	L	Low			●		

Sr	Identified Projects	Criteria			Priority	Time-Frame				
		PSPL	DI	IC		Immediate	1-5 Years	5-10 Years	10-15 Years	Later
D	**Global Trading & Distribution Hub**									
1	Addition of 5-6 berths of adequate lengths to offer suitable linear wharf , allowing berthing of super post panamax vessels	H	H	H	High			●		
2	Expansion of container terminal facilities, i.e. making it adequate enough to increase throughput to 5 million TEU	H	H	H	High		●			
3	Create facilities to make port a one-stop-shipping-centre, i.e. creation of facilities to assure full range of services, including container handling dry-docking, ship repair, bunkering, pilotage services, tug services, arbitration, insurance, and comprehensive financial services, and even, training and education in port operation and management, logistics and distribution management, and other transport studies	H	H	H	High			●		
4	Highly sophisticated and automated warehousing and distribution facilities catering to wide range of storage and distribution needs	H	H	L	Very High		●			
5	Container Freight Station(CFS) / Inland Container Depots (ICDs)	H	H	L	Very High		●			
6	Cold Storages , Silos for Grains, Open Stockyards, Godowns	H	H	L	Very High		●			
7	Chemical / POL Products storage terminals	H	H	L	Very High		●			
8	Testing and Certification Labs	H	H	L	Very High		●			

Sr	Identified Projects	Criteria			Priority	Time-Frame			
		PSPL	DI	IC		Immediate	1-5 Years	5-10 Years	10-15 Years	Later
E	**Infrastructure Projects**									
1	Development of specialised and dedicated berths	H	H	H	High			●		
2	Modernisation of Kandla and development of Kandla – Tuna – Kandla Special Economic Zone Complex	H	H	H	High			●		
3	Ship breaking, repairing and building yards	H	H	H	High			●		
4	4-Lanning of Anjar – Mundra Road	H	H	H	High			●		
5	4-Lanning of Bhuj-Kandla Road	H	H	H	High			●		
6	4-Lanning of Bhuj_Bhachau Road	H	H	H	High			●		
7	2-Lanning of Bhuj – Jakhau Road	H	H	H	High			●		
8	2-Lanning of Bhuj – Lakhpat Road	H	H	H	High			●		
9	2-Lanning of Mandvi – Gadhshisa – Nakhatrana Road	H	H	H	High			●		
	Surfacing of 306 Kms of Rural Roads	H	H	H	High			●		
10	Salt Pan Area Road Network	H	H	H	High			●		
11	Extension of BG line to connect, Bhuj - Naliya – Jakhau	H	H	H	High			●		
12	LNG based power plant (refer LNG terminal)	H	H	H	High			●		
13	Imported coal based plant	H	H	L	High		●			
14	Wind power Projects	H	H	L	High		●			
15	Large Desalination Plants	H	H	H	High			●		
16	Airstrip in Bhuj	L	H	H	High			●		
17	International Airport in Bhuj	L	H	H	High					●

Specific Action Plan

Agriculture / Horticulture Development

- Make appropriate facilities for the storage of monsoon surplus water in KBC in high land areas for distribution to other water starved areas through link canals, or pipelines or storing in lakes/ check dams to irrigate additional land (about 80,000 hectares)- **(GWSSB)**
- Recycle part of the 200 MLD drinking water proposed to be supplied to Kutch, for reuse in agriculture irrigation and fodder growing for animal rearing. **-(GWSSB)**
- Continuing support for use of micro irrigation techniques will optimise use of water and make available water for increased crop areas in Kutch. **-(State Agriculture Department, GAIC)**
- There is need for improvement in soil quality, specifically reduction in salinity in many areas, to increase the productivity of land. **-(State Agriculture Department)**
- Promote value added processing units in Kutch with a view to increase the market for local agriculture / Horticulture produce and to increase the net realization of agriculture / horticulture produce in the district. **-(State Agriculture Department, GAIC)**
- Imparting training in high tech agriculture in Kutch will increase the agriculture productivity with the increase in irrigation facilities. **-(State Agriculture Department, GAIC)**
- Creating Kutch as a hub for organic products will open up newer market opportunities for farmers in domestic and export markets. **-(State Agriculture Department, GAIC, Agencies involved in promoting organic product markets)**
- Appropriate marketing infrastructure for agriculture produces (incl. for organic produce) and thereby increases the net realization of agriculture produce in the district. **-(State Agriculture Department, GAIC)**
- Ensure availability of necessary farm inputs, pre and post harvest farm technology and training for the cultivators in newer technologies. Also provide quality planting material at competitive cost by creating nursery facilities in the district and arranging supplies from other government nurseries. **-(State Agriculture Department)**
- Assured buy back or contract farming will increase the cultivation of horticulture crops. Amend APMC act to cover all horticulture crops and also to facilitate the contract farming in the district. Also encourage growers to produce export oriented horticulture produce.
- Provide training to youths from rural areas for cultivation of potential horticulture crops and encourage them for cultivation under Employment Generation Scheme (EGS) as similar way in Maharashtra. **-(State Agriculture Department, NHB, Large Public / Private Sector players in Fertilizer / Insecticides / Pesticides sector)**
- Funding support to projects for horticulture development in Kutch on priority basis. **(Agencies like NABARD, NCDC andNHB)**
- Create necessary post harvest infrastructure: pack house, pre-cooling units.

Marine Fisheries / Animal Husbandry Development

Marine Fisheries

- Suitable incentives for attracting private / public investments for fisheries infrastructure development projects.**(Revenue Department)**
- Allotment of land on priority basis for development of shrimp farming and fish hatcheries.
- To carryout a detailed feasibility for better fishing vessels, GPS for accurate navigation and support through remote sensing facilities for movement of fish lots **(Fisheries Department)**.

Animal Husbandry

- Integrate modern animal breeding techniques with age old experience of local caste and tribes which are rearing quality animals in Kutch since centuries.
- Ensure vital inputs for animal husbandry development such as water, fodder, green pastures for grazing,

cattle-feed and animal healthcare facilities.

- Encourage value added processing of animal husbandry products such as milk, wool, meat and leather to have enhancement of value of overall sector. **(iNDEXtc, Co-operative Dairies, Animal Husbandry Department)**
- Strengthen the state animal husbandry department's network in Kutch, which is unable to provide sufficient extension services due to scarcity of staff as well as longer distances in Kutch , due to large size of the district.

Tourism Development

Short Term

- Aggressive marketing of the kutch festival through print media in national newspapers, magazines (business & travel) and Television commercials. **(TCGL, Gujarat Tourism)**
- Restoration of damaged heritage properties like Aina Mahal, Museum, Chatardi and Jaisal toral Samadhi. **(TCGL, Gujarat Tourism)**
- Maintenance of Beach at Mandvi with involvement of private parties. **(TCGL, Gujarat Tourism)**
- Providing accommodation, food and water facilities at Dholavira. **(TCGL, Gujarat Tourism, private operators, hotel owners)**

Medium Term

- RO-RO facility/Hover craft linkage facilities from Dwarka. **(TCGL, Gujarat Tourism, Private Operators)**
- Encourage cruises from Dwarka. (TCGL, Gujarat Tourism, Private Operators) & create facilities for cruises to dock. **(GMB, Private Port / jetty Operators).**
- Improvement in the Banking facilities (acceptance of travellers cheques and credit cards is absent)
- Well designed and developed light and sound shows at important heritage places like Dholavira and fort of Kutch-Mandvi be organised. **(TCGL, Gujarat Tourism)**
- Some unique projects ,i.e. Desert safari & night Golf Club in small and greater Rann of Kutch to be developed **(TCGL, Gujarat Tourism, Private Operators)**

Long Term

- Kutch to be developed as a separate brand for Gujarat Tourism. Involve specific promotion agency for the task **(TCGL, Gujarat Tourism, Private Tour Operators)**

Salt and Salt based Industries

Salt / Salt Refining Industry

- Expansion of salt pan areas / focus proximity to ports **(Salt Commissioners office, IC Office, MoEF, GPCB, Private industry players)**
- Enhancing port facilities & Creation of dedicated berths in the ports **(GMB, KPT, GIDB, Salt Industry Association)**
- Increase loading rate to international standards
- Technology up gradation and creation of large refineries
- Siting new salt works in close proximity to port - minimise inland transportation cost

Salt Downstream Industries (Caustic / Chlorine and Soda Ash)

- Allocating Lignite for captive power generation **(GMDC, IC Office, iNDEXTb)**
- Developing large consuming industries in the region (i.e. Large Chemical complexes, Glass units, etc) **(IC Office, iNDEXTb, MoCPF)**

Mining and Minerals

- Initiate judicious & balanced study (by multi-disciplinary committee) for the assessment of environment impact of mining activities for locked up mineral resources within sanctuaries **(GPCB, MoEF, GMDC).**
- Identified inventory gaps for china clay, Bentonite, White clay, Silica Sand can be filled up by launching schemes for prospecting. **(GMDC)**
- Common Mineral Testing Laboratory can be erected by GMDC on a commercial scale on a no-profit-no-loss basis **(GMDC)**
- Regularise the export of Bentonite, China clay, silica sand, low grade bauxite, a separate berthing facility at Kandla can be considered **(GMDC, GMB, KPT, GIDB, IC Office, Private Sector).**
- Bentonite, China Clay clusters technology up gradation, personnel training, sponsored R&D projects can be taken up in co-operation of existing Association of individual minerals. **(GMDC, iNDEXTb, IC office).**
- "Mineral Wealth" District web site can be launched by the Government showcasing profiles of identified viable projects **(GMDC)**
- Special package for transport subsidy on mineral value-added items of export can be considered **(Revenue Department)**
- Royalty concession can be considered for processed minor minerals export **(Revenue Department)**
- A separate wing in the GMDC with mineral engineering experts be instituted to implement Value-added mineral product, enhance exports of processed minerals, sourcing and tie-up of high-tech mineral processing technology, sponsoring R&D trouble shooting projects and to attract suggested investments **(GMDC)**
- Techno-commercial viability studies need to be carried out for specified Value-added propositions in minerals and mining sector **(GMDC, iNDEXTb, IC office).**
- Export oriented Fly ash value-added projects (e.g. Tiles, Blocks, Cable-brick) can be considered based on Panandhro and Akrimota Power Project **(GEB)**

Mega Chemicals Industrial Estate (MCIE)

- Identify potential sites near ports where MCIE can be set up **(GMB, GIDC)**
- Prepare a conceptual plan and feasibility report for MoCFs' consideration **(GIDC)**
- Identify potential developers / anchor investors interested in the proposal. **(GIDC)**

LNG Terminal

- Identify prospective site for the LNG Terminal and associate power plant **(GIDC, IC Office, Prospective LNG Terminal Operators)**
- The case for locating LNG Terminal in Kutch needs to be made stronger by combining it with large power plant and mega projects like MCIE.
- Work out detailed feasibility of the proposal. **(GIDB)**
- Initiate dialogue with developers (i.e. British Gas, Indian Oil) who have expressed their desire to set up LNG terminal on the western coast – **(GIDB)**

Other Potential Industries

Textiles

- Special Textile / Garment Zone meeting specific infrastructure requirements of industries be planned in the SEZ. **(GIDC)**
- Also need to attract Large Textile and garment Export Houses to Mundra or Kandla SEZ **(iNDEXTb, IC Office)**
- Setting up of textile / Garment manufacturing training institutes in the region to develop local capabilities
- Cotton Weaving and Spinning yarn projects are power intensives and may some concessions be granted. **(Revenue Department, GEB)**

Chemicals and Petrochemicals

- Special chemical estates to be developed in the vicinity of ports **(GIDB, MoCPF)**
- Implement few mega project (like LNG Terminal, Refinery or Mega Chemical Industrial Estate) to trigger fast development of chemical sector in the region **(GIDB, Ministry of Energy, Ministry of Oil and Gas)**

Gems and Jewellery

- Special Gems and Jewellery Zone meeting specific infrastructure requirements of industries be planned in the SEZ **(GIDB, IC Office)**
- Setting up of extension centre of Diamond Training Institute in the region to develop local capabilities – **(Diamond Institute-Gandhinagar, Surat)**
- Air linkage is very crucial for the exports of diamond and Jewellery. Immediate attention is required in this direction **(GIDB, IAA, Ministry of Civil Aviation)**

Global Trade & Logistics Hubs

- Enhance current facilities at Mundra and Kandla port (possible enhancement areas could be addition of 5-6 berths of adequate lengths to offer suitable linear wharf , allowing berthing of super post panamax vessels; Expansion of container terminal facilities, i.e. making it adequate enough to increase throughput to 5 million TEU, Matching facilities at container terminal (i.e. quayside cranes having 22-box outreach capable of catering to next generation super post panamax vessels, yard cranes utilizing Differential Global Positioning System (DGPS) ensuring productivity, safety and security; Create facilities to make port a one-stop-shipping-centre, i.e. creation of facilities to assure full range of services, including container handling dry-docking, ship repair, bunkering, pilotage services, tug services, arbitration, insurance, and comprehensive financial services, and even, training and education in port operation and management, logistics and distribution management, and other transport studies.)

- Set up advanced telecommunication infrastructure offering International Direct Dialling (IDD) with links to major trade destinations, Integrated Service Digital Network (ISDN), data communications, video conferencing, sky-phones and services. Information Technology (IT) in logistics management is essential, and calls for electronic data interchange (EDI) network for streamlining processing procedures for import and export and transshipment documents within minutes.

- Set up Highly sophisticated and automated warehousing and distribution facilities catering to wide range of storage and distribution needs

- Attract large distribution companies (like Keppel, Schenker, BMW, PTP, Kenwood) doing distribution after value added processing and leading international logistics operators specialized in integrated logistics, providing quality service to clients in the region (i.e. Federal Express, DHL, UPS, AEI, TNT Express Worldwide, Burlington, Airborne, Nippon Express, and Mitsui-Soko)

- Attract MNCs (such as Sony Corporation, General Motors, Eastman Kodak, Dupont, Caterpillar, Hewlett Packard, AT&T, Ciba Geigy, Fuji Xerox, and General Electric) to establish their central distribution centres (CDCs) to serve their regional and global operations.

- Create excellent Rail & Road connectivity between Warehousing facilities and industrial areas /ports,

- Extend support and incentives

Overall Industrial Development

- Land allocation /allotment permissions to be accelerated / and streamlined **(GIDC, IC Office)**
- Upgrade roads and connectivity further and also extend the rail connectivity in the region **(GIDB,**

GSRDC, Indian Railways)

- Special attention / institutional arrangement may be put in place for allocating water allocation to industries, including to Industrial Estates **(GWSSB)**
- Extend Sales tax exemption / deferment for a longer period at a stretch to attract mega and large projects **(State Revenue Department)**
- Similarly excise exemption time limit be extended for a longer period at one go to facilitate planning of Large Trigger Projects—say for 5 years **(State Govt. to make appropriate representation to Central Government)**
- In addition, grant electricity duty exemption/ concession for 5 years to select industries which are power cost sensitive including for captive power plants, may be with limits linked to investment, employment and local content in terms of man and materials. **(Revenue Department, GEB)**
- Transport subsidy to select industries says salt and minerals which together account for employment of 50000 to 60000 workmen. **(State Revenue Department)**
- Seek Income Tax exemption for (select) industries in Kutch **(State Govt. to make appropriate representation to Central Government)**
- Promote LNG terminal and LNG based power Plant
- Encourage desalination plants put up by large / mega industries and estates
- Promote 2-3 more specialized industrial parks and trading centres providing full infrastructure facilities besides 2 SEZs.

Implementation Framework

After deciding the priority / development phasing, it is essential to formulate the appropriate mechanism to further implementation plan of prioritized projects / initiatives. The implementation plan ought to specify specific actions needed and agency / agencies responsible for initiating / furthering the actions.

From the analysis of various projects / initiatives, it was observed that most projects / initiatives would need private sector participation and some of them in fact on a large scale. Attracting large scale private investments would be a Herculean task and would need a special drive / efforts on the part of the State Government. With a view to invigorate the private investment flow, the State must institute a separate ***"Kutch Corridor Development Cell (KCDC)"*** to facilitate the State Government in the process of attracting industrial investments in the corridor. There are number of bottlenecks in the process of attracting private investments, such as:

- Unawareness amongst Investors about potential opportunities
- Non- availability of well-defined projects
- Funding / Time related bottlenecks at the Project definition and configuration stage

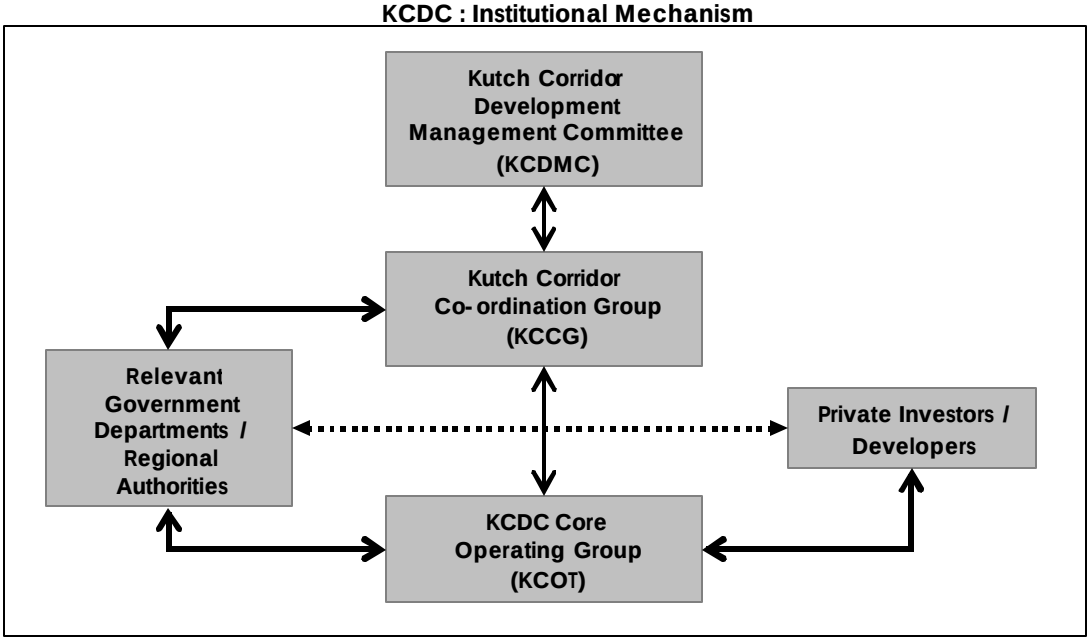
Creation of specific cell would alleviate these bottlenecks and ensure quicker implementation. The broad activities of CDC would include:

- Developing showcase of potential opportunities
- Assisting in the promotion of identified projects / region to targeted investors
- Acting as necessary interface between investing community and the State Government
- Information dissemination to interested investors in the Kutch
- Addressing policy level issues pertaining to specific projects
- Assist in competitive bidding process and selection of appropriate private developers (especially for critical infrastructure projects)

- Continuous progress monitoring , Deviation Analysis and eventual course correction

A well-defined institutional mechanism for KCDC is necessary for forwarding the initiative. The suggested mechanism is schematically shown as Figure-1.

Figure -1
KCDC : Institutional Mechanism



The overall project development institution consists of three components:

- KCDC Core Operating Team (KCOT)
- Kutch Corridor Co-ordination Group (KCCG)
- Kutch Corridor Development Management Committee (KCDMC)
- Project Specific Facilitation Group (PSFG)

KCDC Core Operating Team (KCOT)

KCOT is a day to day operational body involved in furthering the project level initiatives leading towards their implementation. The tasks of the group would involve:

- Prioritization of Project Proposals
- Initial configuring and structuring of projects
- Facilitating interactions between Investor Community and relevant Govt. Departments with a view to eliminate / alleviate bottlenecks and impediments
- Suggest authorities on policy and regulatory issues

Kutch Corridor Co-ordination Group (KCCG)

KCCG acts as an interface between KCOT and KCDMC. Since, KCDMC is the nodal body looking into strategic and policy level planning it is not feasible for them to get into day-to-day operational matters. KCCG is responsible for monitoring and approval of operational matters. Matters that are ratified by KCCG only will go to the KCDMC.

Kutch Corridor Development Management Committee (KCDMC)

The apex body is the KCDMG will play the role as a strategic planning and policy making administrative authority. The KCOT reports to KCDMG through KCCG. As KCDMG is the nodal body, it is not operationally feasible for them to get involved in day-to-day operational matters. Hence, it is proposed to form a Programme Steering Group (PSG) in Kanpur. PSG will be chaired by the M.D, UPSIDC and PDC will act as the member secretary to PSG. The senior officers of the UPSIDC will be the key members of the group. PSG is responsible for monitoring and approval of operational matters. Matters that are ratified by PSG only will go to the IIFMC.

It is suggested to have regular meetings of the KCDMC in Gandhinagar / Bhuj / Gandhidham to review, approve proposals and eliminate any policy impediments in implementation. PSG will meet once in a fortnight formally to review the progress and give directions and approval in operational matters, although a day-to-day sharing of information and co-ordination between PDC and UPSIDC officers is envisaged. PDC will act as a secretary to PSG and will be responsible for preparing the agenda for meetings, preparing minutes, supplying information, etc.

Project Specific Facilitation Group (PSFG)

It also proposed setting a focussed Project- Specific facilitation group (PSFG) for complex projects such as:

- Mega Chemical Estate
- LNG Terminal
- Special Economic Zones
- Trading Hubs
- Large Salt Project

The Project Specific Facilitation Group (PSFG) for each of the above projects should consist of Specific Industry experts, project structuring experts, Environmental specialists and Legal and Contract Specialists. PSFG is a supportive body at the field-level to assist and advise the IIFMC and PSG in co-ordination with departments, eliminating impediments and inadequacies, and expediting progress.

Assessment of Socio-economic Impact

Impact on Social Structure

Development of Export hub and industrialisation will increase employment opportunity in the region, which is potential to lead to influx of skilled and unskilled labours from other parts of the state and country. It is envisaged that Bhuj, Gandhidham, Mundra and Bhachau will experience major influx of population with cultural diversification and multi-culturalism.

Impact of Mega Projects

Initially the mega-projects may not create substantial local employment, but these projects are capable of generating ancillary and down stream small and medium industries and numerous services, which will maximise local employment opportunities. Such projects will also contribute to development in the region through:

- by providing domestic water supply to surrounding villages, towns and communities,

- setting up of townships, schools, hospitals and sport and recreational facilities,
- supporting development of urban and regional infrastructure,
- supporting various training programmes and local resource based community development programmes, etc.

Impact on Urban Economy

Sudden influx of population is potential to create demand and supply gap in housing and real estate. This may initially lead to sharp increase in real estate prices to increase investments in real estate business. Construction industry will experience positive growth trend. Commercial activities in cities will increase, new shopping malls will come up and entertainment and recreational spots will be developed. It will change face of cities and revive economy of cities by generating supporting activities.

Impact on Regional Economy and Employment

Export hub and industrialisation will create employment opportunities and there are possibilities of occupational shifts and intra-regional migration to cities. Approximately 50,000 marginal labourers in agriculture and allied activities may shift towards various secondary and tertiary activities. It is estimated that additional 150 thousand employments will be generated in Kutch by the next decade. Employment created by the industries and in service sector will improve economic status of people through increase in income and ultimately leading to higher purchasing power. Export hub will have multiplier effect on local people by opening new avenues for commercial activities and tertiarisation.

Impact on Environment

Industries and construction activities in region may have adverse impact on environment and ecology of region, which can be checked and minimised through adoption of environmental management plans and procedures. Particularly, region's depleted water resources, wild and marine life, rich traditional culture, grass lands and other environmentally sensitive aspects are important aspects to consider in such plans.

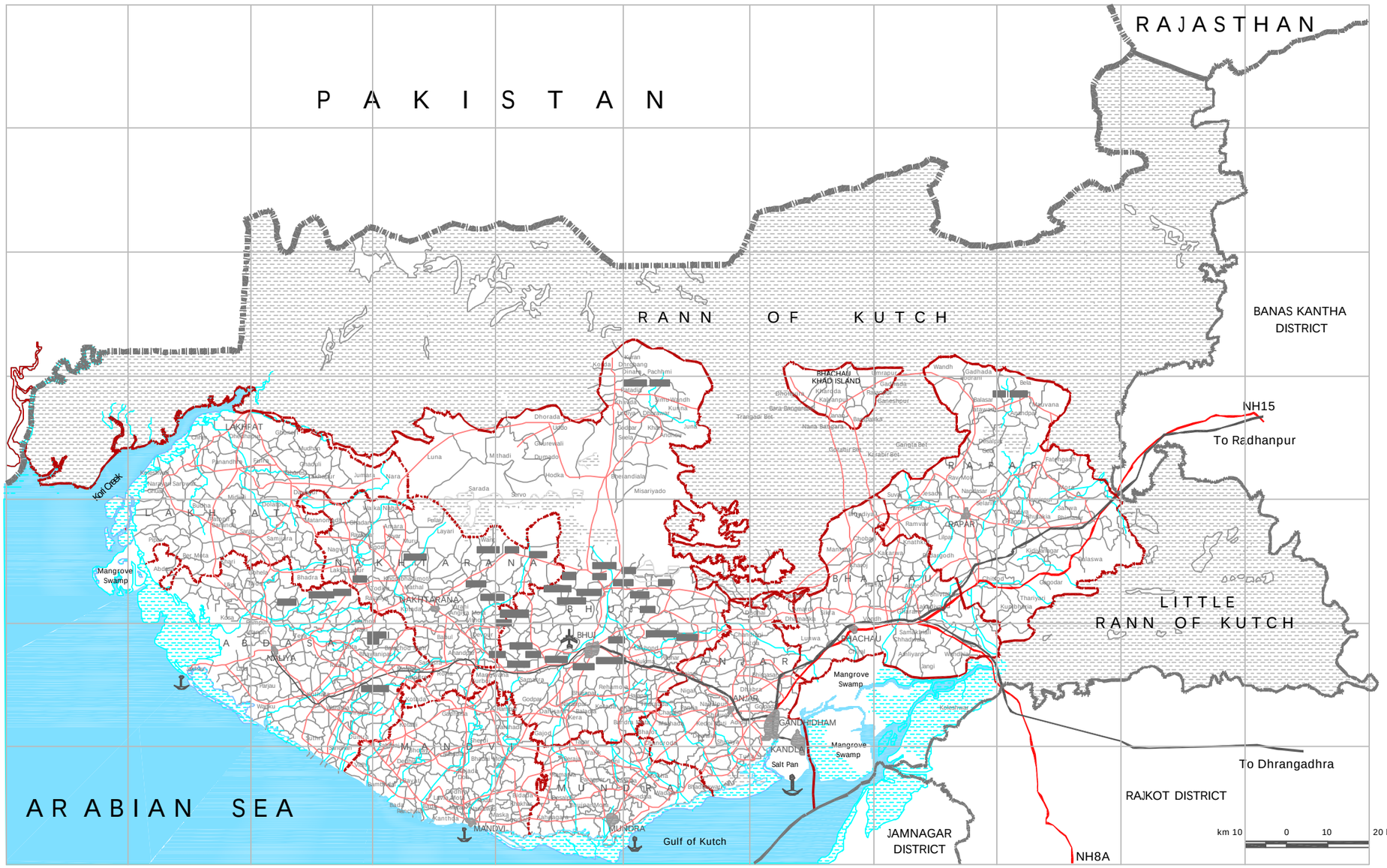
Vol. I, Part I

State of Development of Kutch

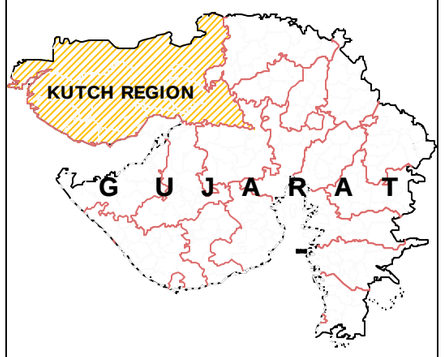
1.1

Mott MacDonald

Dalal Mott MacDonald



KEY MAP



LEGEND

- International Boundary
- State Boundary
- District Boundary
- Taluka Boundary
- Village Boundary
- Railway Line - Broad Gauge
- Railway Line - Metre gauge
- National Highway
- Other Roads
- River / Stream
- Mud Flats
- Water Bodies
- Rann
- Urban Settlements
- Major Port
- Minor Port
- Air Port

N

Source : Survey of India and Census of India

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.

Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
Web www.mottmac.com

Gujarat Infrastructure Development Board
8th Floor,
Block No. 18
Udyoug Bhavan,
Sector-11,
Gandhinagar, 382 017
Gujarat, India.

Tel +91 (79) 3232701, 3232704
Fax +91 (079) 3222481
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R1	27.07.05	SP	Issue for Final Report Submission	YS	AMR
R1	08.08.04	MAS	Issue for ------ Report Submission	VG	AK
R0	30.07.04	MAS	Issue for ------ Report Submission	VG	AK

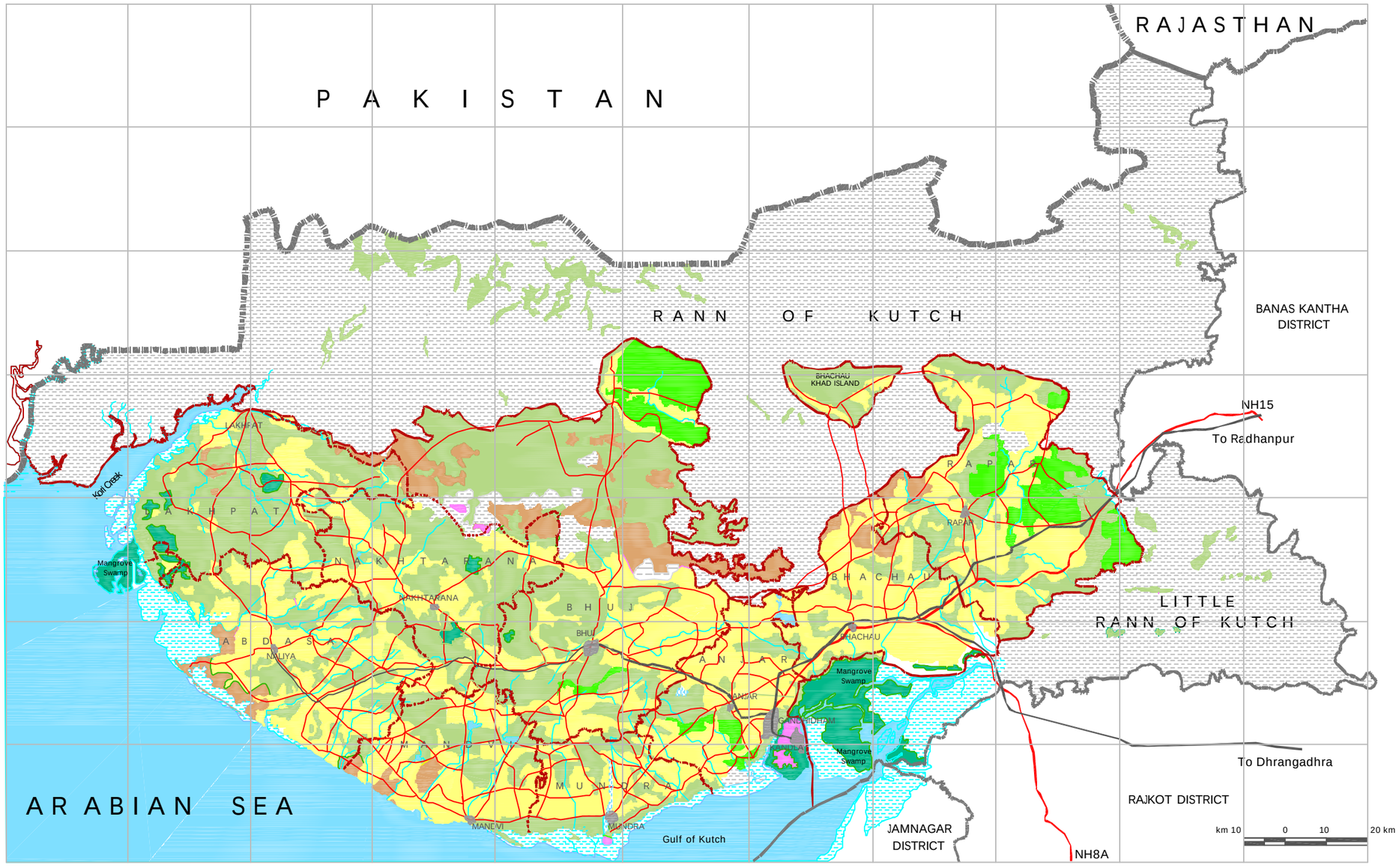
Kutch Region

Base Map

Study on
Potential Development of Kutch

Drawing No.
214002/BASE-MAP/0001

Drawn	MAS
Checked	VG
Approved	AK
Scale	NTS
Rev.	R1
Status	APR



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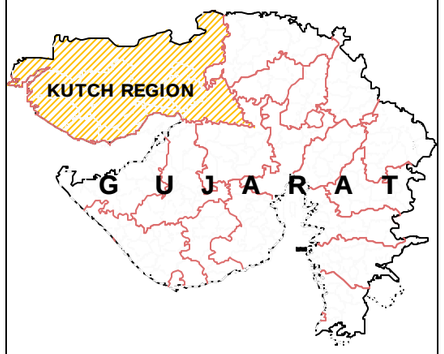

LEGEND

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- Railway Line - Broad Gauge
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- Water Bodies
- Rann
- Urban Settlements

Landuses

- Arable Land
- Non-agricultural Land
- Forest
- Scrub
- Culturable Waste Lands
- Unculturable Waste Lands

N

Source : Survey of India

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.

Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
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Kutch Region

Landuse Map

Study on
Potential Development of Kutch

Drawing No. 214002/LANDUSE-MAP/0002

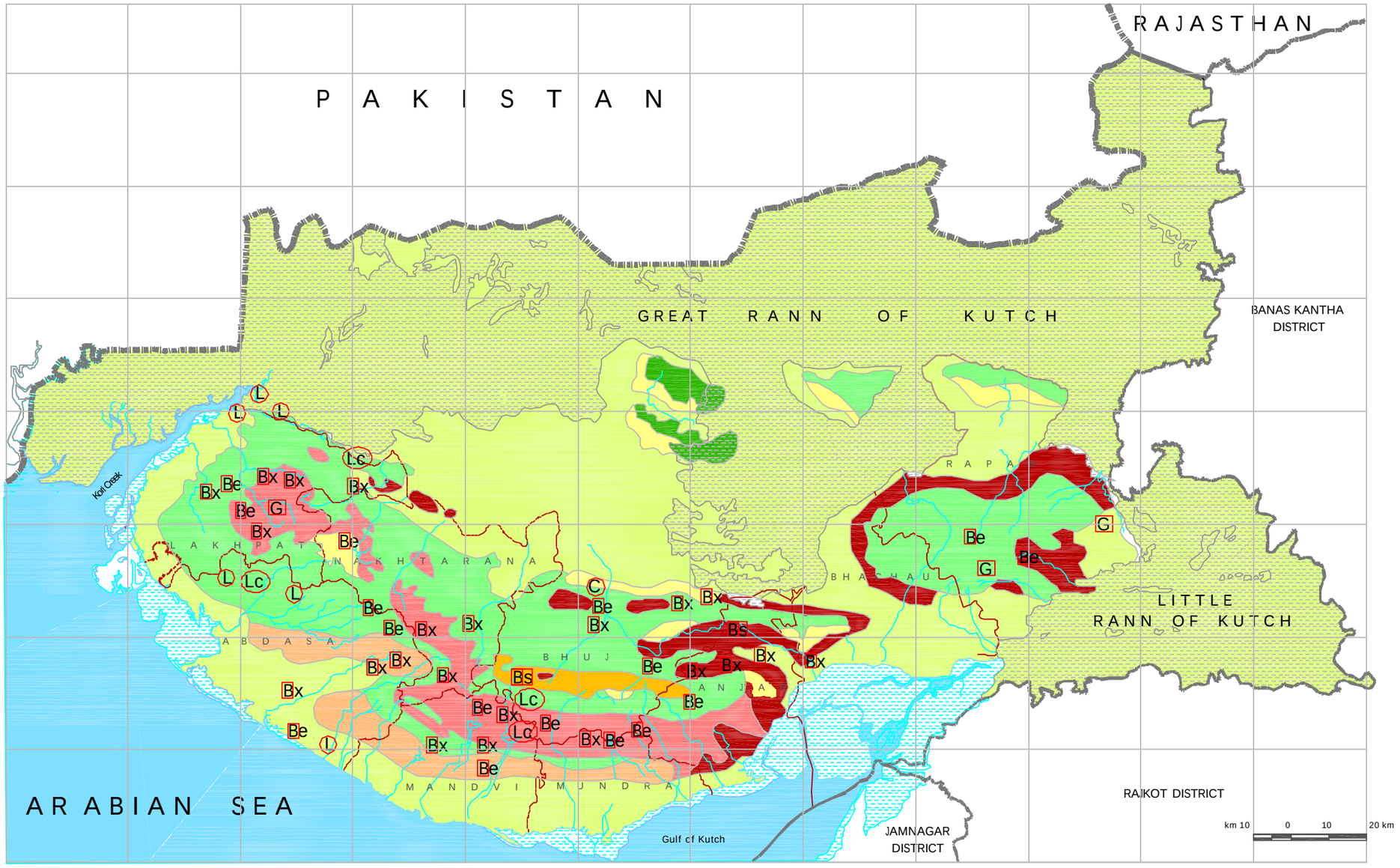
Drawn	MAS
Checked	VG
Approved	AK
Scale	NTS
Rev.	R1
Status	APR

1. Mineral Resource Base

1.1 Brief Geology and Mineral Availability

The geological formations in the region range from Middle Jurassic to late Tertiary periods. It has unconformities breaking the succession between the Middle Cretaceous and Supra-trappean and Middle Kirthar and finally Miocene and Pliocene. Kutch is considered to be an eastern extension of the mobile belt then a part of the unfolded and stable peninsular foreland of India. In this orogen, Mesozoic and Tertiary terrestrial and marine sediments and Deccan Traps have been involved in folding movements which began in middle Tertiary time and continued intermittently into the Quaternary.

The Jurassic rocks occupy a large area in Kutch and are exposed in three anticlinal ridges trending east-west. The northern range which is about 160 km long includes four elevations, viz., Pachham, Khadir, Bela and Chorad in the Rann of Kutch. The middle range is about 290 km from Lakhpat to west. The southern ridge, south of Bhuj, is 64 km long. The general anticlinal folds in Kutch are NW-SE in the western part of the district swinging to E-W in the eastern part. Small structural domes and saddles, aligned along the anticlinal axes are typical to this region. The basic rock formation is of four main divisions based on fossil contains, viz., Pachham, Chari, Katrol and Umia series. Geology of Kutch has provided the region with various non-metallic minerals in abundance.



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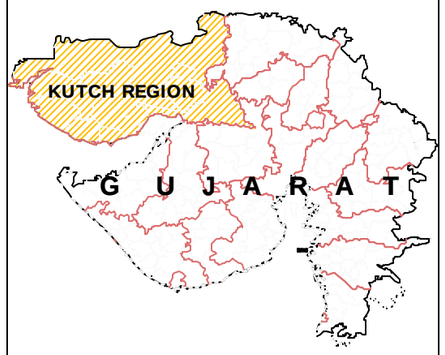

LEGEND

- International Boundary
- State Boundary
- District Boundary
- Taluka Boundary
- River / Stream
- Mud Flats
- Water Bodies
- Rann

ROCKS

- Basalt and associated lavas and tuff
- Alluvium
- Laterite
- Sandstone
- Sandstone, shale/clay
- Sandstone, shale/ limestone
- Sandstone, limestone/clay
- Shale, clay/ limestone

MINERALS

- G Gypsum
- Bx Bauxite
- L Limestone
- Lc Lignite coal
- Be Bentonite
- C China clay
- Bs Building stone

N

Source : Survey of India

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.
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R0	30.07.04	MAS	Issue for ------ Report Submission	VG	AK

Kutch Region

Rocks and Minerals

Study on
Development Potential of Kutch

Drawn	MAS
Checked	VG
Approved	AK
Scale	1:1200000

Drawing No. 214002/ROCKS-MINERALS/0009

Rev.	Status
R0	APR

1.2 Mineral Availability and Spatial Distribution Pattern

Kutch is a mineral rich region. Mineral resources in a region play very important role in industrialisation. The important minerals available in Kutch are mostly of fuel, metallic and non-metallic categories. Limestone, bauxite, lignite, kaolin and bentonite are the important and gypsum, white clay, ball clay, fire clay are the 'minor' minerals available in Kutch. Moreover, Kutch is also bestowed with sand stone, murram, black trap, etc.

Kutch has a significant share in mineral resource base of Gujarat. Gujarat is one of the important states for mineral production in India. The state accounts for 9 percent of India's total value of mineral production and is ranked second in terms of number of operating mines. In 2002-03[1] Kutch contributed 14 percent of the total mineral production in Gujarat. The share of major minerals to the total mineral production in Kutch was 70 percent. Mineral production in Kutch as in Gujarat is dominated by non-metallic minerals.

Kutch has the largest number of leased mines in Gujarat. In 2002-03, 628 mines and quarry in an area of 7974 hectares was leased for mineral production in the region.

Table1.1 Minerals in Kutch, Their Availability in Other Parts of Gujarat and India

S. N.	Mineral	Availability		
		Kutch	Gujarat	India
1	Kaolin	Rapar, Bhachau	Kutch, Sabarkantha, Mehsana, Patan	Kerala, Rajasthan, Gujarat, AP
2	Gypsum	Rapar, Nakhatrana	Kutch, Jamnagar, Rajkot,	na
3	Bauxite	Mandvi, Nakhatrana, Abdasa, Lakhpat -	Kutch, Jamnagar, Sabarkantha, Junagadh, Kheda	Orissa, Gujarat, Jharkhand, Maharashtra
4	Fire Clay	Rapar, Bhachau	Kutch, Mehsana, Rajkot, Sabarkantha, Surendranagar	Gujarat
5	Ball Clay	Rapar, Bhachau, Mandvi	Kutch, Banaskantha,	Gujarat
6	Lignite	Lakhpat	Bharuch, Bhavnagar, Surat, Kutch	Tamil Nadu, Rajasthan, Gujarat
7	Lime Stone	Lakhpat, Abdasa	Kutch, Sabarkantha, Banaskantha, Junagadh, Amreli, Bhavnagar	MP, AP, Rajasthan, Gujarat, Chhattisgarh

Table 1.2: Mining and Quarrying Leases in Kutch and Gujarat 2002-03

Region	Mines		Quarry		Total	
	No.	Area	No.	Area	No.	Area
Kutch	152	7074	476	901	628	7974
Gujarat	1217	35896	5106	8805	6323	44701
% Share Kutch	12	20	9	10	10	18

Table 1.3: Major and Minor Minerals in Kutch and Gujarat

Mineral Type	Production in mmt	
	Kutch	Gujarat
Major	7	32
Minor	3	40
Total	**10**	**72**

Source: CGM, GoG

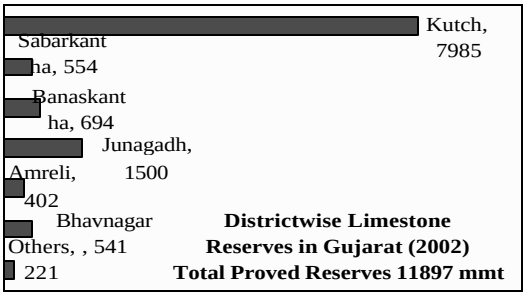
[1] Mineral Production data for 2002 are provisional. Reserves mentioned anywhere is proved reserves, unless specified.

1.3 Profile of Minerals in Kutch

1.3.1 Limestone

1.3.1.1 Reserves

Kutch has the largest deposits of limestone in Gujarat with 67 percent of the total proved reserves. The deposits in Kutch are of three different geological ages and are concentrated in Abdasa and Lakhpat talukas. Shear deposits of limestone are also estimated in the talukas of Bhuj and Nakhatrana.



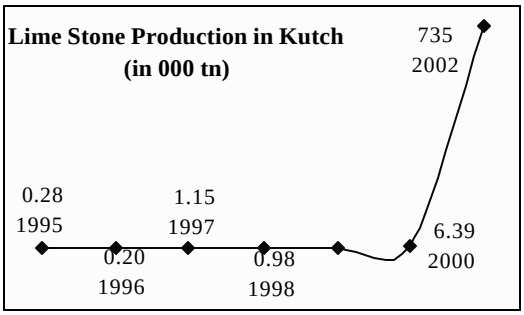
Source: CGM GOG in 'Overview of Mines & Minerals' (Vibrant Gujarat 2003)

1.3.1.2 Quality

The quality of limestone (CaO=49.06%, MgO=2.10%, SiO_2=4.06%, P_2O_5=3.75%) available in Kutch is cement grade.

1.3.1.3 Production

Gujarat is a major limestone producing state in India and contributes 11 percent of India's total. Though, Kutch posseses the largest limestone reserves in Gujarat, but Amreli and Junagad are the major producers of limestone due to location of the cement plants of Siddhi, Gujarat Ambuja, L & T, etc. Limestone production in Kutch saw a significant increase after 2000, due to establishment of a cement



Source: CGM GOG

Table1.4: Cement Production in Kutch, a Comparative Scenario, 2003-04

Region	Cement Plant	Limestone Reserves mmt.	Cement Production mmt.
Kutch	Sanghi Cement	7985 (67%)	2.6 (21%)
Southern-Coastal Saurashtra (Amreli, Junagadh and Jamnagar)	Gujarat Ambuja L & T (3 plants) Saurashtra Cement Siddhi Cement Grasim Cement	3912 (13%)	9.6 (79%)
Total Gujarat		11897	12.2

Reserves as on 2002 (CGM, GoG)

Source: Computed from CMIE 2004

plant by Sanghi Industries Ltd. in Abdasa, in proximity to the reserves. This led to increase in

limestone production in the region to a slightly higher than 4 percent share of Gujarat's total in the year 2002.

Limestone along with silica sand and china clay which forms important ingredients for cement and ceramic industry are all produced in Kutch and combined production of these minerals has grown at an average 15 percent per annum during 1995 to 2002.

1.3.1.4 Limestone, the Backbone of Cement Industry

Limestone is consumed by a large number of industries such as cement, chemical, fertilizers, aluminium, steel, ferro alloys, foundry, glass, paper , sugar, etc. 90 percent of limestone is consumed by cement industry. The average production of limestone per annum stands at about 13.89 million tonnes in Gujarat. Along with growth in construction industry, demand for cement is constantly increasing both in the domestic as well as in the international markets. The cement industry in India comprises of 125 large cement plants with an installed capacity of 148.28 million tonnes and of more than 300 mini cement plants with an estimated capacity of 11.10 million tonnes per annum. The total installed capacity in the country as a whole is 159.38 million tonnes. Actual cement production in 2002-03 was 116.35 million tonnes as against a production of 106.90 million tonnes in 2001-02, registering a growth rate of 8.84%.

Presently, there are 8 major cement plants[2] in Gujarat, out of which only one, (Sanghi Cement[3]) is located in Kutch. Although, Kutch has the largest reserves of limestone in the state but maximum utilization of limestone is in Amreli district by five major private players. Most of these cement plants are located near the ports for exports to other countries.

Gujarat is the third largest consumer and sixth largest producer of cement in the country. Consumption of cement is highest in the western zone of India with more than 30 percent of the total consumption. The total production of cement in the state was 12.2 million tonnes in 2003-04 with 67 percent capacity utilization. Presently India produces 126 million tonnes of cement, while demand is expected[4] to grow by 180 million tonnes in 2011.

Apart from meeting the entire domestic demand, the industry is also exporting cement and clinker. The export of cement from India during 2001-02 and 2003-04 was 5.14 million tonnes and 6.92 million tonnes respectively. Ports of Gujarat exported 1.2 million tonnes of cement and 2.2 million tonnes of cement clinker. Major exporters were Gujarat Ambuja Cements Ltd. and L&T Ltd. Looking at the growth rate of cement manufacturing industry and increasing demand, it can be easily internalise that Kutch with its massive reserves possesses great potential of development of cement industry. It has the largest limestone reserves and infrastructure in the region is also being developed most recently.

[2] Madhya Pradesh, Andhra Pradesh and Rajasthan have 20, 20 and 13 cement plants respectively.

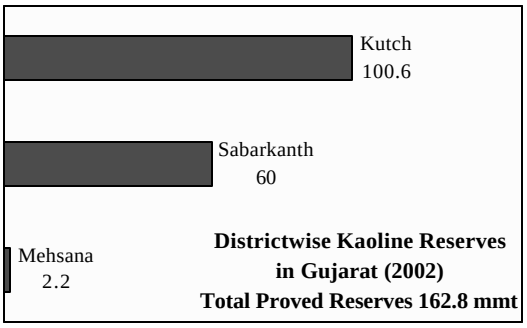
[3] M/s Sanghi Industries have been leased limestone mines in Kutch by the state government and established a cement plant in Abdasa Taluka.

[4] Saket Industrial Digest, Ahmedabad July 2004

1.3.2 Kaolin or China Clay

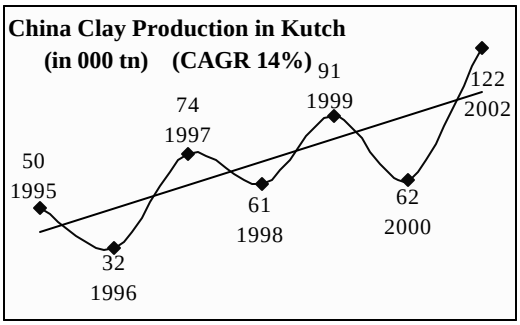
1.3.2.1 Reserves

Kutch accounts for 62 percent of the Kaolin reserves in Gujarat. The reserves are mostly concentrated in Rapar and Bhachau talukas. In addition to this, recently, a massive 200 million metric tonnes of Kaolin reserves have been discovered in Rapar Taluka.



Source: CGM GOG in 'Overview of Mines & Minerals' (Vibrant Gujarat 2003)

Kaolin reserves in Kutch are of national importance. Kerala (29%), Rajasthan (21%), Gujarat (14%) and Andhra Pradesh are the major producers of Kaolin in India. Kutch is the largest (73%) producer of Kaolin in the state followed by Mehsana and Sabarkantha.



Source: CGM GOG

1.3.2.2 Quality

Ceramic grade ($Al_4 Si_4 O_{10} (OH)_8$) is usually found in Kutch.

1.3.2.3 Production

Production of kaolin has experienced significant fluctuations during 1995-2002, but has maintained an overall positive growth trend. Production has been increased from 50 thousand tonnes in 1995 to 122 thousand tonnes in 2002 with a 14 percent growth per annum.

1.3.2.4 Kaolin (China Clay), the Basic Ore for Ceramic Industry

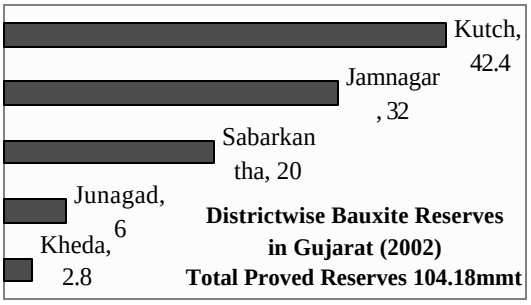
China Clay is largely consumed in the ceramic industry for tiles, sanitary ware, pottery ware and crockery ware. In India, the per capita ceramic tile consumption is 0.09 sq. m. per annum as compared to 1.2 sq. m. per annum in China and 5 to 6 sq. m. per annum in European countries. But its demand is expected to increase with the increase in household consumption. Indian ceramic products are also exported to East and West Asian countries, Europe, Canada and East and West Asia. The total export of ceramic products from the country was about INR 2710 million during 2001-02.

Kutch has the largest reserves of kaolin in the state. During the year 1991 and 2004, 16 projects with an investment of INR 16220 millions have been filed for ceramic industry in Kutch district. This investment is 45 percent of the total investment in ceramic industry in Gujarat. With recent exploration of 200 million metric tonnes of kaolin in Rapar taluka, the prospects of setting up these industries have enlightened in the region. Most recently, Ajanta Manufacturing limited, has set up a vitrified tiles plant with an investment of INR 2108 millions.

1.3.3 Bauxite

1.3.3.1 Reserve

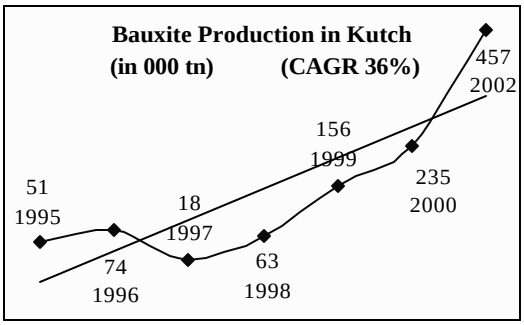
Bauxite deposits in Kutch are confined between the Deccan Traps and tertiary sediments covering a length of about 50 km. Kutch has the largest bauxite reserve in the state; a 40.7 percent of the total proved reserves. However, around 70 percent of the bauxite is of low grade and requires refinement before any value addition.



Source: CGM GOG in 'Overview of Mines & Minerals' (Vibrant Gujarat 2003)

1.3.3.2 Quality

Kutch Bauxite is Gibsitic and superior grade (Al_2O_3=50.02%, SiO_2 = 5.22%, Fe_2O_3 = 11.47%, TiO_2 = 4.38%, CaO + MgO = 1.61%, LOI = 26.93%), However, it is estimated that only 25 percent of it is Grade I and rest 75 percent is low and medium grade.



Source: CGM GOG

1.3.3.3 Production

Kutch is an important producer of bauxite. Gujarat is the second largest producer of high grade bauxite in the country after Orissa. Gujarat contributes 17 percent of bauxite production in India. Although Kutch possesses the largest reserves, Jamnagar is the largest producer of bauxite in the state. Kutch contributes 27 percent to the state's production. Among various minerals found in Kutch the rate of production of bauxite is the highest and is being exported. Production has increased noticeably after the lifting of ban on bauxite exports in Exim Policy in the year 1997. Over the years, bauxite production has shown a consistent growth of 36 percent.

1.3.3.4 Bauxite, a Basic Ore for Alumina Industry

Bauxite is a precious metallic mineral and basic ore for alumina (88 percent consumption) processing industry. Aluminium has both industrial and domestic usage and therefore, forms a large market segment.

Box 1.1: Facts, Bauxite and Alumina Industry

Total reserves of bauxite in the world are 22 billion mt, where India's share is 4 percent. While bauxite production is concentrating in the developing countries on the contrary to it aluminium production is mostly concentrating in the developed countries.

Source: US Geological Survey, Year book 2002.

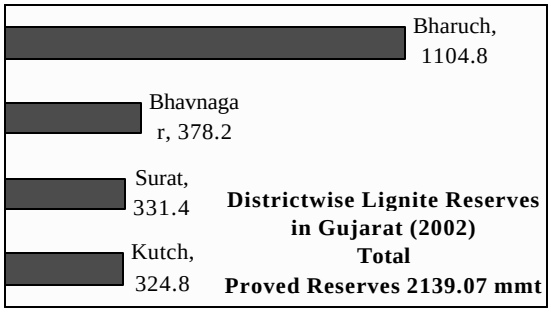
Nearly 104 million mt of bauxite reserves are available in Kutch, Jamnagar and Junagadh districts in Gujarat. Most of these are low grade bauxite, but these has to be mined out to extract high grade bauxite beneath. Presently most of the bauxite of Kutch is exported to Australia, Europe and Middle East countries. The annual produciton of bauxite during last five years has been 1 million tonnes. Currently a joint venture between Ashapura Minechem and Sichuan Aostar Aluminium Corporation of China plans to build a 1 million tonnes per annum alumina project in Kutch by 2005. The projected investment for the alumina refinery to be executed in two phases will be INR 25 billion. The project's first phase, estimated to cost INR 12.70

billion, will produce 0.5 million tonne alumina largely for export. The project also envisages setting up of a lignite-based power plant and a desalination plant for the refinery. Power requirement for the full capacity of one million tonnes has been estimated at 40 MW. Another bidder for the same project is MAN Group, the promoters of Man Industries Ltd, India in a joint venture with Aluchem of the USA and plans for setting up of an INR 13.50 billion alumina refinery and specialty alumina chemical project in Kutch. Bauxite is also used in ferro alloy, cement, cereamic, abrasives, refractories etc.

1.3.4 Lignite

1.3.4.1 Reserves

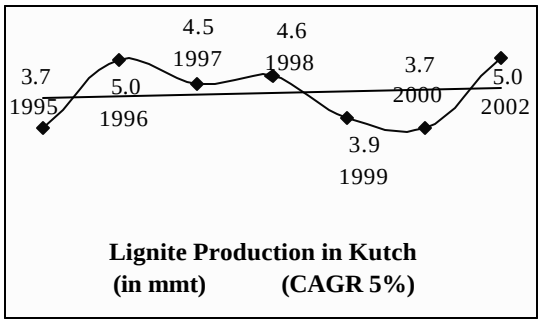
Lignite basically is a fuel mineral found in four districts of Gujarat and Kutch possesses 15.2 percent of the total proved reserves in Gujarat. The tertiary rock belt in western Kutch mostly in the Lakhpat taluka (in Panandhro, etc) has large deposits of lignite.



Source: CGM GOG in 'Overview of Mines & Minerals' (Vibrant Gujarat 2003)

1.3.4.2 Quality

The quality of lignite found in Kutch has higher calorific value (3500-4500) compared to lignite found in other parts of Gujarat. Also the presence of sulphur content (dry basis 1%-6%) in the lignite adds to the quality of lignite. Table below shows the quality specification of lignite found in Kutch.



Source: CGM GOG

1.3.4.3 Production

Kutch is also a major lignite producer and it accounts for 89 percent of lignite production followed by Bharuch and Surat district. Gujarat is the second largest lignite producer in India after Tamil Nadu. In 2002, Tamil Nadu produced 78 percent followed by Gujarat's 21 percent of India's total production. Annual production of lignite in Kutch ranged from 3.7 to 5 million metric tonnes[5] during 1995 to 2002 with a CAGR of 5 percent. Production has experienced a slump during 1999 and 2000 and thereafter has registered a 37 percent growth from 2000 to 2002 to regain its annual production figures experienced during 1996, 97 and 98. The consumption of lignite will increase in the coming years with the commissioning of the second phase of power plant at Panandhro. Gujarat Mineral Development Corporation owns the sole license for mining and selling of lignite. But there are few public agencies with licenses to mine only for captive consumption.

[5] mmt indicates million metric tonnes.

1.3.4.4 Lignite, a Source of Power

Lignite is a basic source for thermal power plants. With accelerating industrialisation, the demand for power in Gujarat has been increasing. Based on lignite available at Panandhro and Akrimota in Lakhpat Taluka in Kutch GMDC[6] has developed a power plant with 250 MW capacity at Chher Nani Village in the region and another 250 MW additional capacity will be added once this plant is started.

Box 1.2: Lignite Use in the USA

Globally, the largest producer of Lignite, the USA meets 80 percent of its power demand through lignite.

Source: US Geological Survey, Year book 2002

Lignite has several other uses. It can be used as a solid fuel by briquetted and carbonisation with chemical by-products, as a feedstock for making urea and methanol. It also finds application in chemical and metallurgical industries as coke. Raw lignite is used in cement and other industries. Power industry cosumes 43 percent, textiles 23 percent, and chemical industry 12 percent. Lignite produced in Gujarat is mainly consumed in the state itself by these sectors.

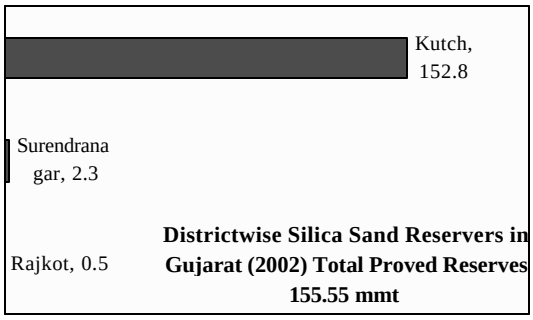
Box 1.3: Neyveli Lignite Corporation: A Southern Powerhouse

Neyveli power plant is a collaboration of Neyveli Lignite Corporation (NLC) Tamil Nadu, the Government of India and the German Development Bank (KFW) with a project investment of INR 40,000 millions. Neyveli Lignite Corporation has two mines with lignite reserves of 287 million tonnes and 398 million tonnes. Mine I feeds Thermal Power Station I with 6.5 million tonnes per annum and Mine II feed Thermal Power Station II with 10.5 million tonnes per annum. The total power generated is 1470 MW and will be fed into the Southern Grid to Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Pondichery.

1.3.5 Silica Sand

1.3.5.1 Reserves

Kutch is an extremely important region for its proved silica sand reserves. Around 98 percent (152.8 million tonnes) of the Silica Sand reserves in Gujarat are found in Kutch. The reserves in Kutch are more than 45 percent of the total proved reserves in India (336.3 million tonnes). It is an extremely significant reserve after the same in Haryana possessing the largest reserves in the country.



Source: CGM GOG in 'Overview of Mines & Minerals' (Vibrant Gujarat 2003)

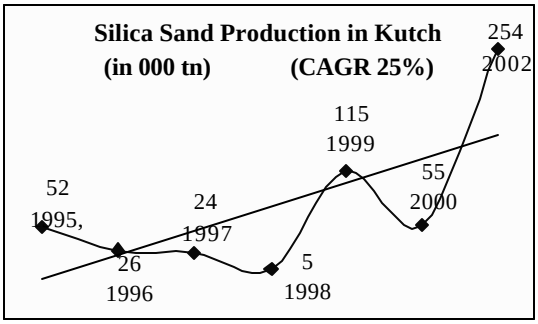
[6] GMDC, Gujarat Mineral Development Corporation was formed in the year 1963 with a charter to develop major mineral resources in the State of Gujarat. It is the sole agency undertaking mining of lignite and bauxite in Gujarat.

1.3.5.2 Quality

Silica sand available in Kutch is comparatively of low grade (Fe_2O_3=0.3%, TiO_2=0.43%, CaO=0.21%, Na_2O=0.03%) and needs technology upgradation for various industrial purposes.

1.3.5.3 Production

Although having the largest reserve, in Gujarat, Kutch (31.7 percent) is the second largest producer after Bharuch district. On the other hand Gujarat is the largest producer in India followed by Haryana, Maharashtra, Uttar Pradesh and Andhra Pradesh. Over the years Haryana was the largest producer of Silica Sand. However, in the recent years the production in Gujarat, with increasing production in Kutch has exceeded that of Haryana. In Kutch the production of silica sand has increased substantially in 2002. Although there were fluctuations in production over the years but it has shown an overall 25 percent growth per annum.



Source: CGM GOG

1.3.5.4 Silica Sand and its Industrial Applications

Silica sand exploited at present is only sieved into different fractions. No value-added products are manufactured. Down stream possibilities for processed washed silica items also exist in the district. For above items, few units are in operation in the state. But no unit has been established in the district for the above value-added items. Silica sand value-added products are water intensive and chemical treated. Pollution Control Board Certificate and Water source are the constraints, so present processors have not given consideration. But now with the availability of Narmada Water, reconsideration with CSMRI technology tie up is advisable for the items. Silica sand as per the information is also utilised by IFFCO in fertilizer industry.

Box 1.4: Major Limestone, Bauxite, Lignite and Silica Sand Total Recoverable (Proved + Probable + Possible) Reserves in India

- Major **Limestone** reserves are concentrated in Karnataka (23%), Andhra Pradesh (20%) and **Gujarat (12%).**
- Major **Bauxite** reserves are concentrated in Orissa (57%), Andhra Pradesh (22%) and **Gujarat (5%).**
- Major **Lignite** reserves are concentrated in Tamil Nadu (87%), Rajasthan (6.9%) and **Gujarat (5.4%).**
- Major **Silica Sand** reserves are concentrated in Haryana (63%). Gujarat is ranked 10th in the country with 2 percent reserves.

Source: India Minerals Book - 2001

1.3.6 Bentonite

1.3.6.1 Reserves

Bentonite deposits of Kutch have earned fame in the world market due to their usefulness in the steel casting industry. There are large deposits of Bentonite in Kutch, which is estimated to be of around 60 million mt (proved). Bhavnagar with 45 million mt of reserves is the second district of Gujarat in

terms of reserves. In Kutch, the single largest deposits of bentonite are concentrated in Sherdi-Vandh area of Mandvi taluka. Moreover there are reserves in Nakhatrana and Abdasa talukas. Kutch accounts for 57 percent of the states and 16 percent of the country's reserves of bentonite (2002).

1.3.6.2 Quality

Bentonite of Kutch is regarded as the best quality (Al_2O_3=16.64%, TiO_2=3.16%, CaO=1.07%, MgO=2.43, Na_2O=2.5, K_2O=0.05%, Li_2O=0.15%, LOI=6.49%) in Kutch. Both grade of Bentonite sodium (swelling type) and calcium (non-swelling) are available in Kutch, which has a wide variety of uses in industrial applications.

1.3.6.3 Production

Bentonite, though classified as a minor mineral, but it is an important mineral due to varieties of industrial usage. Kutch is India's largest bentonite producing region. In 2002, 406.8 thousand tonnes of Bentonite was produced in Kutch, which is 98 percent of the same in Gujarat. In the year 2000, Gujarat was the leading state with 88 percent contribution in the India's total. In that year, total production of bentonite in India was 600 thousand tonnes and other than Gujarat it was also produced in Rajasthan and Bihar.

1.3.6.4 Bentonite and Its Versatile Uses

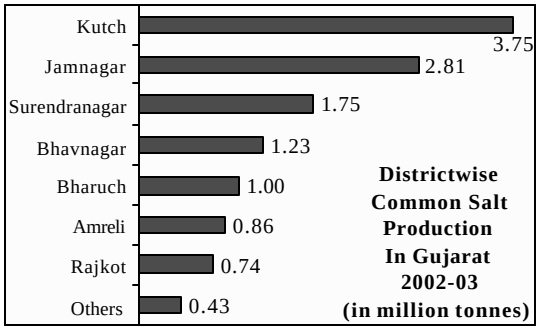
Bentonite is an unusual and one of the most versatile industrial minerals in the world. It is a naturally occurring mineral ore known as swelling clay that sorbs and retains water at very high levels. It is used in a multitude of industrial, environmental, and consumer products such as hydraulic barries construction, in cement industries, detergents, cosmetic, food products, water treatment and contaminanat removal. There is a range of bentonite properties developed for commerce, but its behaviour as it interacts with water is generally its most well known property. The metalcasting industry adds hydrated bentonite to sand as a glue to hold these types of molds together before, during and after the molten metal is poured into them.

The bulk of the worldwide bentonite products are calcium bentonites, sodium exchanged calcium bentonites, and mixtures of sodium, calcium and magnesium bentonite. These bentonites in their natural state are often used as desiccants, catalysts, as vegetable oil processing agents, and as foundry clays.

Kutch has 60 million tonnes of bentonite reserves. The sodium based bentonite has intensive use in steel plants, oil exploration, medicines etc. Presently bentonite is being exported from Kutch. Exports of bentonite from Kutch stands at 450 thousand tonnes in 2002-03.

1.3.7 Salt Production

Kutch is bestowed with a long coastline and due to scanty rainfall, dry-weather; fairy high temperature, high wind velocity and suitable soil conditions, the region is extremely rich in salt deposits. Kutch is a major producer of salt in India and its production is also significant globally. India is ranked fourth after the US and China in global production of salt. The average annual production of salt in India is 17.8 million tonnes and in the year 2002, Gujarat produced 13.2 million tonnes (74 percent) of the total common salt in India and Kutch is the largest producer in the state. Around 70 percent of salt produced in India is sea salt and apart from Gujarat salt production is concentrated in Tamil Nadu (15%), Andhra Pradesh (12%), Maharashtra, Karnataka, Orrisa, West Bengal and in Rajasthan. In Gujarat, apart from Kutch, other major producing districts are Jamnagar, Surendranagar, Bhavnagar, Rajkot, and Bharuch. Out of the total common salt produced in Gujarat 29 percent is produced in Kutch. The percentage change of growth over the previous year was 41 in the region.

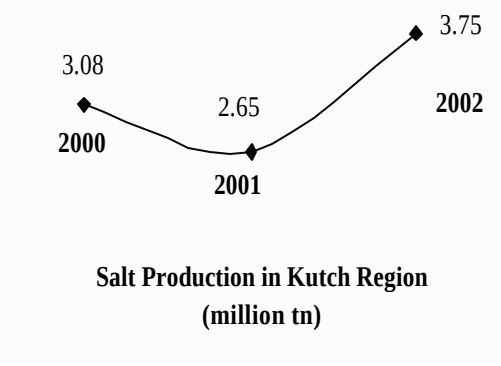


Source: Industry Commissionerate Gandhinagar

Table 1.5: Salt Industries in Kutch

Type	No. of Plants	Production (million tonnes)			
		Capacity	Actual		
			2000	2001	2002
Iodization Plants	115	2.24	1.24	1.08	0.95
Refinery	14	1.50	0.43	0.27	0.38
Grand Total	129	3.74	1.67	1.35	1.33

Source: Chamber of Commerce and Industry, Gandhidham



Source: Industry Commissionerate Gandhinagar

1.3.7.1 Salt Industry

Salt is a major and essential component of food and an important raw material for various salt based industries such as soda ash, caustic soda, chlorine, sodium metal, hydrochloric acid etc. The per capita consumption of salt in India is 12 kg (edible and industrial).It is estimated that the present annual demand for salt in India is 12.5 million tonnes, inclusive of 6 million tonnes for edible uses and 6.5 million tonnes for industrial usage.

Box 1.5: Israel, Using Salt Resources Rationally

Food industries: **56%**
Home usage (retail packaging): **16%**
Textile: **7%**
Chemical industries, including detergents: **7%**
Water softening: **6%**
Animals (fish curing): **5%**
Miscellaneous: **3%**
Total: **100%**

Source: Israel Salt Industry, Dankner Group, Israel

In Kutch common salt is largely utilized for producing iodized edible salt and around 1.3 million tonnes of salt is exported annually. As of 2002, there are 115 iodisation plants and 14 refiners located in different coastal talukas of Kutch with an aggregate installed capacity of 3.7 million tonnes per annum. However, only 65 percents of this capacity has been utilized for producing iodized salt.

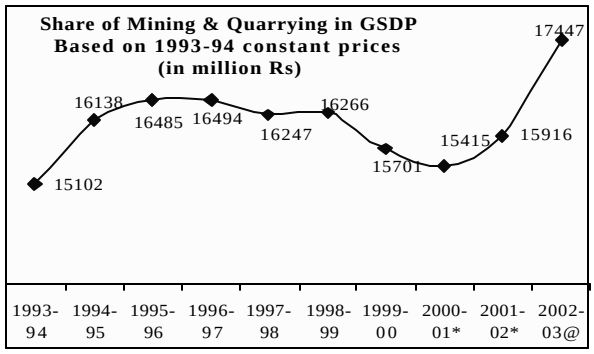
From 2001 to 2004, three new iodisation plants have commissioned and another three plants are under implementation with an investment of INR 232 millions and INR 3100 millions respectively in Kutch.

Growth of salt industry in Kutch is restricted to production of edible, industrial and common salt. There is lack of initiatives for developing salt based and allied industries with greater sophistication. Israel being one of the major salt producers in the world utilizes majority of its produces in the allied value added industries such as in electro-chemical industries, fish curing, water softening, food preservation, washing powder, in textiles other than the edible use of salt.

1.4 Mining Economics and the Investment Scenario

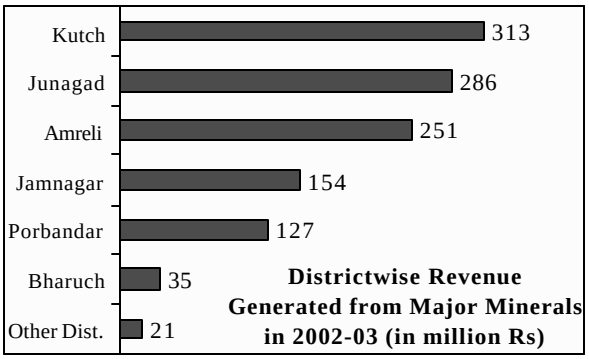
1.4.1 Income Generation

The contribution of mining and quarrying activities in Gujarat to the state's domestic product was INR 17447 millions (2% of SDP) in 2002-03[7]. But the sector has registered a 9.5 percent growth over the previous year due to increased demand in the industrial sector. It has grown at a CAGR of 1.6 percent from 1993 to 2002 at constant prices.



Source: CGM GOG

Kutch stands first in Gujarat in capital generation through royalties[8], dead and surface rents of the leased mines. The capital generated in 2002-03 in Kutch was of INR 313 millions from major minerals, which is 26 percent of the total capital generated from leased mines in the state. In 2002-03 it contributed 21percent to the state with both major and minor minerals. In 2002-03 the royalties from the region registered a 43 percent increase over the previous year.



Source: CGM GOG

Table 1.6: Value of Mineral Production and Revenues Earned from Kutch and Gujarat, 2002-03

Mineral Type	Production in million mt		Value of Production in INR millions		Revenue in INR millions	
	Kutch	Gujarat	Kutch	Gujarat	Kutch	Gujarat
Major	7	32	2502	5417	313	1187
Minor	3	40	162	2197	47	471
Total	10	72	2664	7614	360	1658

In 2002-03, the total value of minerals produced in Kutch was INR 2664 million (35% of state), out of which the major minerals contributed INR 2502 million. More than 88 percent of the value of

[7] The share of mining and quarrying in India's Gross Domestic Product is in the range of 2.2 to 2.5% only. But mineral based manufacturing contributes 10 to 11 percent in the country's income from the industrial sector (Tata Energy Research Institute, Overview of Mining and Mineral Industry in India, 2001).

[8] The royalty rates on minerals in India are observed to be high as compared to many countries (Tata Energy Research Institute, Overview of Mining and Mineral Industry in India, 2001).

production of lignite in Gujarat was from Kutch. The value of production of other two important minerals, bauxite and bentonite together was INR 160 millions in the same year. Kutch is the leading district in the state in bentonite production and accounts for 98 percent (by value) in the year 2002-03.

1.4.2 Investments

Till 2001

Since the initiation of the open market policies in 1991 and subsequent adoption of the National Mineral Policy, 1993 in India; gradually private Indian and also foreign direct investment has spurred in mining and mineral based industries. As on 2001, seventy FIPB proposals have been approved in India in mineral sector out of which with a value of INR 2293 millions, a share of 5.8 percent of the investments have flown in to Kutch Region. Most of these investments in Kutch have arrived in the industries related to bauxite and bentonite uses.

Table 1.7: FIPB Approvals in Mineral Industry

Region	No. of Projects	Inv. INR mill.	% of Total Inv.
Kutch	3	2293	5.8
Gujarat	5	4125	10.4
India	70	39630	

Source: www.nic.in/mines/ppfinvest

Note: Investments as on 15/10/2001

2001 Onwards

The minerals constitute the bedrock of industrial development as they provide the basic raw material for most of the industries. In Kutch the major mineral based industries are of alumina, ceramic, building material, chemicals and salt. Amongst various areas of investments, around 23 percent of the total investment[9] in Kutch is coming in the mineral based industries. Around 14 mineral based industrial projects are announced in the region with an investment of INR 17852.1 millions. 14 percent of these projects have already started their production and another 23 percent are under implementation stage.

Table 1.8: Status of Mineral Based Projects in Kutch during 01/08/2001 and 15/06/04

Status	All Projects		Mineral Based Projects		
	Numbers	Inv.	Number	Inv.	% of Total Inv.
Comm.	43	60212	9	8232	14
Under Impl.	89	729221	5	170289	23
Total	132	789433	14	178521	23

Note: Inv.=Investments Rs. In INR '00 thousand, Comm.=Commissioned, Impl.=Implementation, Source: iNDEXTb

1.5 Industrial and Other Forward Linkages

1.5.1 Mineral Trade

Minerals in both forms raw and processed are being exported from India. Kutch with abundant of few of the important minerals and availability of modern ports have made it a suitable location for extraction and export. Minerals presently being exported[10] from Kutch are bentonite, bauxite and salt.

Table 1.9: Mineral Exports from Ports of Kutch 2002-03
(in thousand tonnes)

Product	Kutch*	Gujarat	% Share Kutch
Bentonite	453	453	100
Bauxite	406	1341	30
Grand Total	841	1776	47

**figures include exports from GMB Ports (2002-03) & Kandla Port (2001-02), Source: KPT & GMB*

[9] The Government of India in the Ministry of Finance vide notification No.39/2001-Central Excise dated the 31st July, 2001 have announced a five year excise holiday to the new industrial units set up in the district of Kutch between 31/07/2001 and 31/07/2003.

[10] The value of production of two major export minerals Bauxite and Bentonite together was rupees 160 million in 2002-03 in Kutch district.

Bentonite has large commercial usage and is mainly exported to Europe, Middle East and America. Kutch is the sole exporter of bentonite in Gujarat. Bauxite[11] (30% of the produce is export quality) exports from Kutch was 30 percent (400 thousand tonnes) of the state's total. The export of metallurgical-grade bauxite from India exceeded 1.5 million tonnes in 2002 and was expected to reach 4 million tonnes by 2004.

Box 1.6: Global Trade; Bauxite 2001

- Total global exports – 29.6 million mt.
- Australia is the largest exporter – 12.6 million mt. (42%)
- India is the 5th largest exporter – 0.97 million mt (3.3%)
- World imports – 30.6 million mt,
- The USA is the largest importer – 9.3 million mt (30%)

Source: International Aluminium Institute, www.world-aluminium.org

From Kutch, salt is exported mainly to Australia and Middle East. In 2001-02, 1.3 million tonnes of salt was exported from the ports of Kutch, of which the districts accounted 91 percent of the total exports from Gujarat. Kandla Port alone exported 88 percent of the salt. There is also coastal trading of salt within the country through other Indian ports.

Table 1.10 Salt Exports from Kandla - Mundra Ports 2001 - 02

Port	**Export (000' tonnes)**		
	Foreign	**Coastal**	**Total**
Kandla	1211	87	1298
Mundra	83		83
Total	**1294**	**87**	**1381**

Source: KPT and Gujarat Adani Port

1.5.2 Employment Generation

As per the 2001 census data, the total main workers in mining and quarrying activities in Kutch were 4758 persons. The rate of growth of employment in these activities was 2.1 percent (CAGR) from 1991 to 2001. Share of regional workers in this category has increased from 2 percent in 1971 of the state's total to a significant 8 percent in 2001. It is estimated that out of total workers in mining activities, 40 percent were engaged in white clay production, 36 percent in bauxite and 11 percent in lignite mining.

Table 1.11: Main workers in Mining and Quarrying in Kutch and Gujarat

Year	Employment		
	Gujarat	Kutch	% Kutch
1961	12	0	
1971	37315	729	2
1981	37315*	729*	2*
1991	58760	3862	7
2001	58760*	4758	8

Source: Census of Gujarat, 2001,District Statistical Handbook, Kutch,
*Note: * change in classification- nine fold to four fold.*

[11] Under the new Exim Policy 1997-2007, restriction on export of Bauxite has been lifted.

2. Agricultural Resource Base

2.1 State of Agriculture Practice

2.1.1 Climate and Soil

Kutch falls in the arid tract of Gujarat and has a tropical monsoon semi-arid climate and is not favourable for agricultural practices. It experiences extremes of weather conditions. The district observes three distinct seasons, winter, summer and monsoon. The winter season lasts usually from the middle of November to the end of February with January being the coldest month having an average minimum temperature of 4.6^0 C with mercury occasionally dropping below the freezing point. Winter is followed by summer from March onwards and continues till late June with the maximum temperature ranging from 39 to 45^0 C. The hot wet monsoon season commences in the last week of June or beginning of July with the onset of South-West Monsoon and continues till September. The annual average precipitation of Kutch is a scanty 340 mm and about 95 per cent of occurs during June-September. Number of rainy days is very few; annual average is only 13 days. The variations in the timing and quantity of rainfall are very high having co-efficient of variability of about 60 per cent. This unreliability and uncertainty of rainfall has made Kutch susceptible to droughts.

Kutch generally has a moderately high humidity through out the year with maximum in the summer months. The annual average relative humidity of the area is 63 per cent. Winds are generally moderate to high with an annual wind speed of 11.3 km per hour. Winds are frequently stronger, especially during the late summer when violent storms are also registered. Generally, the wind direction is south-west and west. The evapotranspiration rates in Kutch district are very high largely because of high temperature and wind velocity. In the months of May and June, the evaporation rate is as high as 250 to 270 mm per month or 8 to 9 mm per day.

Table 2.1: Land Use and Land Cover in Kutch

Sr. No.	Land Cover and Use Categories	Uses in Sq. Km.	% Share of Total Land
1	Area under Forests	2886	6.32
2	Land not Available for Cultivation	17786	38.96
3	Other Uncultivated Land Excluding Fallow	17505	38.34
4	Fallow Land	1865	4.09
5	Total Cropped Area	5911	12.95
	Area of the Region	45652	100.00

Source: Statistical Abstract of Gujarat State 2002

Table 2.2: Land Unavailable for Cultivation

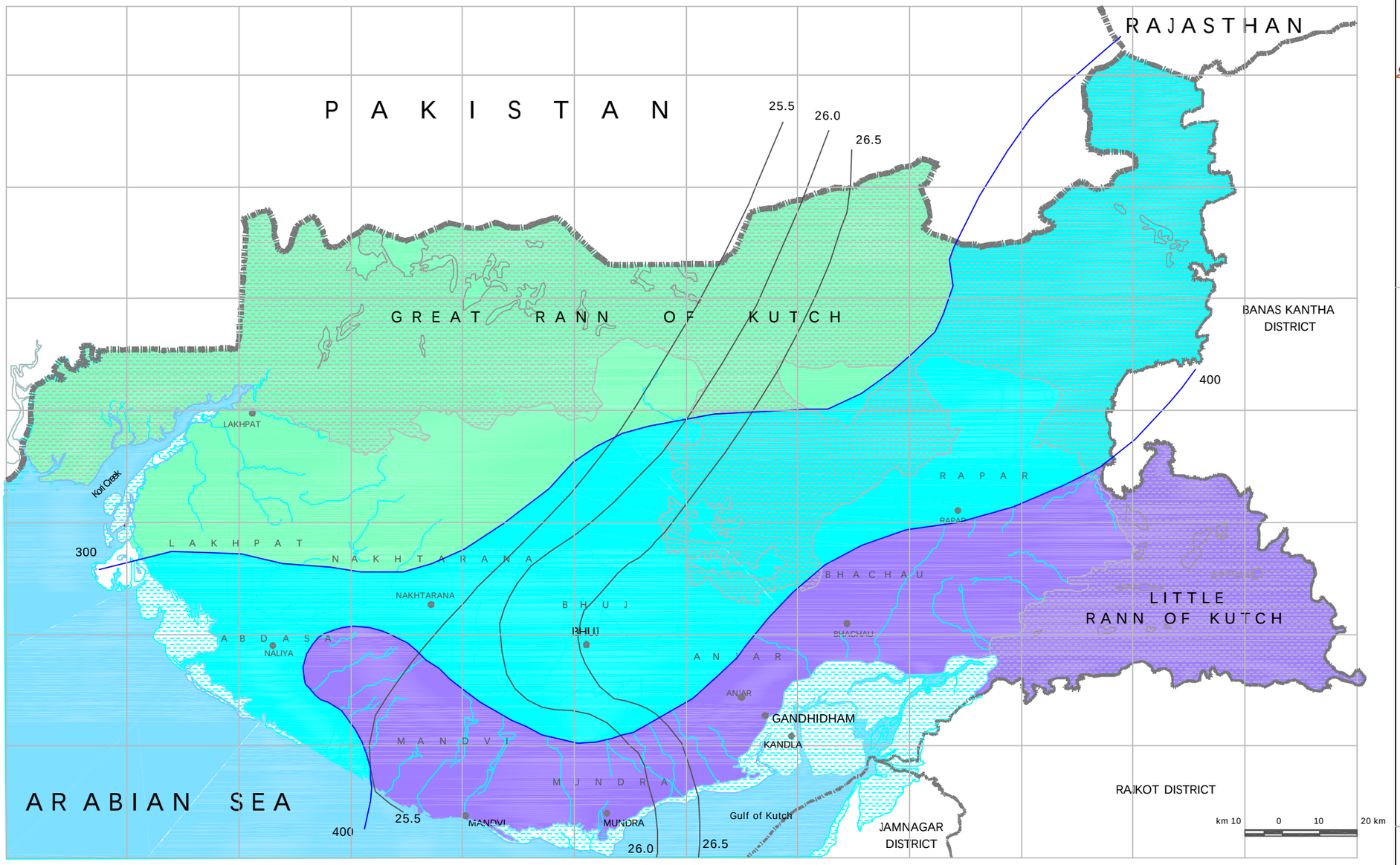
Sr. No.	Land Cover and Use Categories	Uses in Sq. Km.	Share of Regional Total
1	Barren Uncultivable Land	17056	37.36
2	Land under Non-agricultural Uses	730	1.60
3	Land Unavailable for Cultivation	17786	38.96

Source: Statistical Abstract of Gujarat State 2002

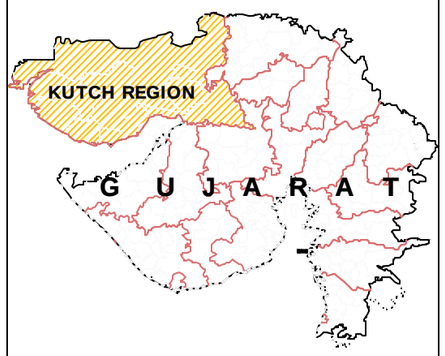
Table 2.3: Distribution of Fallow Land and Uncultivated Land

Sr. No.	Land Cover and Use Categories	Uses in Sq. Km.	Share of Regional Total
1	Fallow land	1865	4.09
	Current Fallow	1865	4.09
	Fallow Land other than Current Fallow	0	0
2	Other Uncultivated Land	17505	38.34
	Permanent Pastures and Other Grazing Land	700	1.53
	Land Under Misc. Tree Crops and Groves	0	0
	Cultivable Waste	16805	36.81

Source: Statistical Abstract of Gujarat State 2002



KEY MAP



LEGEND

- International Boundary
- State Boundary
- District Boundary
- River / Stream
- Mud Flats
- Water Bodies
- Rann

RAINFALL ZONES (Rainfall in mm)

- > 400 mm
- 300- 400
- <300
- Isotherms in degree celcius
- Isohyet in mm

N

Source : Survey of India

Mott MacDonald
Dalal Mott MacDonald

501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.

Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
Web www.mottmac.com

Gujarat Infrastructure Development Board

8th Floor,
Block No. 18
Udyoug Bhavan,
Sector-11,
Gandhinagar, 382 017
Gujarat, India.

Tel +91 (79) 3232701, 3232704
Fax +91 (079) 3222481
Web www.gidb.org

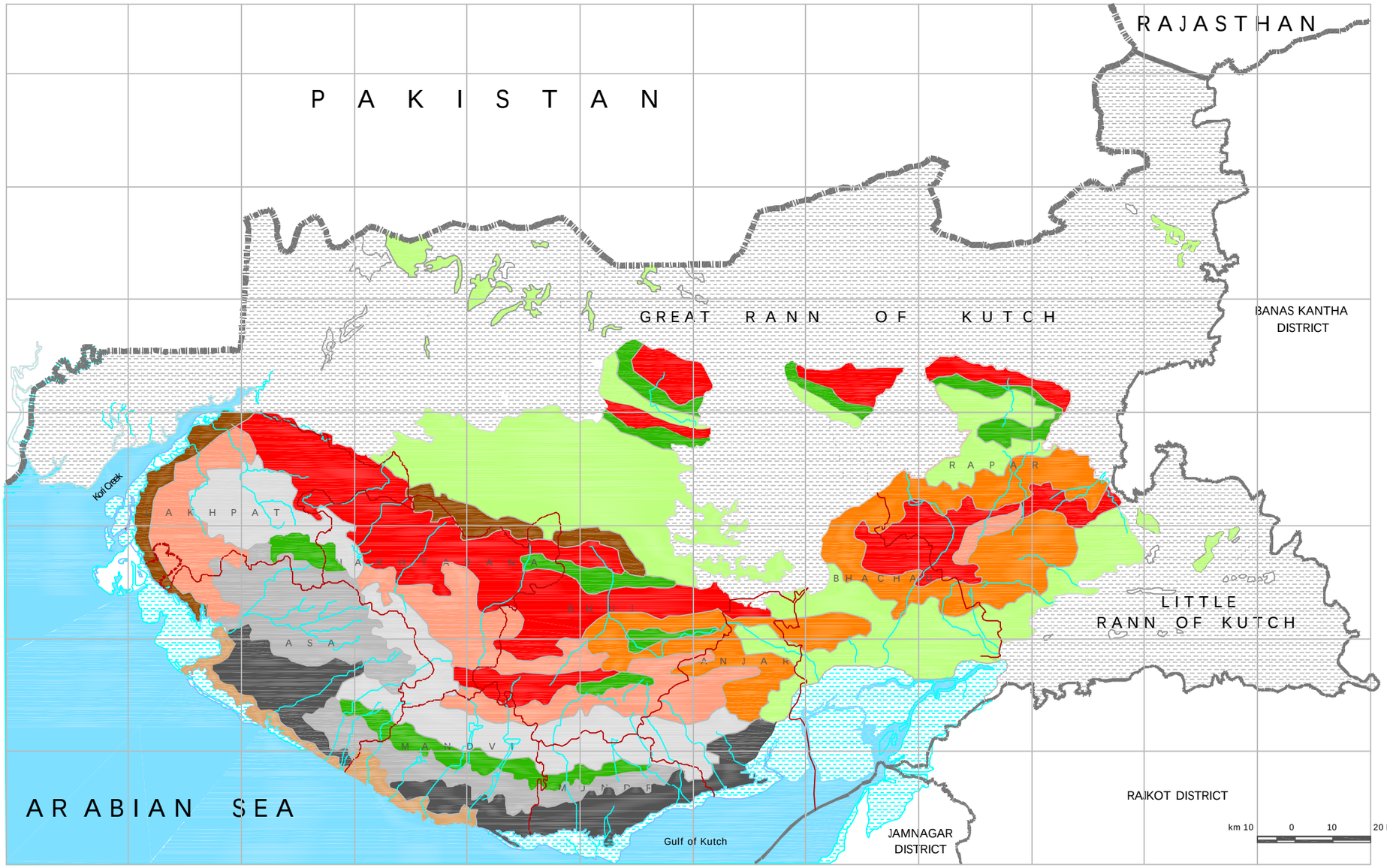
Rev.	Date	Drawn	Description	Ch'k'd	App'd
R0	30.07.04	MAS	Issue for ------ Report Submission	VG	AK

Kutch Region

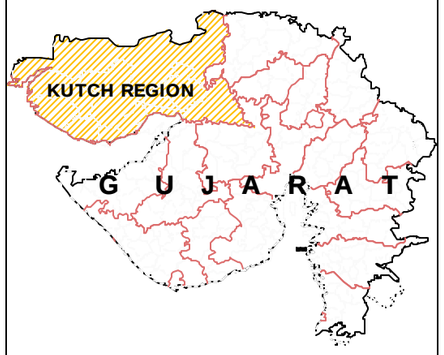
Climatic Characteristics

Study on
Development Potential of Kutch

Drawn	MAS
Checked	VG
Approved	AK
Scale	1:1200000
Drawing No.	214002/CLIMATE/0003
Rev.	R0
Status	APR



KEY MAP



LEGEND

- International Boundary
- State Boundary
- District Boundary
- Taluka Boundary
- River / Stream
- Mud Flats
- Water Bodies
- Rann

SOIL TYPES

ENTISOILS
- Coastal alluvial soils

VERTISOILS
- Deep black soils
- Medium black soils

INCETISOILS
- Shallow black soils

ARIDSOILS
- Saline and saline alkali soils

ALFISOILS
- Older alluvium soils
- Red gravelly soils
- Red sandy soils
- Red loamy soils

ULTISOILS
- Laterite soils

N

Source : Survey of India

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.

Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
Web www.mottmac.com

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Sector-11,
Gandhinagar, 382 017
Gujarat, India.

Tel +91 (79) 3232701, 3232704
Fax +91 (079) 3222481
Web www.gidb.org

Rev.	Date	Drawn	Description	Ch'k'd	App'd
R0	29.10.04	MAS	Issue for ------ Report Submission	VG	AK

Kutch Region

Soil Types

Study on
Development Potential of Kutch

Drawn	MAS
Checked	VG
Approved	AK
Scale	1:1200000

Drawing No. 214002/SOIL-MAP/00010

Rev.	Status
R0	APR

All these conditions have created limitations in agriculture practices in the region. The region naturally does not support water intensive crops and any crop is susceptible to droughts and high velocity of wind and even cyclones and higher temperature levels.

The region possesses soil types ranging from black soil to red loamy soil. The major soil types in the region are red loamy, red sandy, red gravelly, and deep, medium and shallow black soil. Black soil types are mostly concentrated in the southern and western coastal areas, while red soil types are predominant in the northern and eastern belt. Moreover, saline and saline alkali is the basic soil type in the Banni area and in some parts laterite soil is also available. Back soil types and red loamy soil are favourable for various crops from cotton to oil seeds and spices.

2.1.2 Land Availability

Area of the region is larger than even many of the Indian States, but due to its unique ecology; existence of Great and Little Rann of Kutch and other typical geomorphic conditions, only 12.95 percent land (24 percent of the cultivable land) of the region is cropped land. But overall, land available for cultivation in the district is almost 39 percent of the regional area. On the other hand 4 percent of the area in the region is fallow land and around 38 percent is other uncultivated land.

More than 37 percent of the land in the region is not available for cultivation due to natural conditions and approximately 1.6 percent is not available for cultivation due to various non-agricultural uses. Out of the total uncultivated land, the fallow land and culturable waste (which is a 36 percent of regional land) are available to be converted into agricultural land.

2.1.3 Land Holding Size

Due to less population and less number of cultivators, in terms of operational holdings, Kutch exhibits a better picture. CMIE sources reveal that the region is ranked second next to Dangs in terms of size of holdings during 1995-96. Four and a half hectares of land is available in the region per holding, while the same for the state is almost two and a half hectares. Distribution of Cultivated Land

Spatial distribution of cultivated land varies in different talukas in the region. Rapar in the east possesses the largest amount of cultivated land, which is almost one third of the total in the region. Mundra, Lakhpat and Nakhatrana are the talukas, where cultivated land is the minimum.

Table 3.4: Distribution of Estimated Cultivated Land Area for Selected Major Crops 1999-2000

Sr. No	Talukas	Total Cultivated Land in Thousand Ha
1	Rapar	53.32
2	Abdasa	22.11
3	Bhuj	19.50
4	Mandvi	12.30
5	Anjar	12.22
6	Bhachau	10.10
7	Mundra	9.55
8	Nakhatrana	9.12
9	Lakhpat	7.18
10	Gandhidham	DNA
	Total	155.41

Source: District Statistical Handbook 2001-02, Kutch

Share of land under food grains is higher in the region which is more than 86 thousand hectares. Total land under the next important crop, i.e. pulses is of more than 46 thousand hectares. In different talukas, among the food grains, bajra is cultivated covering large areas while proportion of land under wheat is negligible. Rice is not cultivated at all in Kutch. Land under total food grains is in higher proportion in Rapar, Abdasa and Bhuj talukas. Land under bajra or millet is the maximum in the talukas of Rapar and Abdasa. Wheat is cultivated up to certain extent in Nakhatrana and Bhuj talukas. In terms of land under various pulses, Rapar again has the largest proportion followed by Bhuj, Abdasa

and Nakhatrana.

2.1.4 Production of Major Crops and Productivity

Oil seeds and few other commercial crops are the major agricultural produces in the region. Kutch due to its semi-arid conditions is not an important food grain producer.

Table 2.5: Taluka-wise Cropping Pattern for Selected Food Crops 1999-2000

Sr. No	Talukas	Total Cultivated Land	Land Under Various Crops in Thousand Ha								
			Wheat	Bajra	Total Food Grains	Mug	Other Pulses	Total Pulses	Vegeta-bles	Potato	Fruits
1	Rapar	53.32	1.32	33.49	34.81	9.12	7.23	16.35	0.33	0.00	0.02
2	Abdasa	22.11	2.17	12.35	14.51	6.97	0.00	6.97	0.28	0.00	0.03
3	Bhuj	19.50	3.34	5.93	9.27	5.77	1.79	7.56	0.86	0.09	0.12
4	Mandvi	12.30	2.57	4.86	7.43	2.39	0.57	2.96	0.56	0.00	0.20
5	Anjar	12.22	1.65	2.58	4.24	2.50	0.46	2.96	1.51	0.18	0.20
6	Bhachau	10.10	0.82	3.97	4.78	3.20	0.31	3.51	0.34	0.00	0.03
7	Mundra	9.55	0.59	1.55	2.14	0.55	0.45	1.00	0.38	0.00	0.25
8	Nakhatrana	9.12	5.56	0.78	6.34	1.19	0.00	1.19	0.63	0.00	0.08
9	Lakhpat	7.18	0.51	2.18	2.69	3.88	0.57	4.45	0.01	0.00	0.00
10	Gandhidham	Added in Anjar Taluka									
	Kutch	155.41	18.52	67.68	86.20	35.57	11.38	46.95	4.90	0.27	0.92

Source: District Statistical Handbook, District Panchayat – Kutch

Taluka-wise Cropping Pattern for Selected Non Food Crops 1999-2000

Sr. No	Talukas	Land Under Various Crops in Thousand Ha										
		Total Cultivated Land	Cotton	Ground nut	Coco nut	Sesame	Rape and Mustard Seed	Other oil Seeds (Sun four etc.)	Total Oil Seeds	Castor Seeds	Medicinal Plants	Fodder Crops
1	Rapar	63.6	12.84	0.88	0.01	3.35	1.51	-	15.62	9.85	0.97	34.09
2	Abdasa	57.69	3.74	11.28	0.02	2.35	2.68	0.04	20.48	4.09	1.82	31.64
3	Bhuj	51.38	3.82	12.00	0.03	3.05	2.38	0.03	26.92	9.41	0.30	20.22
4	Mandvi	39.77	7.48	11.53	0.07	0.72	0.23	-	14.72	2.15	0.15	17.39
5	Anjar	29.77	2.31	6.24	0.07	0.40	0.34	-	8.18	2.13	0.34	17.91
6	Bhachau	26.48	0.53	2.70	0.01	1.02	0.83	-	7.91	3.34	0.78	11.52
7	Mundra	13.91	1.01	1.08	0.25	0.46	0.18	-	3.69	1.71	0.28	8.91
8	Nakhatrana	45.80	0.37	27.75	0.01	0.54	2.04	0.16	35.85	5.34	1.10	8.41
9	Lakhpat	17.50	0.002	4.90	-	1.36	0.91	-	8.63	1.46	1.36	7.49
10	Gandhidham	Added in Anjar Taluka										
	Kutch	345.9	32.10	78.34	0.5	13.2	11.1	0.23	142.0	39.48	7.14	157.58

Source: District Statistical Handbook, District Panchayat – Kutch

2.1.5 Oil Seeds and Other Commercial Crops

Among various oil seeds produced in the region, groundnut castor seeds are the two most important oil seed crops. Moreover, Kutch also produces rape and mustard seeds in certain pockets. However, higher dependency on rain and resultant seasonal fluctuations, in terms of total production of oil seeds, in 2001-02 Kutch was in the 8th position among the districts in Gujarat. Top four districts in the state are from Saurashtra Region, Junagadh being the top oil seeds producer in that year, followed by Jamnagar, Rajkot and Amreli. Banaskantha a neighbouring district of Kutch in North Gujarat was in the fifth place and these top five districts produced more than 70 percent of total oil seeds in Gujarat. Contribution of Kutch was nearly five percent of the total.

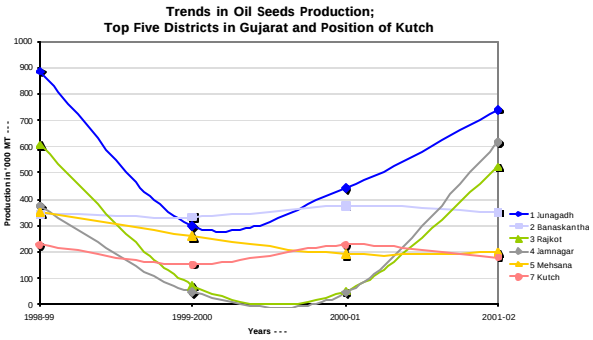


Table 2.6: Production of Oil Seeds and Position of Kutch 2001-02

Rank	Districts	Production '000 MT	% Share
1	Junagadh	740.3	20.39
2	Jamnagar	617.7	17.01
3	Rajkot	522.3	14.39
4	Amreli	443.2	12.21
5	Banaskantha	351.6	9.68
	Top Five	2675.1	73.69
8	Kutch	179.1	4.93
	Gujarat	3630.4	100.00

Source: CMIE

2.1.5.1 Groundnut or Peanut

Groundnut is an important oil seed crop of Kutch. The groundnut or peanut is the edible seed of the plant, Arachis hypogaea. Although called a nut, the peanut is a member of the pea family Fabaceae, and the fruit is not a nut, but a legume or pod. Groundnuts develop underground in a woody pod, usually with two seeds to a pod. The peanut plant is a hairy, taprooted annual that measures 30-50 cm (1-1.5 feet) in height. It is an important cash crop. Its seeds are a rich source of edible oil (43-55%) and protein (25-28%).

About two thirds of world production is crushed for oil and the remaining one third is consumed as food. Its cake is used as feed or for making other food products and haulms provide quality fodder. Groundnuts or peanuts are also known as Earthnuts, Goobers, Goober peas, Pindas, Pinders, Manila nuts and Monkey nuts (although the last of these is often used to mean the entire pod, not just the seeds).

On the otherhand, trends from 1998-99 to 2001-02 reveals that in average annual production of oil seeds, Junagadh was in the top most position followed by Banaskantha, Rajkot, Jamnagar and Mehsana. Position of Kutch improves to seventh position. While Kutch and the North Gujarat Districts Banaskantha and Mehsana exhibits consistancy in production, the same in the districts in Saurashtra fluctuates at a greater degree with deepressions in the years 1999-2000 and 2001-02.

Table 2.7: Production of Groundnut and Position of Kutch 2001-02

Rank	Districts	Production '000 MT	% Share
1	Junagadh	719.6	27.19
2	Jamnagar	573	21.65
3	Rajkot	465.9	17.60
4	Amreli	409	15.45
5	Bhavnagar	263.6	9.96
	Top Five	2431.1	91.86
6	Kutch	101.7	3.84
	Gujarat	2646.6	100.00

Source: CMIE

Table 2.8: Production of Groundnut ; Top States 2001-02

Rank	States	Production '000 MT	% Share
1	Gujarat	2714.9	37.68
2	Tamil Nadu	1332.2	18.49
3	Andhra Pradesh	1250.2	17.35
4	Karnataka	600	8.33
5	Maharashtra	492	6.83
	India	7206.1	100.00

Source: CMIE

Table 2.10: Top 5 Districts with High Groundnut Productivity and Yield in Kutch 2001-02

Rank	Districts	Yield Kg/ha
1	Junagadh	1613.8
2	Kheda	1500
3	Amreli	1452.4
4	The Dangs	1404.8
5	Mahesana	1404.3
16	Kutch	1210.7
	Gujarat	1400

Source: CMIE

Table 2.11: Groundnut Yield; Top 5 States 2002

Rank	States	Yield
1	Tamil Nadu	1720
2	West Bengal	1510
3	Gujarat	1410
4	Uttaranchal	1250
5	Rajasthan	1230
	India	1130

Source: CMIE Table 5.2:

Table 2.12: Groundnut Yield; Top 10 Countries and India 2002

Rank	Countries	Yidd Kg/ha
1	Israel	6277
2	Saudi Arabia	4000
3	Cyprus	3846
4	Nicaragua	3771
5	Malaysia	3750
6	Egypt	3234
7	Turkey	3103
8	Syrian Arab Republic	3075
9	China	3012
10	Venezuela, Boliv Rep of	2977
87	India	733
	World	1382

Source: Food and Agriculture Organisation, UN

Table 2.9: Production of Groundnut ; Top Countries 2002

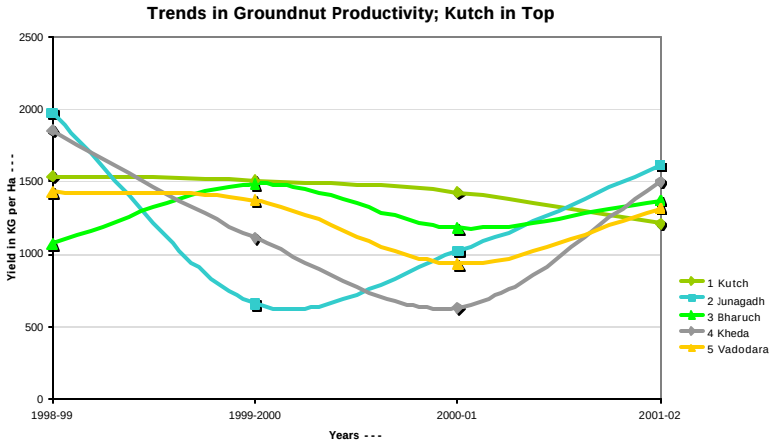
Rank	Countries	Production '000 MT	% Share
1	China	14895	44.73
2	India	4363	13.10
3	Nigeria	2699	8.10
4	United States of America	1506	4.52
5	Indonesia	1267	3.80
	World	33303	100.00

Source: Food and Agriculture Organisation, UN

Groundnut is an important crop in Kutch. In 2001-02, Kutch produced more than 100 thousand tones and was ranked sixth among the districts in Gujarat. But in terms of share in the state's total, Kutch produced a meagre 4 percent of the total groundnut, whereas the top five produced more than 90 percent of the total. Junagadh being at the top produced more than 27 percent of the state's total followed by Jamnagar, Rajkot, Amreli and Bhavnagar. All these districts are the parts of comparatively dry districts of Saurashtra. Gujarat, on the other hand produced more than 37 percent of the total groundnuts in India and India, being the global number two in groundnut production, contribution of Gujarat is extremely significant. In 2001-02, Gujarat produced more than 2700 thousand metric tonnes of groundnut and was ranked in the first position among the Indian states well ahead of Tamil Nadu. Tamil Nadu produced 18 percent of the India's total groundnut. Figures from Food and Agriculture Organisation of the United Nations reveal that in 2002 India was the second groundnut producing country in the world after China.

Groundnut in Kutch is produced as a Kharif crop and is heavily dependent on rain.

But relative productivity of groundnut in the region is higher among the districts in Gujarat. Although in the particular year of 2001-02, Kutch was in the 16th position, analysis of the productivity trends since 1998-99, reveals that fluctuations in the productivity level in the region was least in the region in comparison to other districts and in terms of the average productivity level from 1998-99 to 2001-2002, Kutch is the number one district in Gujarat.



Uses and Utilities of Groundnut

Groundnuts are often roasted and salted, but also are often eaten raw, or boiled in salt water. They can also be made into peanut butter, peanut brittle, candy bars, and other products. Peanut oil is often used in cooking, because it has a mild flavor and burns only at a relatively high temperature.

Peanuts for edible uses account for two-thirds of the total groundnut consumption in countries such as the USA. The principal uses are peanut butter, peanut candy, salted, shelled nuts, and nuts that have been roasted in the shell. Salted peanuts are usually roasted in oil and packed in retail size, transparent plastic bags and hermetically sealed cans. Dry roasted, salted peanuts are also marketed in significant quantities. The primary use of peanut butter is in the home, but large quantities are also used in the commercial manufacture of sandwiches, candy, and bakery products.

Box 21: 300 Uses of Groundnut

George Washington Carver, an American teacher and agricultural researcher, identified more than 300 different uses for peanuts and is generally credited with introducing peanuts to the United States food market. He encouraged cotton farmers to grow peanuts instead of or in addition to cotton because cotton had leached so much nitrogen from the soil in Alabama, and one of the peanut's properties as a legume is to put nitrogen back into the soil (a process known as nitrogen fixation). His purpose in identifying a variety of uses was to encourage the growth of demand for the peanut so it could become a viable cash crop alternative to cotton.

Peanuts have a variety of industrial end uses; paint, varnish, lubricating oil, leather dressings, furniture polish, insecticides, and nitroglycerin are made from peanut oil. Soap is made from saponified oil, and many cosmetics contain peanut oil and its derivatives, The protein portion of the oil is utilized in the manufacture of some textile fibers. Peanut shells are put to use in the manufacture of plastic, wallboard, abrasives, and fuel. They are also used to make cellulose (used in rayon and paper) and mucilage (glue). Peanut plant tops are used to make hay. The protein cake (oilcake meal) residue from oil processing is utilized as an animal feed and as a soil fertilizer.

Table 2.13: Production of Castor Seed and Position of Kutch 2001 - 02

Rank	Districts	Production '000 MT	% Share
1	Banaskantha	147.1	31.63
2	Mahesana	111.7	24.02
3	Kutch	58.6	12.60
4	Sabarkantha	24.4	5.25
5	Jamnagar	21.2	4.56
	Top Five	363	78.05
	Gujarat	465.1	100.00

Source: CMIE

Table 2.14: Production of Castor Seed; Top Five States 2001-02

Rank	States	Production '000 MT	% Share
1	Gujarat	465.1	71.24
2	Andhra Pradesh	83	12.71
3	Rajasthan	66.1	10.12
4	Karnataka	14	2.14
5	Tamil Nadu	10.8	1.65
	India	652.9	100.00

Source: CMIE

Table 2.15: Production of Castor Seed; Top Five Countries 2002

Rank	Countries	Production '000 MT	% Share
1	India	428	41.01
2	China	370	35.45
3	Brazil	171	16.37
4	Ethiopia	15	1.44
5	Thailand	10	0.96
	World	1044	100.00

Source: Food and Agriculture Organisation, UN

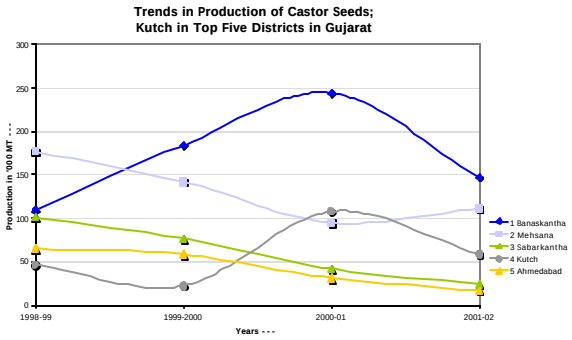
2.1.5.2 Castor or Eranda

Castor oil is a vegetable oil obtained from the castor bean (or preferably castor seed as the castor plant Ricinus communis L. is not a member of the bean family). The plant is a native of India, where it bears several ancient Sanskrit names, the most ancient and most usual being Eranda, which has passed into several other Indian languages. Castor is a major crop in Kutch and in the neighbouring Banaskantha districts. Castor oil is a valuable purgative and extremely versatile and unique in its composition. Castor oil consists for 90 percent of the unsaturated C:18 ricinoleic fatty acid. It is a major source of sebacic acid.

In 2001-02, Kutch produced 12 percent of the total castor seeds in Gujarat and was ranked 3rd among the districts in the state. Banaskantha and Mahesana being first and second collectively produced more than half of the total in the state. On the otherhand, Gujarat being top castor seeds producing state in India in 2001-02 produced 70 percent of the total castor seeds in the country, and FAO figures places India in the year 2002 at number one position in castor seed production in the world with more than 40 percent production of the global total.

This proved Kutch-Banaskantha-Mahesana belt to be not only an important castor seeds producing region in India but also in the world. China in the second and Brazil in the third position are the other important castor seed producing countries in the world. In India, after Gujarat, Andhra Pradesh and Rajasthan are the major states producing castor seeds.

Average annual production of castor seeds since 1998-99 till 2001-02 places Kutch at fourth position among the districts in Gujarat after Banaskantha, Mahesana and Sabarkantha at the top three and followed by Ahmedabad in the fifth place. Production in Sabarkantha and Ahmedabad gradually decreases during that period and the same in Mahesana is almost showing a stable trend after 2000-01. While production in Kutch is showing a positive trend since 1999-2000 and crosses that of Mahesana in 2000-01 to achieve the second position. But in 2001-02 the trend in Kutch fell sharply almost imitating the trend of Banaskantha and reached at the third position. While Banaskantha in the periphery of Kutch is the top castor seed producing district in Gujarat continuously for three years from 1999-2000 to 2001-02, even after sharp fluctualtions.



But in sharp contrast to the production part, yield of castor seeds in Kutch is not satisfactory. It was ranked at 16th place among the districts in Gujarat in 2001-02. Productivity in Banaskantha was the highest followed by the Saurashtra districts of Jamnagar, Bhavnagar, Surendranagar and Rajkot. Productivity in Kutch was almost half of that of Banaskantha and less than the state's average in 2001-02. But it is interesting to note that productivity of castor seeds in Gujarat is one among the highest in the world and much higher than that of India's. Gujarat's productivity, i.e. more than 1500 kg per hectare is higher than that of China's, which is number one country in the world in castor seeds yield.

Table 216: Top 5 Districts with Productivity of Castor Seeds and Yield in Kutch 2001-02

Rank	Districts	Yield Kg/Ha
1	Banaskantha	2365
2	Jamnagar	2141.4
3	Bhavnagar	1818.2
4	Surendranagar	1814.8
5	Rajkot	1812.5
16	Kutch	1112
	Gujarat	1526.4

Source: CMIE

Table 217: Castor Seeds Productivity; Top 5 States 2001-02

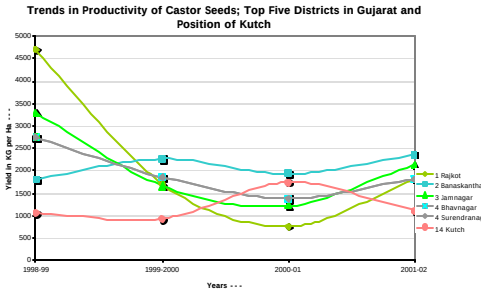
Rank	States	Yield Kg/ha
1	Gujarat	1526
2	Rajasthan	1440
3	Karnataka	670
4	Orissa	440
5	Madhya Pradesh	320
	India	900

Source: CMIE

Table 218: Castor Seeds Productivity; Top 10 Countries 2002

Rank	Countries	Yield Kg/ha
1	China	1480
2	Brazil	1255.6
3	Paraguay	1216
4	Ethiopia	1034.5
5	Cambodia	1000
6	Russian Federation	1000
7	Viet Nam	815.4
8	Ecuador	800
9	Philippines	800
10	Ukraine	800
11	India	731.6
	World	951.9

Source: FAO



Trends in productivity of castor seeds in Kutch exhibits comparitively lower levels during 1998-99 and 1999-2000 and then an upwardly moving productivity during 2000-01 and again a slump during 2001-02. While in the top five districts with higher yield (with average annual yield) during 1998-99 to 2001-02 productivity has decreased to large extent. Rajkot with a yield of more than 4500 kg per hectare in 1998-99 has produced less than 1000 kg per hectare in 2000-01 and around 1900 kg per hectare in 2001-02. Similar trend is also clearly visible in Jamnagar (3rd), Bhavnagar (4th) and in Surendranagar (5th). But in Banaskantha (2nd) closely located to Kutch, trend was comparatively stable during the same period. The most interesting is to see when all the top districts with higher yield saw a depression in 2000-01, productivity in Kutch increased significantly.

Uses and Utilities of Castor Seeds and Oil

Castor oil is regarded as one of the most valuable laxatives in medicine. It is of special service in temporary constipation and wherever a mild action is essential, and is extremely useful for children and the aged. It is used in cases of colic and acute diarrhoea due to slow digestion, but must not be employed in cases of chronic constipation, which it only aggravates whilst relieving the symptoms. The oil will purge when rubbed into the skin, or injected. It is also used for expelling worms, after other special remedies have been administered. Castor Oil forms a clean, light-coloured medicinal soap, which dries and hardens well. The inferior qualities of the oil are frequently employed in India for soap-making. Externally, the oil has been recommended for various cutaneous complaints, such as ringworm, itch, etc. Castor oil is an excellent solvent of pure alkaloids and such solutions of Atropine, Cocaine, etc., as are used in ophthalmic surgery. It is also dropped into the eye to remove the after-irritation caused by the removal of foreign body. Apart from its medicinal uses, castor oil is finding increasing uses in the industrial world. It is largely used in the manufacture of the artificial leather used in upholstery; it furnishes a colouring for butter, and from it is produced the 'Turkey-red' oil used in the dyeing of cotton textures. It is an essential component in some artificial rubbers, in various descriptions of celluloid, and in the making of certain waterproof preparations, and one of the largest uses is in the manufacture of transparent soaps. It is also used in manufacturing of hydraulic and brake fluids, inks, coatings and perfumes. It also furnishes sebacic acid which is employed in the manufacture of candles, and caprylic acid, which enters into the composition of varnishes, especially suitable for the polishing of high-class furniture and carriage bodies. One of its minor uses is in the manufacture of fly-papers.

Castor oil is also used in the preservation and restoration of pictures and combined with citron ointment; it is used as a topical application in common leprosy. The poison ricin is made from the by-products in the manufacture of castor oil.

2.1.5.3 Rape and Mustard Seed

Rape and Mustard Seeds are also produced the region. The Mustards, Black (Brassica nigra, Sinapis nigra) and White (Brassica alba), are cultivated for their seeds, which are valuable medicinally and commercially. They are now generally included in the Cabbage genus, Brassica. Rape seed (Brassica napus) also known as Cole Seeds are also a type of mustards and falls under Cruciferae family.

In production of rape and mustards seeds, share of Kutch in Gujarat's total production have fallen from 6 percent in 1998-99 to less than 2 percent in 2001-02. Banaskantha and Mehsana, the top two districts produced more than 90 percent of the Gujarat's total production. In 2001-02, Gujarat was sixth largest producer of rape and mustards in India and FAO figures keep India at the second position in rape seed production in the world after China. But in the production of mustard seeds, India could not make an entry in the list of top five positions.

Table 2.21: Rape and Mustard Yield; Major States 2001-02

Rank	States	Yield
1	Haryana	1490
2	Punjab	1200
3	Gujarat	1180
4	Rajasthan	1060
5	Uttar Pradesh	1000
	India	1000

Source: CMIE

Table 2.22: Rape and Mustard Seeds Productivity 2002

Rape Seed			Mustard Seed		
Rank	Countries	Yield Kg/ha	Rank	Countries	Yield Kg/ha
1	Belgium	3588.2	1	Ukraine	5000
2	Luxembourg	3585.9	2	Mexico	2375
3	Netherlands	3471.1	3	Lithuania	1666.7
4	United Kingdom	3398.1	4	France	1540.2
5	France	3201.7	5	Germany	1333.3
6	Switzerland	3183.3	6	Czech Republic	899.9
7	Ireland	3181.8	7	United States of America	790.7
8	Germany	2968.2	8	Sri Lanka	769.2
9	Bosnia and Herzegovina	2791.7	9	Slovakia	740.7
10	Turkey	2727.3	10	Nepal	718.5
40	India	1001.9		World	674.1
	World	1514.1			

Source: FAO

Table 2.19: Rape and Mustards Seeds Production; Top Five States 2001-02

Rank	States	Production	% Share
1	Rajasthan	1942.7	38.54
2	Haryana	796	15.79
3	Uttar Pradesh	536	10.63
4	Madhya Pradesh	415.9	8.25
5	West Bengal	336.9	6.68
6	Gujarat	292.1	5.80
	India	5040.4	100.00

Source: CMIE

Table 2.20: Rape and Mustard Seeds Production; Top Countries 2002

Rape Seeds

Rank	Countries	Production '000 MT	% Share
1	China	10552	31.00
2	India	5083	14.93
3	Canada	4178	12.27
4	Germany	3849	11.31
5	France	3317	9.74
	World	34044	100.00

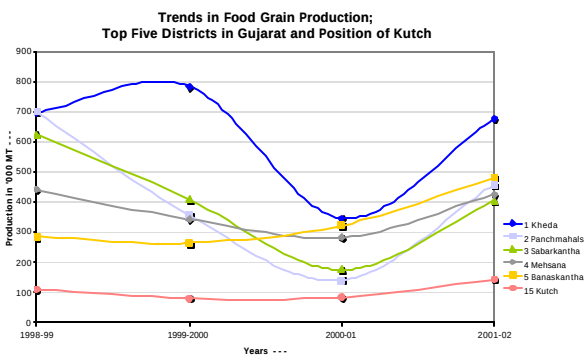
Mustard Seeds

Rank	Countries	Production in '000	% Share
1	Canada	154	31.61
2	Nepal	135	27.64
3	United States of America	56	11.47
4	Russian Federation	35	7.18
5	Myanmar	34	6.94
	World	488	100.00

Source: FAO

Looking at these figures, it is interesting to know that the North Gujarat districts of Banaskantha and Mehsana with proximity to Kutch produces more than five percent of the India's total and hence it is an important crop for consideration in the region for various related business opportunities.

Average yield from 1998-99 to 2000-01, in Kutch was 1183 kg per hectare, which placed Kutch at number three position among Gujarat's districts in terms of rape and mustards seeds productivity. Interestingly productivity in Kutch is far higher than that of Banaskantha, which is the largest producing district. In an



average, Gujarat also produced 1180 kg per hectare of rape and master seeds in 2001-02, which is almost equivalent to what Kutch produced in per hectare in 2000-01. Gujarat is the third most productive state in India after Haryana and Punjab. But in comparison to the international standards productivity of the top Indian states is very low. Belgium produces more than 3500 kg per hectare, while Ukraine produced 5000 kg per hectare mustard seeds in the year 2002. In the productivity of rape seeds, India was ranked 40th in 2002 among all the countries, which was even lower than the world's average.

Uses and Utilities of Rape and Mustards Seeds

Rape is cultivated for the sake of the oil pressed from its seeds, the refuse being used to make oil-cake, or rape-cake, for feeding cattle. These have been also employed medicinally from very early times. White Mustard seeds were at one time quite a fashionable remedy as a laxative, especially for old people, an infusion of the seeds relieves chronic bronchitis and confirmed rheumatism, and for a relaxed sore throat a gargle of Mustard Seed Tea can be applicable. Mustard is used in the form of poultices for external application near the seat of inward inflammation, chiefly in pneumonia, bronchitis and other diseases of the respiratory organs. It relieves congestion of various organs by drawing the blood to the surface, as in head affections, and is of service in the alleviation of neuralgia and other pains and spasms. Oil of Mustard is a powerful irritant and rubefacient. Hot water poured on bruised Black Mustard seeds makes a stimulating footbath and helps to throw off a cold or dispel a headache. It also acts as an excellent fomentation. The bland oil expressed from the hulls of the seeds, after the flour has been sifted away, promotes the growth of the hair and may be used with benefit externally for rheumatism. Moreover, in the eastern part of India mustard oil is extensively used as cooking oil.

Table 2.23: Top 5Districts with High Food Grain Productivity and Yield in Kutch 2001-02

Rank	Districts	Yield Kg/Ha
1	Junagadh	2570
2	Gandhinagar	2140
3	Kheda	1790
4	Valsad	1790
5	Amreli	1660
20	Kutch	**730**
	Gujarat	1410

Source: CMIE

2.1.6 Food Grains

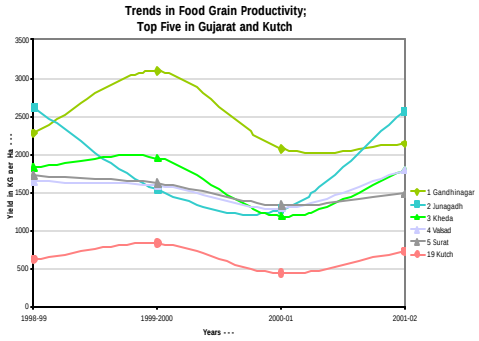
The region's agro-climatic conditions, particularly of lack of rainfall and irrigation do not provide a favourable environment for cereal production. Out of all the cereals, millet or bajra is produced as kharif crop and wheat is produced as a rabi crop in a very limited way, wherever irrigation is available. But in terms of pulses production the region poised itself ahead of many other districts in the state.

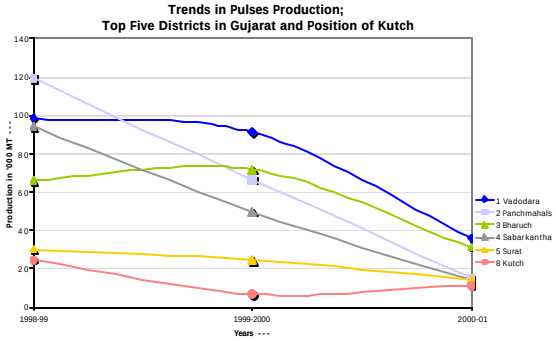
Comparative figures, average of four years from 1998-99 to 2001-02 reveals that, Kutch is in 15th position among the districts in the state (according to the old 19 districts format – split data for new districts are not available yet), top five places are being held by Kheda, Panchmahals, Sabarkantha, Mehsana and Banaskantha. Kheda being number one produced six times more food grains than Kutch during that period. Average annual production per cultivator in the same period of time for Kheda was 1.7 MT, while same for the region was only 1 MT. Thus it can be understood that production of food grains as a whole is not an important aspect in the region's agriculture.

Productivity of food grains is also extremely low in the region. It was ranked at the 19th position among all the districts in Gujarat. Gandhinagar at the top produced almost five times more food grains per hectare than that of Kutch. Trends show that the productivity was overall low during 2000-01 in the districts of Gujarat, which is also visible in Kutch. But it is in an improving trend in 2001-02.

2.1.6.1 Pulses

In food grain production, the region is better off in production of pulses than cereals. Average annual pulses production from 1998-99 to 2000-01 put Kutch in overall eight position among the districts in Gujarat. But Kutch produced less than five times of what Vadodara (ranked 1st) produced. The region also suffers from low pulses productivity. During the period of analysis average annual yield was the lowest (ranked 19th) in Kutch and it produced almost 4 times less quantity per hectare than of Surat with the highest yield.



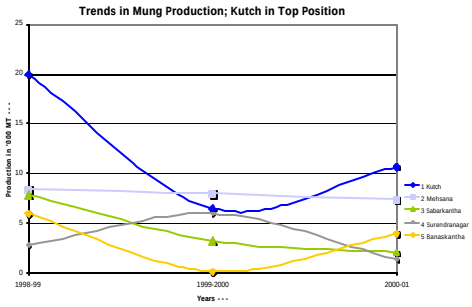


Trends of pulses production of Kutch and its comparison to the top five pulses producing districts in Gujarat shows a sharp decreasing trend since 1998-99 to 2000-01. Production in the first two, Panchmahals and Vadodara declined 3 to 4 times during that period. But interestingly the trend in Kutch was reverse with a slight depression in 1999-2000 and an up in 2000-01.

Among the pulses, Kutch produces mung and math as Kharif crops. The region is the largest producer of mung and math. Among the pulses, Kutch produces mung and math as Kharif crops. The region is the largest producer of mung and math.

2.1.6.2 Mung or Green Gram or Golden Gram

The mung bean is the seed of Vigna radiata (Fabaceae), which is native to India. It is also known as green gram or golden gram. The mung bean is one of many species recently moved from Phaseolus to Vigna and is still often seen cited as Phaseolus aureus or Phaseolus radiatus. These are all the same plant.



In mung production, Kutch produced almost double than what Mehsana (ranked 2nd) produced during 1998-99 to 2000-01. But Kutch has seen a high fluctuating trend in mung production. In a single year, from 1998-99 to 1999-2000 mung production in Kutch declined almost four times and in the year 2000-01 it again achieved an increasing trend. The trend in Mahesana, which is in the second place, was almost stable during that period.

But productivity of mung is very low in Kutch. In annual average production per hectare, Kutch was positioned at the 17th position among the districts in Gujarat. Yield in Ahmedabad was the highest followed by Junagadh, Surat, Panchmahals and Sabarkantha. The trend in Junagadh was the most fluctuating with a sharp decline during 1999-2000. In 2000-01, Junagadh top the list, which was around three times higher than that of Kutch.

Uses and Utilities of Mung

It is excellent with Chinese foods such as mung bean soup or sweet and pungent pork and makes an excellent cold salad bean as opposed to kidney beans. They are used to make bean sprouts and as a source of starch for cellophane noodles or fen si. In India, mung is used to prepare 'dal' a popular Indian pulse-curry, fried or roasted for preparing instant food items, or crushed to prepare powder to use as an ingredient in various snacks and other foods. In the eastern region there is massive demand of raw mung used as an important food in the religious and other ceremonies.

2.1.6.3 Cereals

In cereals, bajra is the dominant crop in the region. Area under bajra in Kutch is one of the highest among the districts in Gujarat and in 2001-02, the region produced 6.5 percent of the total produce in the state and ranked in sixth position. Kutch also produces less amount of wheat, wherever irrigation is available.

2.1.6.4 Millet or Bajra

Millet or Bajra is extensively grown in Kutch. Millet is the collective name of a group of genera of the Grass family (Gramineae/Paniceae) widely grown around the world for food or animal feed. Pearl millet (Pennesetum glaucum (L.) R.Br, syn. P. americanum (L.) Leeke is the most widely grown of the group. Pearl millet has been grown in India and Africa since prehistoric times. It is now generally accepted that pearl millet originated in Africa and that it was introduced into India from there. Millet is well adapted to low rainfall and high temperature, and thus can be grown in areas where other cereal crops, such as wheat or maize, would not survive. Today pearl millet is grown on 260,000 km² worldwide. It is an important crop in Kutch. Pearl millet is known as cattail millet, pencillaria in the USA; bajra, bajri, sajje, cumbu in India, sanio, gero, babala, nyoloti, bullrush millet, dukkin, souma in Africa and candle millet, dark millet in Europe.

In 2001-02, Kutch produced 6.5 percent of the total millet in Gujarat. Semi-arid climatic conditions with lack of rainfall and irrigation and high temperature in the region favours millet production in the region. In 2001-02, it ranked sixth among the top millet producing districts in the state. Traditionally, bajra or millet is accepted as an important food in the region. Particularly, bread (rotla) prepared from it is extensively in use among the local folk. Therefore, millet farming is a traditional practice in the region. Banaskantha, a district in the eastern periphery of Kutch produced the largest quantity of millet in Gujarat followed by Kheda, Mahesana, Bhavnagar and Surendranagar in 2001-02. But annual production varies significantly from one year to another depending upon variations in rainfall. Area under millet in Kutch is one of the highest (4th) in the state accounting for around 10 percent of the total area (2002), but production is lower due to lower level of productivity.

Table 2.24: Production of Bajra and Position of Kutch 2001-02

Rank	Districts	Production '000 MT	% Share
1	Banaskantha	209	16.56
2	Kheda	191.7	15.19
3	Mahesana	172.3	13.65
4	Bhavnagar	144.7	11.46
5	Surendranagar	113.2	8.97
	Top Five	830.9	65.82
6	Kutch	82	6.50
	Gujarat	1262.3	100.00

Source: Centre for Monitoring of Indian Economy

Table 2.25: Gujarat, Second Largest Producer of Millet / Bajra 2001-02

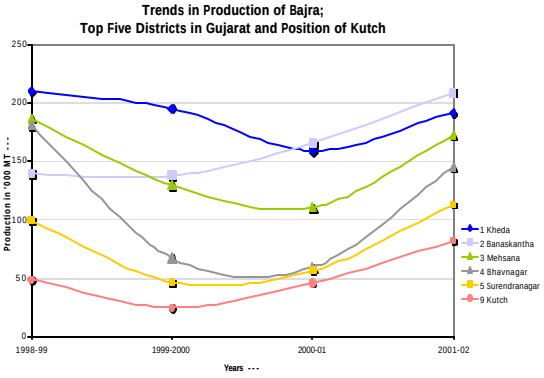
Rank	States	Production '000 MT	% Share
1	Rajasthan	3802.4	45.51
2	Gujarat	1262.8	15.12
3	Uttar Pradesh	953	11.41
4	Haryana	834	9.98
5	Maharashtra	830.8	9.94
	India	8354.6	100.00

Source: Centre for Monitoring of Indian Economy

Table 2.26: Production of Millet /Bajra; Top Five in the World 2002

Rank	Countries	Production '000 MT	% Share
1	India	6508.9	26.96
2	Nigeria	6100	25.27
3	Niger	2500	10.36
4	China	2176.8	9.02
5	Burkina Faso	994.7	4.12
	World	24142.26	100.00

Source: Food and Agriculture Organisation, UN



In India, Gujarat due to its climatic conditions and food habits is a major producer of millet. In 2001-02 Gujarat produced more than 15 percent of India's total millet and was ranked second only after Rajasthan. On the other hand India was the largest millet producing country in the world and it produced more than 26 percent of the total global production followed by Nigeria, Niger and China in the year 2000. In many countries in the western and developed world millet is produced as a fodder crop. Yield in the countries such as Spain and Croatia is two to three times higher than that of Kutch and Gujarat.

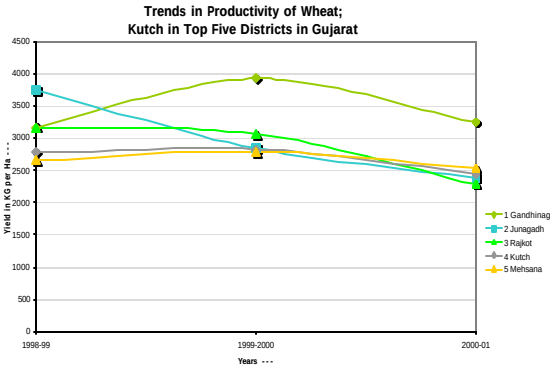
Trends in production of millet in Kutch and its comparison to the top five millet producing districts in Gujarat reveals that almost all the districts except Banaskantha have experienced a relative low during 1999-2000 and also in 2000-01. Fluctuation was the highest in Bhavnagar, while trend in Banaskantha was mostly positive throughout the time-series. It improved its position from forth in 1998-99 to number one in 2001-02. Kutch's overall position remains in the same throughout the time-series and since 1999-2000, taking a positive trend closely following Surendranagar.

Uses of Millet and Millet Products

Millet grain is the basic staple for farm households in the poorest countries and amongst the poorest people. Millet straw is a valued building material, fuel and livestock feed. Millet is consumed in the form of fermented or non-fermented breads, porridges, boiled or steamed foods, and (alcoholic) beverages. In the Sahel and elsewhere in northern Africa, pearl millet is an important ingredient of couscous. In the USA, Australia, and Europe, millets are also grown to feed cattle and birds.

2.1.6.5 Wheat

Kutch produces a small quantity of wheat and mostly wheat fields are concentrated in the irrigated areas. But surprisingly, productivity of wheat is higher in the district. In terms of the average annual yield, Kutch was ranked fourth among the districts of Gujarat.



2.1.7 Other Commercial Crops

2.1.7.1 Cotton and Cotton Seeds

Kutch also produces cotton. In 2001-02, Kutch was in the 8th position and produced more than 5 percent of Gujarat's total cotton. Surendranagar was in the top position with a share of 23 percent followed by Rajkot (12 percent). Bharuch, Vadodara and Mahesana in the 3rd, 4th and 5th position produced in between 8 to 10 percent each. On the other hand Gujarat produced almost 17 percent of India's total cotton and was ranked 3rd among the cotton producing states. Maharashtra produced more than 26 percent of the total at the top position followed by Andhra Pradesh with more than 18 percent of the total cotton. Punjab and Karnataka are in the 4th and 5th position respectively. India was the world's fourth largest cotton producing country with 9 percent of the global share and follows closely Pakistan, which was the third largest cotton producing country in 2002.

China produced 28 percent of total global cotton, while the USA was in the second rank with around 18 percent share in the same year. Gujarat producing 17 percent of Indian cotton, which is the fourth largest cotton producing country in the world, therefore becomes an important cotton producing region in the world and Kutch definitely is a part of it.

When districts in Gujarat are compared in terms of yield, it was revealed that in 2001-02, productivity in Kutch was the highest in Gujarat, which is far higher than the average productivity of Gujarat and India. Trends also reveal that the overall productivity is also going down since 1998-99 to 2001-02. By international standards, productivity in the region is very low. Israel produced 4400 kg per hectare, which is 10 times higher than the productivity of Kutch.

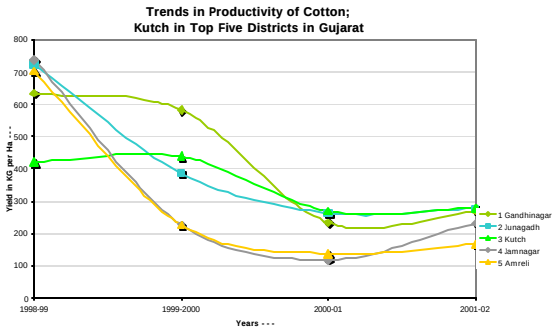


Table 2.27: Kutch in Top, Top 5 Districts in Gujarat with High Cotton Productivity 2001-02

Rank	Districts	Yield Kg/Ha
1	Kutch	279.1
2	Junagadh	276.8
3	Gandhinagar	268.4
4	Sabarkantha	250.4
5	Jamnagar	232.2
	Gujarat	170

Source: CMIE

Table 2.28: Cotton Productivity; Top States 2001-20

Rank	States	Yield Kg/ha
1	Haryana	722
2	Punjab	370
3	Tamil Nadu	300
4	Andhra Pradesh	290
5	Orissa	280
9	Gujarat	170
	India	190

Source: Centre for Monitoring of Indian Economy

Table 2.29: Seed Cotton Productivity; Top Countries 2002

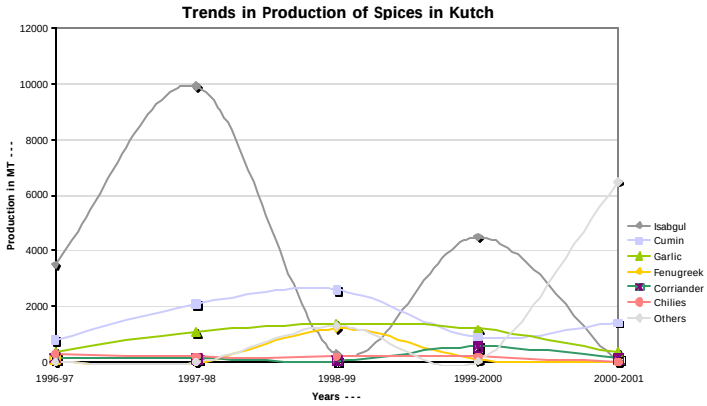
Rank	Countries	Yield Kg/ha
1	Israel	4400
2	Australia	4160.3
3	Syrian Arab Republic	4015.5
4	China	3524.7
5	Spain	3476.2
6	Niger	3333.3
7	Greece	3301.2
8	Mexico	3113.2
9	Turkey	3111.1
10	Brazil	2825
70	India	635
	World	1720.9

Source: FAO

2.1.7.2 Spices

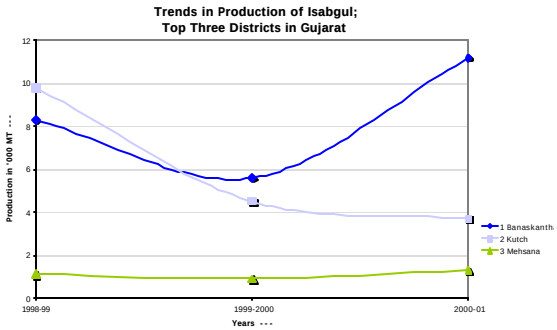
Kutch is very important for production of few of the spices. It is one of the largest producer of the unique spice crop isapgul. More over various other spices ranging from cumin to correander is being produced in Kutch.

Trends in production of various spices from 1996-97 to 2000-01 in Kutch exhibits extreme levels of fluctuations among various crops. Isapgul production is in its peak in the year 1997-98, while seeing a sharp decline to almost nil in the year 1998-99 and again an upwardly movement in 1999-2000 and again a fall thereafter. While cumin production gradually increased till 1998-99 and then fell during 1999-2000 and taken a gentle stride thereafter. Production of garlic gradually increased till 1997-98 and then gradually fell. Fenugreek, correander and chillies are not very important in the region due to less quanity of production.



2.1.7.3 Isabgul

Isabgul or Psyllium husks is separated husk form and 85 per cent of the processed Isabgul from India is exported. Many medicinal formulations are made from Isabgul husk. Husk purity of 95.98 and 99 per cent is marketable. The cost of 95 to 99 per cent purity product varies from Rs 100 to 150 a kg. Isabgul is marketed in husk, powder and seed forms. India is one of the major producers and processors of Isabgul. It is produced in Gujarat, Rajasthan, Haryana and Bihar. Banaskantha, Kutch and Mahesana are the major Isabgul producers in Gujarat. Trend in production is fluctuating over the years in Kutch and Banskantha.



Uses and Utilities of Isabgul

Isabgul or Psyllium Husks is one of nature's best sources of soluble fibre. It has been used for centuries as a natural colon cleanser and for supporting bowel regularity. It's also a valuable nutritional tool for maintaining a healthier cardiovascular system. Retail price for 500 mg of finished medicinal Psyllium Husks is around $6 to 8 in western markets.

2.1.7.4 Vegetables

Vegetables are important crops due to the opportunities related to processing industry. But due to lack of availability of water Kutch is not an important vegetable producer. In 2000-01,

Table 2.30: Production of Vegetables; a Comparative Scenario 2000-01

Rank	Districts	Total in MT	% Share
1	Kheda	1214930	19.78
2	Banaskantha	949938	15.47
3	Anand	635562	10.35
4	Surat	440412	7.17
5	Sabarkantha	436252	7.10
	Top Five	3677094	59.87
19	Kutch	48790	0.79
	Gujarat	6141540	100

Source: Directorate of Horticulture, Gujarat

Kutch produces less than 1 percent of Gujarat's vegetables. Kheda, which is the top vegetable producer in Gujarat with a 19 percent state's share produced 25 times more vegetables in quantity than Kutch in 2000-01. Banaskantha in the proximity to Kutch produced 15 percent of the state's vegetables and was ranked second in the same year. Kutch and Banaskantha exhibited almost similar trend in production of most of the agricultural commodities, but in case of vegetable production such a difference is surprising.

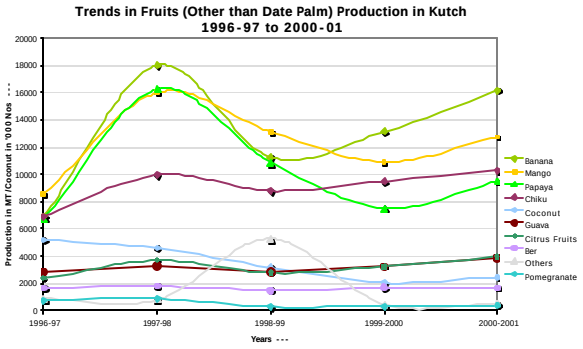


Table 2.31: Production of Fruits in Kutch and Its Share in Gujarat 2000-01

Rank	Fruits	Production in MT		Kutch' % Share	Kutch' Rank
		Kutch	Gujarat		
1	Date Palm	53838	54351	99.06	1
2	Papaya	9500	154456	6.15	4
3	Coconut	2471	85349	2.90	4
4	Chiku	10260	153369	6.69	6
5	Pomegranate	397	23322	1.70	7
6	Guava	3860	95947	4.02	8
7	Mango	12730	364235	3.49	9
8	Citrus Fruits	3960	188824	2.10	9
9	Banana	16160	1000259	1.62	9

Source: Director of Horticulture

2.1.7.5 Fruits

Kutch produces varieties of fruits. The region exhibits its monopoly in India in production of fruit crops such as dates. It produced 99 percent of Gujarat's dates in 2000-01. In the same year it was also ranked 4th in both production of papaya and coconut among the districts in Gujarat. Moreover, Kutch produced more than 6 percent of the chiku as the 6th largest producer in Gujarat. Pomegranate, guava, mango, citrus fruits and banana are other important fruit crops in the region.

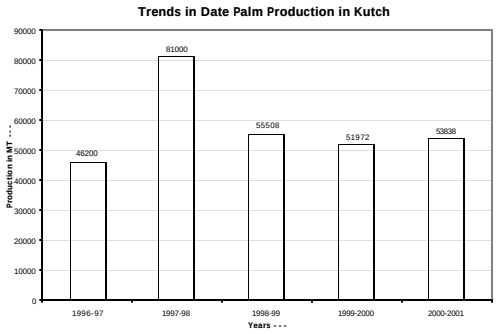
Farmers in the region are also concentrating on mango production recently. Extensive mango orchards along with palm trees can be seen in the vicinity of Anjar, Mundra and Mandvi. Trends in fruit production during 1996-97 and 2000-01 exhibit fluctuations at various levels and at different point of time. Overall production was low in 1996-97, while in 1997-98 it was in its peak with at least two fold increases in production of the major fruit crops. The trend for the important crops again saw a downwardly movement in the next two years, while in 2000-01, it again found an upwardly momentum. But fluctuations were more in the production of banana, mango and papaya production, while these were not very intense for chiku and for the less important crops.

But an interesting picture immerses when considered production of fruits per cultivator and compared with the state level figures. Production in kg per cultivator provides overall intensity of farming of a specific crop. In date production, intensity in Kutch is obviously the highest. But interestingly in the cases of papaya, mango and in chiku, production per cultivator is far higher than that of Gujarat. In guava and coconut too it is marginally higher than the Gujarat's figures. But in production of banana it is substantially lower.

Table 2.32: Production of Fruits Per Cultivator in Kutch and Gujarat 2000-01

Sr. No.	Fruits	Production Kg/Cultivator	
		Kutch	Gujarat
1	Date	546.33	11.54
2	Papaya	96.40	32.79
3	Coconut	25.07	18.12
4	Chiku	104.11	32.55
5	Pomegranate	4.03	4.95
6	Guava	39.17	20.37
7	Mango	129.18	77.31
8	Citrus Fruits	40.18	40.08
9	Banana	163.99	212.32

Source: Director of Horticulture, Gujarat,, Census of India



2.1.7.6 Date

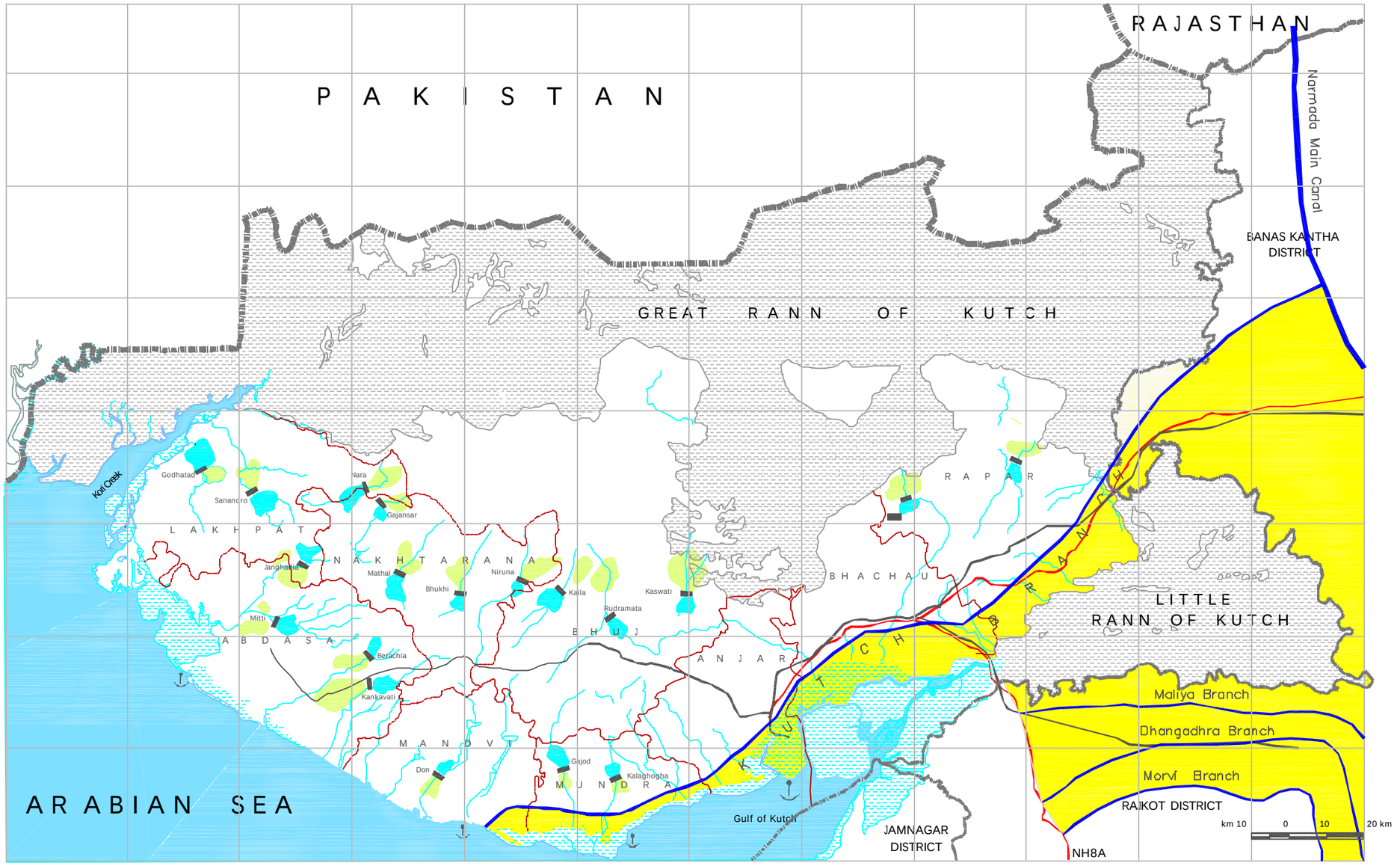
A date is the fruit of the date palm, Phoenix dactylifera. Three main fruit types exist; soft, semi-dry, and dry. The type of fruit depends on the glucose, fructose and sucrose content. A 100 gram portion of fresh dates is a premium source of vitamin C and supplies 230 kcal (960 kJ) of energy. 100 grams of dried dates, one the other hand, provides 3 grams of dietary fibre and supplies 270 kcal (1130 kJ) of energy. Dates are naturally wind pollinated, but in modern commercial horticulture dates are entirely pollinated manually. Pollination is done by skilled laborers on ladders, or less often the pollen may be blown onto the female flowers by wind machine. Parthenocarpic varieties are available but the seedless fruit is smaller and of lower quality.

Dates are an important traditional crop in Arabia, and most varieties were bred there. In Islamic countries, dates and milk is a traditional first meal when the sun sets during Ramadan. In the USA, dates are mainly grown in California. In Kutch commercial date palm cultivation is a recent addition to the region's agriculture history, but now a days it is cultivated extensively.

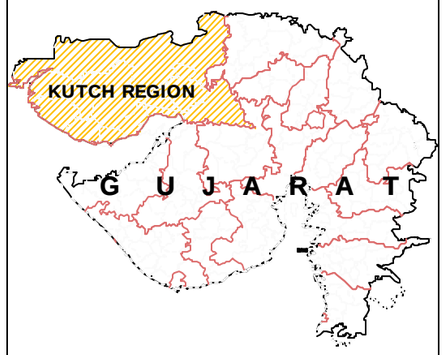
Trend in production of date palm is fluctuating. In 1997-98, production was in its peak with more than 80 thousand MT of production and since then, annual production fluctuated in between 50 to 60 thousand MT in the next three years. In 2002, Egypt was the largest date producing country with more than 1100 thousand MT of date production and with 16 percent of the global share. Yield in Egypt is also the highest in the world. Iran, Saudi Arabia, UAE and Pakistan are the other top date producing countries in the world. On the other hand after Egypt, China is at second position in terms of productivity. In comparison to the international standards, quantity produced in Kutch is less, but it is interesting to note that within a short time frame how Kutch became an able producer of at least 10 to 12 percent of what Pakistan, the fifth largest date producer in the world produces.

2.1.8 Irrigation and Water

Irrigation is a necessity for agriculture in Kutch, but due to lack of infrastructure and rainfall a meagre 37 percent (187 thousand ha) of the gross cultivated area has been brought under various sources of irrigation. Moreover, there is variations across the talukas; Nakhatrana where almost 85 percent of the gross cropped area is irrigated, while in Rapar the figure is as low as 13 percent. Irrigation has been planned in an additional 37 thousand hectare of land under the Sardar Sarovar Narmada Project and approximately 187 thousand hectares through various other schemes in Kutch will make total area under irrigation to 224 thousand hectares.



KEY MAP



LEGEND

- International Boundary
- State Boundary
- District Boundary
- Taluka Boundary
- Railway Line - Broad Gauge
- Railway Line - Metre gauge
- National Highway
- River / Stream
- Mud Flats
- Water Bodies
- Rann
- Major Port
- Minor Port
- Narmada Canal Main Branch
- Branch of Main Canal
- Command Area of Narmada Project
- Command Area of other Large and Medium Projects
- Dam Under Large and Medium Water Resource Schemes

N

Source : Survey of India; Narmada and Water Resources Department, Govt of Gujarat

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.
Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
Web www.mottmac.com

Gujarat Infrastructure Development Board
8th Floor,
Block No. 18
Udyoug Bhavan,
Sector-11,
Gandhinagar, 382 017
Gujarat, India.
Tel +91 (79) 3232701, 3232704
Fax +91 (079) 3222481
Web www.gidb.org

Rev.	Date	Drawn	Description	Ch'k'd	App'd
R0	29.10.04	MAS	Issue for ------ Report Submission	VG	AK

Kutch Region
Water Resource Schemes
Study on
Development Potential of Kutch

Drawn	MAS
Checked	VG
Approved	AK
Scale	1:1200000
Drawing No.	214002/WATER-RESOURCE-SCHEMES/0007
Rev.	R0
Status	APR

: Irrigated Land by Source and Basic Characteristics of Irrigation, Kutch 1999-2000

Rank	Talukas	Irrigated Land by Source %			Basic Characteristics		
		Canals	Wells	Deep Tube Wells	Gross Irrigated Area ha	Net Irrigated Area ha	Double Irrigated Area
1	Nakhatrana	13.21	83.25	3.54	46563	29267	17296
2	Mundra	12.74	86.01	1.37	16361	12876	3485
3	Bhuj	16.36	80.35	3.29	34439	24417	10022
4	Mandvi	1.90	97.80	0.30	23213	17610	5603
5	Anjar and Gandhidham	2.98	95.40	1.62	18519	12988	5531
6	Bhachau	0.94	97.99	1.67	15104	11093	4101
7	Lakhpat	97.47	2.53	0.00	4630	2040	2590
8	Abdasa	28.35	72.03	0.00	13176	9467	3709
9	Rapar	7.08	93.25	0.00	14913	11570	3343
	Kutch	13.00	85.17	1.94	186918	131328	55680

Source: District Statistical Handbook 2001 -02

Irrigation in Kutch is ground water dependent. 87 percent of the total irrigated area depends on ground water sources and out of which 85 percent on traditional wells. Area under canal irrigation is the highest in Nakhatrana (more than 6000 ha), then in Bhuj (5600 ha) and in third in Lakhpat (4500 ha). 97 percent of the irrigated land in Lakhpat is under canals as irrigation through well is negligible in the taluka. Analysis of crop-wise distribution of irrigated area reveals that more than 44 percent of the total irrigated area is under oil-seeds and around 29 percent of the irrigated area is under cotton, isabgul, other spices and fodder. Only 16 percent of the irrigated area is under food grain production.

Taluka-wise Distribution of Irrigated Food Grain Area 1999 -2000

Rank	Talukas	Irrigated Area under Various Food Grain Crops in Ha							Irrigated Food Grain Area to GIA %
		Wheat	Millet	Total Cereals	Mung	Other Pulses	Total Pulses	Food Grains	
1	Nakhatrana	5555	237	5792	0	0	0	5792	12.44
2	Bhuj	3341	2665	6006	4	91	95	6101	17.72
3	Mandvi	2573	1754	4327	3	182	185	4512	19.44
4	Anjar and Gandhidham	1652	1192	2844	0	0	0	2844	15.36
5	Mundra	585	1404	1989	9	439	451	2440	14.91
6	Bhachau	815	3046	3861	74	0	74	3935	25.90
7	Rapar	1320	1444	2764	0	0	0	2764	18.53
8	Abdasa	2165	249	2414	0	0	0	2414	18.32
9	Lakhpat	512	49	561	7	0	7	568	12.27
	Kutch	18518	12040	30558	97	712	809	31367	16.77

Source: District Statistical Handbook 2001 -02

Taluka-wise distribution of irrigated food grain area to the gross irrigated area ranges from 12 percent to 25 percent. Lakhpat and Nakhatrana, where the figure is the lowest, while in Bhachau it is the highest. Wheat and millet are the important irrigated crops. Pulses have a lower share and irrigated area under pulses can be only seen in Bhuj, Mandvi, Mundra, Bhachau and in Lakhpat.

: Taluka-wise Distribution of Irrigated Area under Oil Seeds 1999-2000

Rank	Talukas	Groundnut	Castor	Rape and Mustards	Sesame	Total Oil Seeds	Irrigated Oil Seed Area to GIA %
1	Nakhatrana	26410	4705	2040	0	33155	71.20
2	Bhuj	10394	5080	2385	350	18209	52.87
3	Mandvi	4571	1351	239	74	6235	26.86
4	Anjar and Gandhidham	4496	935	342	196	5969	32.23
5	Mundra	1042	1684	180	142	3048	18.63
6	Bhachau	2520	2320	565	634	6039	39.98
7	Rapar	608	2563	1513	39	4723	31.67

8	Abdasa	985	2095	667	0	3747	28.44
9	Lakhpat	1497	0	913	0	2410	52.05
	Kutch	52523	20733	8844	1435	83535	44.69

Source: District Statistical Handbook 2001 -02

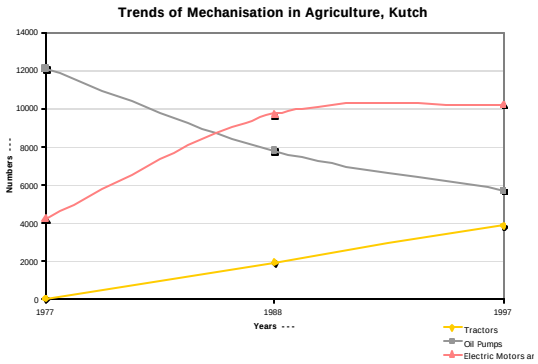
Various oil seeds are important irrigated crops in most of the talukas. Nakhatrana has large amount of irrigated areas under groundnut and more that 71 percent of the total irrigated area is attributed to oil seeds. In Mandvi and Lakhpat too in more than half of the irrigated land, oil seeds are cultivated.

Taluka-wise Distribution of Irrigated Area under Other Crops 1999-2000

Rank	Talukas	Cotton	Isabgul	Other Spices	Sugarcane	Fodder	Coconut	Total	Irrigated Area under Other Crops to GIA %
1	Nakhatrana	372	1100	268	10	4530	19	6299	13.53
2	Bhuj	3501	303	555	270	3622	30	8281	24.05
3	Mandvi	5201	157	306	60	5131	70	10925	47.06
4	Anjar and Gandhidham	988	340	464	193	3266	74	5325	28.75
5	Mundra	1002	288	230	0	2914	250	4684	28.63
6	Bhachau	413	783	1062	0	2188	18	4464	29.56
7	Rapar	2198	975	1477	0	2068	18	6736	45.17
8	Abdasa	3335	1825	54	0	1202	24	6440	48.88
9	Lakhpat	2	1367	0	0	249	0	1618	34.95
	Kutch	17012	7138	4416	533	25170	503	54772	29.30

Source: District Statistical Handbook 2001 -02

Among other irrigated crops, cotton, fodder and spices such as isabgul are important in majority of the talukas. Abdasa has the largest irrigated area under isabgul followed by Lakhpat and Nakhatrana. Irrigated area under cotton is the highest in Mandvi, followed by Bhuj and Abdasa. Fodder is an important irrigated crop and leaving Abdasa and Lakhpat, in majority of talukas, irrigated areas under fodder crops is significantly high.



2.1.9 Mechanisation and Use of Fertiliser

Over the years, a gradual mechanisation is taking place in the region. There is increasing trend of utilisation of tractors. Farmers also have started using more numbers of electric pumps and motors than oil pumps for irrigation. But Kutch is lagged behind other districts in Gujarat in terms of mechanisation in agriculture.

Table 2.32: Distribution of Various Agricultural Utilities and Machineries, Kutch 1997

Sr. No	Talukas	Number of Tractors	Power Tillers	Spray Dusters	Oil Pumps	Electric Motors and Pumps
1	Bhuj	637	19	3104	471	2628
2	Mandvi	870	29	1732	650	2518
3	Rapar	375	11	957	2075	1308
4	Nakhatrana	795	25	910	563	939
5	Bhachau	255	7	438	679	825
6	Abdasa	180	5	870	690	334
7	Mundra	285	40	564	203	954
8	Anjar	300	12	415	248	637

Spatial distribution of utilisation of various agricultural utilities exhibits sharp intra-regional variations. In terms of total numbers of major agricultural equipments and machineries, Bhuj is ranked at the top position among the talukas in Kutch closely followed by Mandvi. But number of tractors is the highest in Mandvi. Lakhpat and Gandhidham are the

9	Lakhpat	171	4	117	171	100
10	Gandhidham	28	0	137	0	15
	Kutch	3896	152	9244	5750	10258

Source: District Statistical Handbook 2001 -02

two talukas, where use of agricultural equipments is the least.

Use of fertiliser is another important aspect of modern agriculture practice. In comparison to other districts, consumption of fertiliser in Kutch is very less. Kutch is ranked at 16th rank in consumption during Kharif season, while at 14th place in consumption during the Rabi season in 2001-02. The region consumed around 4 times less fertiliser than Rajkot (rank 1st) during Kharif season and around 3 times less than Surat (rank 1st) during the Rabi season.

Top 5 Fertiliser Consuming Districts in Gujarat and Position of Kutch 2001 -02

Kharif Consumption '000 MT				Rabi Consumption '000 MT			
Rank	Districts	Consumption	Share	Rank	Districts	Consumption	Share
1	Rajkot	47	10.14	1	Surat	54.4	12.05
2	Surat	44.7	9.64	2	Banaskantha	42.7	9.46
3	Vadodara	35.8	7.72	3	Ahmedabad	27.3	6.05
4	Sabarkantha	32.2	6.94	4	Sabarkantha	26.4	5.85
5	Bhavnagar	27.9	6.02	5	Kheda	25.5	5.65
16	Kutch	13.2	2.85	14	Kutch	17.6	3.90
	Gujarat	463.7	100.00		Gujarat	451.6	100.00

Source: CMIE

But position of Kutch improves when considered consumption of fertiliser per cultivator. In 2001-02, Kutch was at the 8th position and was well above the same for Gujarat. Ahmedabad, followed by Bharuch, Surat, Rajkot and Surendranagar are the top consumers of fertiliser per cultivator.

Table 2.33: Consumption of Fertiliser per Cultivator; Position of Kutch 2001-02

Rank	Districts	Kg/Cultivator
1	Ahmedabad	439.40
2	Bharuch	419.53
3	Surat	384.42
4	Rajkot	334.85
5	Surendranagar	317.62
8	Kutch	261.81
	Gujarat	194.29

Source: CMIE, Census of India

2.2 Agro-business

Leaving the cereals, almost majority of the agricultural products in the region are cultivated for commercial purposes, which includes production of oil seeds, spices, pulses, cotton, fruits, etc. Oil seeds and related business is extremely important for the region. Particularly, castor and groundnut oil are the two important commodities produced in the region.

2.3 Agro-infrastructure

2.3.1 Irrigation Infrastructure

Irrigation infrastructure is crucial for Kutch. Kutch has around 570 km of irrigation canals and around 265 km of canals under medium category. A canal density (length to GCA) of 8.62 km per 100 ha GCA is considerable, but coverage of canal irrigation in Kutch is not significant. Longest canal length is available in Mandvi Taluka followed by Abdasa. Basic irrigation in the region is carried out through surfaced private wells. There are more than 25500 of such wells across the region. There are more than 200 private deep tube wells in the region with greater concentrations in Bhuj and Nakhatrana talukas and 162 tanks used for irrigation purposes. Electric pumps for irrigation purposes are more popular than the oil pumps. There are more than 22 thousand electric and 10 thousand oil pumps being used for this purpose. Mandvi and Bhuj are the two talukas where maximum concentration of electric pumps is found.

41: Distributionof Irrigation Infrastructure, Kutch 1999-2000

Rank	Talukas	Canal Length KM	Medium Canal Length KM	No. of Private Well		No. of Private Deep Tube Wells	Tanks		No. of Pumps	
				Surfaced	Unsurfaced		Large	Small	Oil	Electric
1	Mandvi	117.33	7	3328	0	10	0	21	274	4330
2	Abdasa	102.53	64.49	1740	505	0	0	24	310	1088
3	Bhuj	62.48	41.93	3917	180	81	3	31	2000	4457
4	Rapar	56.7	39.59	4910	505	0	0	16	2530	2721
5	Mundra	54.8	26.89	3066	0	14	0	10	1031	2197
6	Lakhpat	54.14	39.07	390	5	0	0	15	162	1099
7	Anjar and Gandhidham	50.45	0	2665	703	25	0	11	1293	2192
8	Nakhatrana	35.76	45.73	3240	301	61	0	15	1650	2486
9	Bhachau	35.55	0	2440	411	28	0	16	1250	1848
	Kutch	569.74	264.7	25696	2610	219	3	159	10500	22418

Source: District Statistical Handbook 2001 -02

2.3.2 Storage and Wholesale Facilities

Leaving storage facilities in and around the ports, Kutch suffers from lack of general and cold storage facilities. There are few private godowns in the region.

2.3.3 Specialised Parks

No specialised agro-parks have been created in Kutch yet. There is potential of export oriented agro-parks within the proposed special economic zones in the region.

2.3.4 Transport Infrastructure

Roads, Railways, Ports and Airports are extremely important for development of agriculture and related industry and trade. Recent development of four lane highways, broad gauge railway lines and expansion of ports as discussed in the infrastructure heads now fulfils the basic infrastructure requirements in the region creating attractive environment for agro-processing industries and also for

enhancing trade.

2.4 Agricultural Development Initiatives

Oil Seed Development Programme (ODP), a joint effort by the state and the central government was carried out for more than a decades in the districts of Gujarat. Recently the programme has been merged with the National Pulses Development Programme (NPDP) and along with another mission to develop the palm oil and maize an integrated annual programme called Integrated Scheme for Oil Seeds, Pulses, Oil Palm and Maize (ISOPOM) is developed. Under ISOPOM, with 75 percent funding from the central government and rest by the state government various activities such as purchase of seeds, infrastructure development, block demonstration, manual equipments, power equipments, sprinkler sets, rhizobium uses, farmer's training, etc are the annual targets for each districts. An investment of around INR 233 million was planned for the Fin Year 2004-05, out of which around INR 77 million was spent on various activities in different districts. Around 450 sprinkler sets are being distributed in Kutch under this programme during the same year.

Moreover, private companies and NGOs are also contributing to development of agriculture and agricultural products in various intensities. Contract farming of aloe-vera is gradually becoming popular in the areas such as Mandvi. Advanced tissue culture of Kutchi mango is under research in the agriculture extension centre in Mandvi.

2.5 Problems and Potentials of Agricultural Development

- Groundnut planting has critical stages, such as flowering, pegging, pod development, etc. Fluctuations in rainfall during these stages results in fluctuations in the yield.
- Cereal development in Kutch is a distant dream due to scarcity of water.
- Castor is a deep rooted crop, which makes it more preferable for dry conditions. Its commercial value is high and castor oil manufacturing units are being established in the region. Castor is the crop with extreme potential in Kutch.
- Mung is a potential crop in Kutch.
- Among the spices Isabgul is an extremely potential crop.
- Anjar, Mundra and Mandvi are the horticulture potential areas in the region. Mango, papaya, date palm, coconut and new crops such as aloe vera can be produced in orchards.
- Kutch has a vast amount of virgin land, which has not seen use of chemical fertilisers yet. It creates favourable environment for organic farming for exports.
- Organic farming can be supported through easily available castor cakes, which can be used to produce organic fertiliser.

2.6 Development Actions

- Stress on organic farming; potential investors to be identified, attracted and feasibility studies to be prepared for viability of organic farming for various cash crops and horticulture products. Identification of potential areas for organic farming to be carried out, which should be supported by an efficient land information system,
- To designate the agricultural belt of Mandvi-Mundra-Anjar as Horticulture Development Belt and preparation of detailed master plan with details of land ownerships, land parcels, details of soil types, water availability, a production and marketing information systems. To facilitate these areas with state of the art infrastructure as per requirements identified in the plan and financing mechanism should be detailed out with participations from people, government and financial institutions. A community based water conservation plan should follow this,
- A pulses and oil seed belt to be identified in a similar fashion,
- Special marketing approaches to be adopted for attracting private investments in agro-parks, food parks, etc, for which special economic zones can create substantial attraction; large-scale export oriented integrated farms with animal husbandry can be a viable option,
- The Department of Forest along with the Directorate of Agriculture is attempting to promote new crops such as Jetropha. A feasibility study on large-scale cultivation of this crop through private investments to be carried out and potential investors to be identified,
- In the existing irrigated areas and in the areas to be covered by Narmada Irrigation Schemes, drip and sprinkler irrigation techniques to be promoted and financing mechanism and government supports to be strengthened.

2.7 State of the Agriculture Allied Activities: Animal Husbandry and Fisheries

Livestock breeding is a very important agriculture allied activity in Kutch. Traditionally Kutch is famous for livestock related activities and rural folk is highly dependent on it. Livestock censes of 1997 reveals that although share of livestock population of Kutch in Gujarat's total is very less, but number of livestock per thousand persons is higher in Kutch than that of Gujarat's. When there were 9 cross breed cattle in Kutch per thousand persons, Gujarat as a whole has 7. Number of buffaloes per thousand population is almost double than that of Gujarat's. But there are less concentration of indigenous cattle, sheep and goats in Kutch.

2.7.1 Milk Production and Dairy Development

According to the 21st Survey Report on Estimates of Major Livestock Products for the Year 2003-04 for Gujarat State (Directorate of Animal Husbandry, Gujarat), Kutch produced 209790 tones of milk during 2003-04, which is only 3.27 percent of Gujarat's product. But overall milk production in the district has increased from 135770 tones in 1993-94 by 55 percent. Gujarat is the one of the largest producers of milk. In 2001-02 Gujarat was the fifth largest state in milk production and produced 5.8 mill tones of milk. Banaskantha, Mehsana and Sabarkantha are the largest milk producing districts. Around 76 percent of the total milk produced in Kutch is buffalo milk. The Banni (Sindhi) breed of buffaloes and Kankrej breed of cows are famous indigenous breeds in Kutch.

According to the records with the Directorate of Animal Husbandry - Gujarat, Kutch dairy in Bhuj produced around 30,000 litres of milk per day (only 1.5 percent of Gujarat's) during its existence in the mid-nineties. There were 2 chilling centres, out of 24 in Gujarat. Gujarat's dairy milk production has increased since than from 1.9 mill litres to 2.9 million litres in 2003-04, while the only dairy in Kutch was closed due to miss-management related loss. But in the year 2003, an MoU has been signed with the state and central government and NDDB for revitalising Kutch dairy.

2.7.2 Sheep and Wool Production

According to the provisional figures of the 17th Quinquennial Census of Livestock 2003, Kutch has 494168 numbers of sheep, which is the highest in Gujarat and comprises of 24 percent of the state's total. The sheep population has decreased from 614831 in 1997 (Livestock Census 1997), by 19 percent. But wool production has increased from 648300 kg in 1997-98 to 894000 kg in 2002-03. According to the sources from Gusheel, Gandhinagar, in the eastern parts (Anjar-Bhachau-Rapar) of the region, density of sheep is higher a 150 average flocks per breeder, but quality of wool produced is little inferior (highly modulated coarser) than that of the western parts. In the western parts, although density of sheep is lesser (100 average flock-size per breeder), better quality wool is available. Naliya wool is the best quality from Patanwadi sheep, a local breed from the western parts.

Per sheep wool production presently is estimated at 1215 grams, which has gradually improved over the years. According to the 21st Survey Report on Estimates, Kutch contributes around 33 percent (2002-03) of the total wool produced in Gujarat, while Gujarat is the fifth largest (2001-02) wool producer in the country. Gusheel sources add that around 1.5 million kg of wool out of the total 2.7 million kg (2002-03) in Gujarat is used for growing carpet industry in India and demand for wool from Gujarat is high as these are of high carpet grade wool.

The Government of Gujarat is engaged in sheep development in the region through 24 sheep extension centres. It spends around INR 6 million per annum for breed development, health care and vaccination, training, marketing of wool (produced by the breeders) and also for weaver's development providing raw materials, purchase of products, organising exhibitions and marketing. An Intensive Sheep Development Programme with assistance from Government of India is also being implemented in Kutch by the state government. Two sheep breeding farm have been also established in Mandvi and Bhuj. Gusheel is implementing a technical and design development scheme with central government funds, which facilitates around 4/5 workshops (10 in Gujarat) for weavers with students from NID and NIFT. NGOs are also presently attempting development of wool products through local craftsmen.

Presently there is no wool-yarn making facility in Gujarat. Wool is being transported to the Northern Indian states for yarn making and woollen product manufacturing. With yarns manufactured in these states, woollen products along with carpets are being manufactured in Gujarat. According to its sources, around 25 percent of the products are being marketed by Gusheel and rest are being marketed by private initiatives.

2.7.3 Livestock (Cattle and Sheep) Development

In terms of animal husbandry infrastructure provided by the Government of Gujarat, presently there are 1 polyclinic, 24 dispensaries, 29 first aid veterinary centres, 1 disease investigation laboratory and 6 mobile dispensaries in Kutch. Moreover, there are one cattle breeding farm in Bhuj. In 2003, Gujarat Livestock Development Board is established by the state government with assistance from the Central Government of India. The board was established to facilitate improvement of indigenous breeds of cattle and buffalo through artificial insemination, production of quality semen by strengthening existing frozen semen production stations, popularise artificial insemination and provide breeding and artificial insemination at farmer's door step, conservation of pure indigenous breeds and encouraging establishment of private artificial insemination centres.

Apart from government's initiatives for development of animal husbandry in the region, NGOs such as BAIF (Bharatiya Agricultural Industries Foundation) and Aga Khan Foundation, etc are also engaged in development of this sector.

2.7.4 Poultry Development

There are 24,758 numbers of poultry-population in Kutch according to the provisional 2003, Livestock Census figures. Systematic poultry farming is a recent initiative in the region. It is a 68 percent increase from the 1997 livestock census figures. After 1999, 11 private poultry farms are established in Bhachau, Anjar and Gandhidham talukas. 8 of these farms with 12900 birds are producing meat and 3 farms with around 4500 birds produces eggs.

Although in comparison to Nadiyad, which is the largest poultry farming district in Gujarat, development in Kutch is negligible, but within a short period of time, number of poultry farms may grow due to increase in demand due to intensification of industry and businesses. But production of eggs in Kutch presents a great fluctuating trend from 5 million in 1993-94 and 5.7 million in 2000-01 to 2 million in 1996-97 and the lowest 0.5 million in 2002-03. However, number of eggs produced in Kutch is negligible in comparison to 385 million in Gujarat. In Gujarat, numbers of private poultry farms are increasing during past few years. In Nadiyad, there are around 24, 00,000 poultry in 84 layers farms and 157 broiler farms in 2003.

In Kutch presently there are 4 poultry extension centres established by the Directorate of Animal Husbandry. Government of Gujarat provide free vaccination in the poultry farms with less than 1000 birds and charges for vaccines from larger farms.

Table 2.34: Distribution of Fishermen and Population of Fishing Community 1997

Rank	Talukas	No. of Fishermen	Population of Fishing Community
1	Mandvi	760	3363
2	Anjar and Gandhidham	733	3510
3	Mundra	649	3078
4	Abdasa	553	2967
5	Bhachau	277	1167
6	Lakhpat	178	705
7	Bhuj	97	395
8	Nakhatrana	61	247
9	Rapar	0	0
	Kutch	3308	15432

Source: District Statistical Handbook 2001-02

Table 2.35: Distribution of Fishing Utilities 1997

Rank	Talukas	No. of Power Boats	Boats without Power	No. of Nets
1	Anjar and Gandhidham	345	23	9555
2	Mandvi	220	2	13750
3	Mundra	161	15	1418
4	Abdasa	59	9	23525
5	Lakhpat	32	1	13188
6	Bhachau	22	138	5823
7	Rapar	0	0	0
8	Bhuj	0	49	1031
9	Nakhatrana	0	53	913
	Kutch	839	290	69203

Source: District Statistical Handbook 2001-02

2.7.5 Fishing and Fisheries

Although having around 330 km long coast line fishing is not an important activity in the region. There are only 3308 fishermen and only 1 percent of the total population depends on fishing and fishery related activities. Fishing and fishery related activities are mostly concentrated in the talukas of Mandvi, Anjar, Gandhidham, Mundra and in Abdasa.

But in terms of production of fish, Kutch is one of the most important districts in Gujarat. CMIE sources reveals that in 2003-04, Kutch produced more than 11 percent of the total fish production in the state, which is fourth after Junagadh (40%), Valsad (13%) and Porbandar (12%). The region produced 7 thousand tones of fish in 2003-04, which is almost a thousand tones less than a year ago.

The region lacks modern facilities and equipments for fishing and fishery related activities. In terms of taluka-wise distribution, combined Anjar and Gandhidham talukas have the largest number of power boats, followed by Mandvi and Mundra.

In Gujarat, Gujarat Maritime Board (GMB) is set to develop an INR 140 million state-of-the-art fishing harbour (for 600 boats) in Dholai near Billimora in Navsari District of South Gujarat. The project has been recently approved by the Central Maritime Board. The facility will be equipped with a cold storage, a processing house, a wholesale house and an ice-factory. The harbour is to be completed by 2006. It is expected that the harbour will boost fishing activities in South Gujarat and will provide the fishermen with opportunities to directly market their products to wholesale market or to the processing industry. A plan to start a fishing club within the harbour is also under consideration. In addition to this the Government of Gujarat is planning to develop six fishing ports inclusive of Jakhau in Kutch at an estimated cost of INR 1656 million. According to the GMB website as on December 2004, an INR 282 million CC Wharf has been completed by GMB as part of the phase I development of Jakhau Port and a net mending shed, auction hall, a canteen, bus stop, roads and electrifications with INR 32.8 million is under implementation along with another INR 50 million planned investments.

2.8 Problems and Potentials in Animal Husbandry and Fishing

There are large numbers of problems related to this industry. The major problems are:

- Less number of productive cross breed cows and productive buffaloes in comparison to the standards of the bests in Gujarat and at least two fold increases in productive buffalo population is required for producing milk in capacities of Sabarkantha or Mahesana.
- There is seasonal scarcity of fodder. Fluctuations in natural fodder availability due to fluctuation of rainfall and drought,
- Encroachment of Gando Baval or Prosopis Juliflora and salinity ingression in the Banni Grass lands; Prosopis Juliflora is spreading in an uncontrolled manner at a rate of 2600 ha per annum and saline areas are increasing at a rate of 1600 ha per annum in the Banni Grass lands (Gujarat Ecology Commission, 1994). These have largely destroyed annual grass productivity creating scarcity of fodder for animals.
- Scarcity of water can be a hindrance for large-scale livestock farming and also to facilitate processing units,
- Scattered settlements and migratory livestock breeders create problems in mass-co-operative management and in collection and facilitation systems,
- Lack of infrastructures such as chilling centres for milk, and mobile collection units, mobile dispensaries, etc,
- Social causes discourage poultry industry,
- Lack of veterinary institutes; in Kutch there are 11128 livestock per 1 institute, National Commission for

Agriculture in India recommends 5000 livestock per 1 institute,

- Large numbers of un-productive livestock and uncontrolled breeding create over-exploitation of fodder,
- Lack of a systemic approach to facilitate and encourage private sector investments in development of animal husbandry industry.

Potentials related to animal husbandry sector are

- Potential for increase in the overall milk production through increase in numbers of buffaloes and through an effective system of fodder development and distribution process,
- Large-scale integrated farming or contract farming can be a potential if large investments can be attracted in animal based food processing industries. The region has large barren land.
- Potential for revival of large Banni Grassland (3000 sq km, GEC 1994) to support a large livestock population, there is great potential for converting some of the areas into fodder development farms,
- Potential for special branding of goat milk as large numbers of productive goats are available and around 24,360 tones of goat milk is produced, which is one of the highest (2003-04) among the districts in Gujarat,
- The joint initiative of revival of the Kutch dairy with NDDB is extremely potential for development of dairy industry,
- Potential for development of a woollen yarn making facility and potential for attracting carpet manufacturing industries for exports (Gusheel feedback),
- Demand for poultry meat will be increasing with increase in numbers of hotels, restaurants and also due to in-migration. Gandhidham-Anjar-Kandla and areas surrounding Mundra are potential areas for poultry farming, which may later lead to processing industries for exports.

2.9 Development Actions

- Grass land development and management through artificial seeding; airborne seeding to be introduced,
- Include grassland development and management by village institutions as programmes that could be supported under the watershed development and other similar programmes (EPC),
- Building on Environmental Planning Collaborative(EPC), Ahmedabad's proposal on assessment of minimum required grassland area to feed the livestock expected at various levels: village level, cluster of village level and regional level (Ecology Planning for Drought Proofing and Long Term Development under the Kutch Ecology Fund by UNDP, EPC),
- Checking advances of Gando-Vaval or Prosopis Juliflora in the grass land areas, but effective management procedure and balance is required as this species contributes to reduce soil erosion and also protects desertification. Special areas can demarcated specially for this species along with other plants.
- Demarcation, mapping and information system creation for grass land areas; Gujarat Institute of Desert Ecology (GUIDE) and Space Application Centre (SAC) of ISRO are presently engaged in 'grassland mapping', which will facilitate detailed examination of changes such as spread of Prosopis Juliflora at a scale of 1: 50,000. GUIDE is also engaged in development of a Kutch Land Resources Management System (KLARIS) under GIS domain, which has to be explored fully and integrated with the animal husbandry system in the region.
- Creation of an accounts of migratory livestock breeders and their movement patterns must be tracked through use of sophisticated information systems to facilitate these with artificial insemination, dissemination of knowledge on breeding techniques, vaccination and disease prevention measures, collection and marketing products, social development, etc. Mobile facilitating units can be of great use at the context of typical animal husbandry system and settlement patterns in Kutch.
- Creation of an emergency support system to support animal husbandry during the droughts. Identification of specific villages and development of a hierarchical distribution and support system, learning from experience of NGOs can help in developing fodder banks and their extensions. A participatory framework can be separately developed.
- Formulation of policies for unproductive animals, which uses the scarce natural resources without contributing to the economy,

- Concentration on community planning and special focus on 'maldharis'. To encourage scientific and controlled breeding among the migratory breeders, mostly among the 'maldharis,' and preparation of an integrated community development plan for their socio-economic development,
- To support NDDB for revival of dairy industry in the region.
- Formulation of strategies for capacity building on silvi-pastoral systems / alternate land use systems, furniture making, honey bee farming, gum and resin collection and cattle feed making as proposed by EPC in Kutch Ecology Fund study.
- Separate feasibility study for attracting investments for large-scale ranching and integrated animal husbandry development zones along with processing units for exports. These can manufacture their own fodder, maintain own grassland, manage livestock and take care of these with all necessary infrastructures. These can be also integrated with organic farming and other commercial farming and tourism initiatives and can also support traditional animal husbandry system with technology and other support.
- Introduction of scientific HR development and performance assessment systems for veterinary institutes and enhancing professionalism and co-ordination with NGOs, other private initiatives.

3. Human Resource Base

3.1 Population Size and Growth Trends

Kutch is a scantly populated region since historic past. As per first Indian Census, in 1872 population of Kutch was 487305 persons. In past hundred years the population of Kutch has shown significant variations consisting negative growth in two decades i.e. 1911-21 and 1931-41. From 1901 to 1961 the district has shown the least decadal variation of population among all districts of state. The reasons, which may be ascribed to this tardy process, are frequent recurrence of scarcity and famine and absence of adequate means of livelihood and unsettled conditions at home causing out- migration on the part of its enterprising people (District Gazetteer: Kutch, 1971).

As per 2001 census in terms of population, Kutch was placed at the 15th place amongst the districts in Gujarat. From 1961 to 2001 population growth has taken place at a higher pace. In decadal variation during 1961- 2001 Kutch is again ranked at 15th place among all 25 districts. However, during the last decade (1991-2001) it has become the 8th fastest growing district. As per 2001 census, population in the district was 1.58 million, which constitutes 3.13 percent of population of Gujarat. Average annual compound growth rate of population was 2.29 percent, which is slightly higher than that of state's growth rate (2.07 %).

Intra-regional distribution of population reveals that out of the ten talukas, Bhuj is the most populous and Lakhpat is the least. From 1961 to 2001 growth rate of Gandhidham taluka has been the highest, followed by Bhuj and Lakhpat. As per 2001 census, Gandhidham was the fastest growing taluka having an average annual compound growth rate of 3.31 percent during 1991-2001 decade, which is higher than the district's average. Nakhatrana has the lowest average annual growth rate during the last decade, which is just 1 percent per annum.

Table 3.1: Taluka-wise Distribution of Population 2001

Sr. No.	Talukas	Population '000	AACGR 91-01
1	Lakhpat	50.12	3.15
2	Rapar	198	2.78
3	Bhachau	147.891	2.57
4	Anjar	160.292	2.96
5	Bhuj	345.013	2.21
6	Nakhatrana	129.249	1.01
7	Abdasa	97.508	1.22
8	Mandvi	170.573	1.57
9	Mundra	83.01	1.92
10	Gandhidham	201.569	3.31
	Kutch	1583.22	2.29

Source: Census of India

Note: AACGR: Average Annual Compound Growth Rate

3.2 Population Forecast

Population forecasts have been carried out considering past trends of population in Kutch as well as in Gujarat and also in India. The population of India in 2011, as projected by the Technical Group on Population Projections is 1195 million. The group predicted an additional population of 168 million by 2011. If we consider the trends in population of India and Gujarat from 1901 to 2001, and a regression is run in between the two, it suggests that if India's population increases by 100 thousand, the population of Gujarat will increase by 5.3 thousand. Therefore, using the technical group's forecasted figure for 2011 and the estimated relationship between Gujarat's and India's population, the population of Gujarat in 2011 is estimated approximately at 60 million. On the other hand Gujarat's share in India's population has been more or less 5 percent during past four decades. If we assume this

share to be remained constant till 2011, then this gives a figure of 59 million, which is very close to the earlier estimate.

As per projected population of 60 million for Gujarat in 2011, population for Kutch has been estimated in a similar way. Population in the region will reach approximately 1.81 million in 2011 with an average annual compound growth rate of 1.5 percent. On the other hand, the share of population of Kutch in the state's population has been around 3 percent since past five decades. If we assume to the share as well will remain the same, then the population of Kutch in 2011 can be also estimated at approximately 1.8 million, which is again the same as the figure estimated earlier.

Table3.2: Share of Gujarat in India's Population and Kutch in Gujarat's Population

Year	% Share of Gujarat in India's Population	% Share of Kutch in Gujarat's Population
1961	4.69	3.38
1971	4.87	3.18
1981	4.99	3.08
1991	5.11	3.06
2001	4.93	3.13

Source: Census of India; Socio-Economic Review, Gujarat state, 2002-2003

Table 3.3: Population and Average Annual Compound Growth Rate of Population

Years	Population (in Lakh)			AACGR of Population			
	Kutch	Gujarat	India	Decades	Kutch	Gujarat	India
1901	4.88	91	2384				
1911	5.13	98	2521	1901-1911	0.5	0.74	0.56
1921	4.85	102	2513	1911-1921	-0.57	0.4	-0.032
1931	5.20	115	2790	1921-1931	0.71	1.2	1.05
1941	5.08	137	3187	1931-1941	-0.24	1.76	1.34
1951	5.68	163	3611	1941-1951	1.12	1.75	1.25
1961	6.96	206	4392	1951-1961	2.06	2.36	1.98
1971	8.50	267	5482	1961-1971	2.01	2.62	2.24
1981	10.50	341	6833	1971-1981	2.14	2.47	2.22
1991	12.63	413	8434	1981-1991	1.86	1.93	2.12
2001	15.83	507	10270	1991-2001	2.08	2.07	1.99
2011*	18.10	600	11954**	2001-2011	1.50	1.69	1.53

* 2011 figures are projected figures

** Source: Report of the Technical Group on Population Projections, Registrar general (1996) (adjusted for 2001, on the basis of actual figure of 2001)

Note: In Kutch, Census 2001 was conducted in 2002; AACGR of Kutch (1991-2001 & 2001 2002) has been calculated accordingly

3.3 Urban Population and Urbanisation

According to 2001 census, the proportion of people living in urban areas in Kutch was 29.9 percent, against 37.35 percent in the state. Share of urban population in total places Kutch in the 9th position among the districts in Gujarat. The figure has seen a continuous increase from 19.3 in 1961 to 29.9 in 2001. With 82.5 percent of the total, Gandhidham taluka has the highest share of people living in urban areas, while in three of the talukas: in Lakhpat, Nakhatrana and in Abdasa entire population is rural.

Kutch has eight urban areas (2 class I, 1 class II, 3 class III and 2 class IV) accommodating 474892 persons (Census of India, 2001), which are concentrating in the eastern, central and in the south-eastern coastal areas.

In the light of rapid industrialisation in the state it is assumed that in next decade the share of urban population in Gujarat will increase to 24.0 million in 2011 i.e. around 40 per cent of total population of the state. Kutch region is experiencing rapid industrialization, which may lead to rapid urbanization and therefore, assuming the proportion of urban population to be 30 percent, it will be approx 0.54 million in 2011.

Table 3.4: Share of Urban Population in Gujarat and Kutch

Years	Population in Million			
	Kutch		Gujarat	
	Total	Urban	Total	Urban
1961	0.70	0.14	20.63	5.32
1971	0.85	0.21	26.70	7.50
1981	1.05	0.27	34.09	10.60
1991	1.26	0.39	41.31	14.25
2001	1.58	0.47	50.67	18.93
2011*	1.81	0.54	60.00	24.00

* 2011 figures are projected figures

Presently, Gandhidham is the largest urban centre in the region with a population of approximately 152 thousand in 2001 and is the centre for commerce and industry. The city was planned and established to accommodate migrants from Sindh in Pakistan during partition of India. Being closely linked to the Kandla port and the Special Economic Zone in Kandla and as the major centre in the NH8A corridor, Gandhidham is a rapidly growing city. Bhuj the district head quarter of Kutch is the second largest in the region with an approximate population of 136 thousand and is also a growing city. Anjar and Mandvi are other two important towns in the region in terms of population. Although Bhachau and Kandla exhibit smaller population sizes, but are important and growing towns due to infrastructure investments, newly found economic dynamism and port related activities.

Table 3.5: Demographic Details of Towns in Kutch District, 2001

S. No	Town/ City	Status and Class	No. of Households	Population	AACGR* 1991-2001
1	Rapar	M, Class III	4327	23057	3.4
2	Bhachau	M, Class III	5703	25389	3.3
3	Anjar	M, Class II	14411	68343	2.9
4	Bhuj	UA, Class I	27992	136429	2.9
5	Mandvi	M, Class III	8045	42355	1.5
6	Mundra	CT, Class IV	2680	12931	1.0
7	Gandhidham	M, Class I	29872	151693	3.8
8	Kandla	CT, Class IV	2979	14695	-2.9

Source: Census of India, 2001

Note: * - Annual Average Compound Growth Rate

3.4 Density of Population

Kutch is the largest district in the state, but more than 50 percent of the total area of the district consists of uninhabitable Rann of Kutch, the district has the lowest average density per square km in the state. Gross population density in Kutch is only 34 persons per sq km (Census of India, 2001), which is lowest and almost one seventh of same of the state. But it has an increasing trend and grew from 15 persons per sq km in 1961. Taluka-wise variation of density again reveals concentration of population only in few talukas.

3.5 Sex Ratio

Traditionally sex ratio in the region has been higher than the same for Gujarat. From 1911 to 1971 sex ratio of the district was above 1000. But since than ratio is changing and in 2001 it became 942; which is still slightly higher than the state's figure at 920. It may be attributable to increase in migration of male workers to the region for port and road transportation related activities and extensive out-migration of households to Mumbai and other places in India. Particularly lower ratios in Gandhidham and Bhachau support the first assumption. Ratios in these talukas have fallen drastically even during 1991 and 2001. On the other hand Mandvi taluka has highest females per 1000 males i.e. 988 and Gandhidham has the minimum i.e. 892. Sex ratio in the urban areas also provides a similar scenario. Bhachau and Gandhidham are the towns where the ratio is the lowest, while in Mandvi, Mundra and Rapar it was better.

Table 3.6: Sex Ratio in Urban Areas 2001

S. No	Town/ City	Sex Ratio
1	Rapar	944.6
2	Bhachau	907.5
3	Anjar	933.8
4	Bhuj	920.0
5	Mandvi	959.1
6	Mundra	944.5
7	Gandhidham	911.0
8	Kandla	735.2

Source: Census of India

Table 3.7: Natural Increase and Population of Gujarat from 1991 to 2001

Sr. No.	Year	Natural Increase %		Population '000s	
		Rural	Urban	Rural	Urban
1	1991	1.94	1.8	27064	14246
2	1992	2.0	1.63	27589	14502
3	1993	2.02	1.9	28140	14739
4	1994	1.89	1.76	28709	15019
5	1995	1.92	1.78	29251	15283
6	1996	1.86	1.68	29813	15555
7	1997	1.87	1.64	30368	15817
8	1998	1.84	1.56	30935	16076
9	1999	1.82	1.61	31505	16327
10	2000	1.85	1.6	32078	16590
11	2001	1.78	1.59	32671	16855
Population (2001 Census)				31741	18930
Migration				**931**	**-2075**

Note: estimated on the basis of data from Census of India; Socio-Economic Review, Gujarat state, 2002-2003

3.6 Migration

Migration plays a very important role in rapid urbanisation. During 1991-2001, the population of urban Gujarat increased from 14.2 million to 18.9 million i.e. an increase of 4.7 million. Out of this, an increase of 2 million is due to migration from rural areas of Gujarat and other states (Refer table).

A similar rural-urban migration is also applicable to Kutch. But Kutch also has a history of migrations both in and out. Being a border district and a land of errant rains as well as frequent natural disasters, it has experienced movement of people at different point of times. According to the old Kutch Gazetteer, "from the uncertainty of rainfall and from the pushing, vigorous character of the people, there is much more migration in Cutch than in most parts of Bombay Presidency. The higher class of traders, among

Hindus, Bhatias, Oswal Vanias, and Lohanas, and among Musalmans, Khojas, Memans, and Bohoras, are always ready to leave their homes in search of employment. Many of them have permanently settled in Bombay. And among the young men, a very large number, both of Hindus and Musalmans, leaving their families in Cutch go to push their fortunes not only in Bombay and other parts India, but in Persia, Arabia, Africa and China. Many of them amass considerable fortunes and return to spend their gains in jewellery, feasts, house, and temple building, and purchase of land …….Mass displacement of people took place just after independence. Kutch received in 1947-48 as many as 10884 persons displaced from Sindh, for whose settlement a new township was established at Gandhidham"(District Gazetteer: Kutch, 1971).

There are incidences of seasonal migration too. But after considerable amount of investments in infrastructure during past decade and subsequent industrialisation in the district, in the recent years people from various parts of the country have migrated to urban areas and other intensive activity areas.

3.7 Education

3.7.1 Literacy Rate

The Census of 2001 reveals that literacy rate in Kutch was 59.1 against state's 69.1. In a comparision with the other districts, Kutch possesses a lower literacy level. Among all 25 districts Kutch was at 22nd position in terms of literacy. However in Kutch, a continuous increase in the literacy rate can be observed from 1961. Within the district Mandvi taluka has the highest rate, which is 69.93, while Rapar has the minimum i.e. 39.7. Female literacy rate in Kutch was only 48.6 and Kutch was ranked 18th within the state. Literacy level in the region is even lower in the urban areas in the region than their counter parts in other districts.

Table 3.8: Literacy Rate in Urban Areas, 2001

S. No	Town/ City	Literacy Rate
1	Rapar	60.7
2	Bhachau	58.9
3	Anjar	75.1
4	Bhuj	78.5
5	Mandvi	76.0
6	Mundra	74.6
7	Gandhidham	75.3
8	Kandla	50.9

Source: Census of India 2001

3.7.2 Educational Attainment Levels

As per 1991 census among the literates, Kutch has very high percentage of people without any educational level, which is 42 percent against state's 20 percent. Proportion of people having only primary education is the highest amongst all the categories. Half of the total literates in the region attained matriculation and a less levels. There is less than four percent of the literates with more than a graduate degree and above. Lesser proportion of persons having higher levels of education indecates an urgent need for improvement in overall education infrastructure and quality.

Table 3.9: Educational Attainment Levels, Kutch and Gujarat, 1991

	Kutch		Gujarat	
Details of Attainment Levels	**Persons in '000**	**Percentage of Total Literates**	**Persons in '000**	**Percentage of Total Literates**
Literates without an Educational Level				
Non-formal	1	0.14	49	0.23
Formal	231	42.33	4347	20.57
With Education Levels				
Primary	159	29.03	8702	41.18
Middle	56	10.32	2889	13.67
Matriculation / Secondary	60	10.93	3004	14.21
Higher Secondary / Intermediate / Pre-University / Senior Secondary	15	2.68	910	4.30
Non-technical Diploma or Certificate not Equal to Degree	4	0.78	110	0.52
Technical Diploma or Certificate not Equal to Degree	2	0.32	102	0.48
Graduate and Above	19	3.46	1019	4.82
Total Literates	**547**		**21131**	

Source: Census of India, 1991

3.7.3 Trends in Primary Education

As per 1986-90 data, net enrolment rate of age 6-11, in Kutch was 71.48 percent, which is lower against state's 74.4. In terms of enrollment rate the region is at 16th position among the 19 districts (older) in the state. Dropout rate (class I-IV) for years 1986-90 was 42.74 (Hirvey and Mahadevia, 1999).

3.8 Vital Statistics

In 1991 Crude birth rate in Kutch was 34.3 against 33.5 of Gujarat, which was 6th highest in the state. As per 1992-94 data, morbidity per 1000 population was 61.3, which was again 6th highest in the state. (Hirvey and Mahadevia, 1999). Higher morbidity in Kuch may be due to either of the two reasons. One is due to better reporting of illness during a morbidity survey by literates and aware population or due to high prevelence of deseases and lack of health infrastructure. In the context of Kutch second reason seems to be more relevant.

3.9 Occupational Pattern

Kutch is ranked 23rd among all the districts in the state, with a workforce participation rate (number of workers per 100 populations) at 38.3 percent, against the state's 41.9 percent (Census of India, 2001). The percentage of main worker to the total population is 31.46, which is 3rd from the lowest in the state. The proportion of marginal workers is as high as 6.8 percent. Within the region workforce participation rate as well as percentage of main workers is the highest in Abdasa Taluka. Gandhidham taluka has the least workforce participation rate, while main worker's share was the lowest in Lakhpat taluka.

3.9.1 Cultivators

Among various categories of workers the cultivators consist of 19 percent (Census of India, 2001). Cultivators of Kutch constitute only 1.93 percent to the total number of cultivators in Gujarat. In comparison to other districts Kutch exhibits a lower share of cultivators in main workers. The decade of 1991- 2001 observed a negative growth in cultivators in the region. The average annual growth rate of cultivators during the decade was -0.85, against state's 0.35. The reason behind this may be attributable to substantial increase in non agricultural activities in the region. Within the region, proportion of cultivators among total workers is the highest in Rapar Taluka i.e. 32.7 percent while the lowest in Gandhidham.

3.9.2 Agricultural Labourers

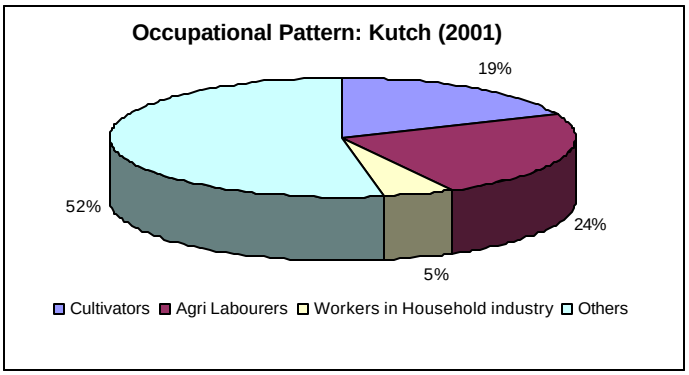
Agricultural labourers constitute 24 percent of the total work force in Kutch, which is 2.76 percent of the total agricultural labourers in Gujarat. The average annual compound growth rate of agricultural labourers in the decade of 1991- 2001 was 0.75 percent, which is less than that of the state. Nakhatrana Taluka has the highest (38.3 %) proportion of agricultural labourers among total main workers.

3.9.3 Workers in Manufacturing, Processing, Servicing and Repairs in Household Industry

As per 2001 census this sector contributed 5 percent of the total workers in the district. Kutch has 2nd highest share of workers in manufacturing and processing in household industries in the state. The region contributes approximately 7 percent workers in household industries in Gujarat, which is a typical characteristic of the regional population. In the last decade workers in household industries have increased with an average annual compound growth rate of 9.7, which is higher than state's rate. Abdasa Taluka has the highest proportion of workers in household industry i.e. 9.1 percent of the total workers.

3.9.4 Other workers

Workers involved in other activities in Kutch constitute 52 percent of the total workforce. Since Census of 2001 does not give further break-up of other 7 categories, it is not possible to trace the current status of workers in allied-agricultural activities, mining, manufacturing and processing in industry (other than household industry), construction, trade, transportation and in other services.



As per census 1991, among primary activities, 4.8 percent of the total workers (main+ marginal) were in animal husbandry and fisheries; etc and 0.87 percent were in mining and quarrying. In secondary activities, 7.4 percent of the total workers were involved in manufacturing and processing industries

(other than household industry). While within tertiary activities, 3.17 percent of total workers were engaged in construction related activities; 8.1 percent were in trade and commerce; 7 percent in transportation-storage-communication and 10 percent were engaged in other services.

Distribution of a specific category of workers varies across the talukas according to the differentiation created by the prevailing economic activities. For example Gandhidham taluka has the minimum proportion of cultivators, agricultural labourers and household workers, due to existence of the port and port related and industrial activities, which have been further enhanced during recent years through influx of further investments in industries and port related activities. Contrast can be seen in Rapar, which has the highest proportion of cultivators and second highest agricultural labourers.

Table 3.10: Category wise Total Workers (Main + Marginal) in Gujarat and Kutch

Category of Workers	Workers in '000s				AACGR	
	1991		2001		1991-2001	
	Kutch	Gujarat	Kutch	Gujarat	Kutch	Gujarat
Cultivators	123	5604	113	5803	-0.85	0.35
Agricultural Labourers	133	4507	143	5162	0.75	1.37
Manufacturing, Processing, Servicing and Repairs in Household industry	12	236	30	430	9.69	6.19
Other Workers	191	6273	320	9862	5.30	4.63
Total Workers	458	16621	606	21256	2.83	2.49

Source: Census of India, 2001

4. Industrial Development

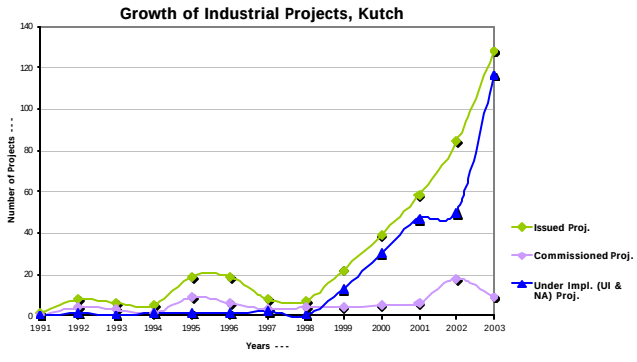
In the era of economic liberalisation, Gujarat has proved itself to be the second most favoured destination of industrial investments after Maharashtra. From August 1991 to July 2004 a total of 8848 industrial project were approved in Gujarat with an estimated investment of INR 3516.97 billion with an estimated employment of 1.4 millions (1408116 persons). Out of which, till July 2004, 4025 projects were implemented and another 1403 projects are now under implementation. Rate of implementation of industrial projects in Gujarat is around 61 per cent.

4.1 The Underdeveloped Kutch and Recent Changes

Although being in one of the most industrialized states in India, industrial growth in Kutch was one of the most sluggish. According to the Industrial Census of 2000 there were only 26 large and medium industries in Kutch and with a small 1.57 per cent contribution to the state's industrial production (INR 1090 billion). After the earthquake of 2001, the Government of India and the State Government of Gujarat have provided incentives with relaxations in excise duty and sale tax to promote rapid industrialisation in Kutch. Incentives given by the governments have facilitated a boom in the number of attracted industries and investments in the region, which was unprecedented. Data from the Industrial Extension Bureau (iNDEXTb) reveals that Kutch received an investment of INR 78.94 billion only during August 2001 and June 2004.

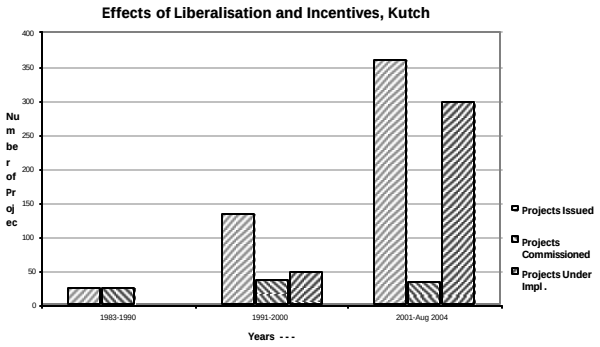
Government of India and Government of Gujarat also have taken initiatives to facilitate a conducive industrial and business environment to support rapid growth in the region. The central government has converted the Kandla Free Trade Zone (FTZ) into a Special Economic Zone (SEZ) and the state government has cleared the Adani Group's proposal of establishing a large SEZ in Mundra. Successive infrastructure development in road and railways sector is also going to play extremely important role supporting the region as the future industrial powerhouse in Gujarat.

4.2 Investments, Growth and Employment



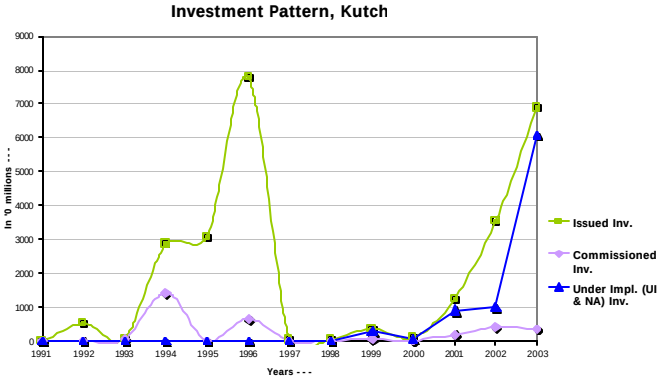
Industrialisation in Gujarat did not have major impact on Kutch till the year 2000. In Gujarat total 6656 industrial projects were sanction under IEM, LOP, LOI from 1991 to 2000 in that share of Kutch was only 134, which was only around 2 per cent. After 2001 both central and state government have provided incentives for industrial projects which had facilitated rapid industrialisation in Kutch. From 2001 to August 2004 total 1847 project were sanctioned in Gujarat in that 360 were in Kutch, which was around 20 per cent. Though Gujarat is the second most favourite destination for industries but within the state industrial development took place only in five districts; in Ahmedabad, Vadodara, Bharuch, Surat and Valsad, which has increased regional inequalities. Around 73 per cent

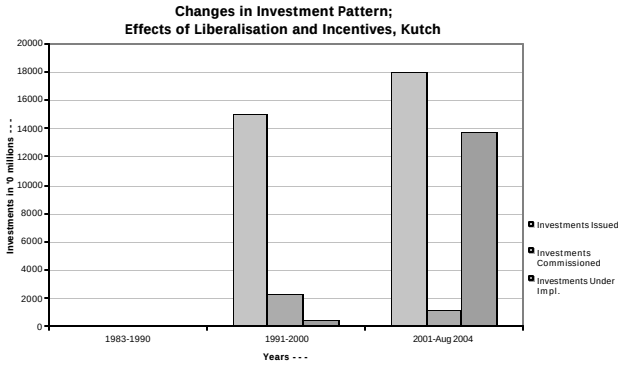
of the total industrial projects implemented after August 1991 in the state were in these districts. Surat ranked top among other districts of the state with 19 per cent of total projects implemented in the state followed by Bharuch, Vadodara, Ahmedabad and Valsad. In other regions North Gujarat and Saurashtra region had received 11 and 9 per cent industrial projects. However, the recent momentum in Kutch can play an important role for reducing such a regional inequality, which will be extremely beneficial for the state.



Rate of implementation in industrial projects sanctioned between 1991 and 2000 was 65 per cent in Kutch. Between 1991 and 2000, 494 industrial projects were sanctioned within these 75 are commissioned and 347 are under implementation. Total 360 projects were sanctioned between 2001 to August 2004 in that 36 projects are fully commissioned and 298 projects are under implementation. It means rate of implementation is higher in the projects sanctioned after declaration of incentives to promote industrialisation in Kutch.

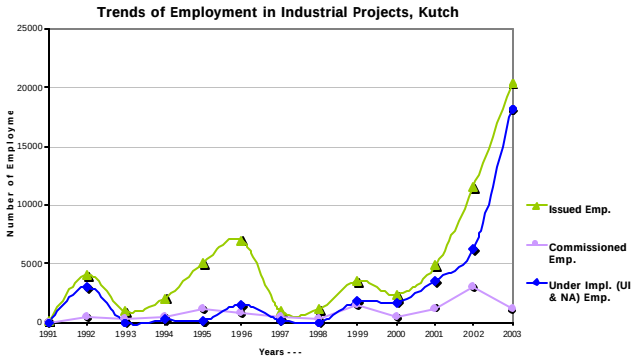
There is clear cut evidence of increase in influx of investments after adoption of open market policies in the early 1990s. In Gujarat, as a whole from 1983 to 1990, projects worth of only INR 98.10 billion were cleared and out of it only projects worth of INR 0.13 billion were in Kutch which was around 0.1 per cent of the total investments in Gujarat. On the other hand, after liberalisation industrial projects worth of INR 2806.26 billion were sanctioned in Gujarat and out of which projects worth of INR 149.92 billion were in Kutch which was around 5.34 per cent. After the special incentives are provided for Kutch in the year 2001, industrial progress attained a new momentum. After 2001 in Gujarat projects with a total investment of INR 612.61 billion were sanctioned and out of it projects of INR 179.55 billion were in Kutch, which is a remarkable 29 percent of the total investment in Gujarat.





All together, during the period from 1983 to August 2004, Industrial projects with an investment of INR 329.6 billion were sanctioned in the region. Out of these, projects with an investment of INR 35.19 billion were commissioned and projects with an investment of INR 142.33 billion are under implementation. It is evident that investments in the sanctioned projects between 1994 and 1996 were also very high, but implementations of these projects was very slow and have not reflected till 2001. After the earthquake in 2001, projects worth of INR 179.55 billion were sanctioned. Out of which projects worth of INR 11.28 billion have been already commissioned and projects worth of INR 137.67 billion are under implementation.

Industrial employment as projected in IEM, LOP and LOI issued from 1983 to August 2004 in Gujarat were 1.4 million in that share of Kutch was 0.1 million. Projects already commissioned have provided employment to 12988 persons and project under implementation will provide employment to around 72494 persons. During August 1991 to 2000, estimated employment in the industrial projects in Kutch was a total of 5710 persons. On the other hand, the same after 2001 in a span of four years was 5527 persons, which was considerably high.



4.3 Foreign Direct Investment

In the era of liberalisation Government of India had opened many sectors for foreign direct investment (FDI). In comparison to the total investments, FDI in Gujarat are less. The state is placed after Maharashtra, Tamil Nadu, Andhra Pradesh, West Bengal and Delhi. After August 1991 total 657 projects with FDI were approved in Gujarat with an investment of INR 742.36 billion. Kutch is one of the significant receivers of FDI in the state. In terms of number of project Kutch was positioned at 9th among the districts in Gujarat. But in terms of investment, Kutch was positioned at 4th position among the districts with a total investment of INR 74.23 billion. Ahmedabad district had received the highest number of FDI projects and the lowest was in Surendranagar district.

Rate of implementation of FDI projects is higher in Kutch as compare to the state level figures. In Kutch rate of implementation of FDI projects is 79 per cent whereas in Gujarat it is 71 per cent. Out of 24 projects approved in Kutch 12 are already implemented and 7 projects are under implementation phase.

In Gujarat maximum FDI approvals were received in petrochemical and refineries with a total investment of INR 284.55 billion approved in 30 projects. Within that 13 projects with an investment of INR 155.27 billion are already commissioned and 12 projects with an investment of INR 117.28 are under implementation. FDI approvals received in Kutch are in Vegetable Oils and Vanaspati, Electronics and Mineral based industries. Without having much petro-based FDI, which is an important sector for Gujarat, Kutch has attracted considerable proportion of FDI.

4.4 Typology and Spatial Distribution Patterns

4.4.1 Typology of Medium and Large Industries

Within past three years, there is extensive change in the industrial mix in the region. There were only seven basic types of industries in the 2000, which has increased to a total of 14 different types in 2004 and became a total of 17 different types when the projects under implementation are considered. Verities of industrial types according to product typology have increased significantly during past few years. Till 2000, industries in Kutch were limited to only food products, non-metallic minerals, and chemical and chemical products. Wood products, beverages, paper products, rubber and plastics and electrical machineries are the other important additions during 2001-mid 04. On the other hand, various types of textile and garment industries are the major addition in the industries under implementation.

Growth in the individual product types of industries in the region is also spectacular. Non-metallic minerals, chemical and chemical products, food products, etc are the categories experiencing rapid growth. Non-metallic mineral industries have grown more than 200 percent and there is also more than 70 to 80 percent growth of industries under chemical and chemical products and food product categories during 2000-mid 04.

Table 5.1: Medium and Large Scale Industries in Kutch

Sr. No.	Industry	2000	2004	Under Implementation
	Food Products	9	17	13
	Beverages, Tobacco & Tobacco Products	0	1	2
	Cotton Textiles	0	0	1
	Wool, Silk & Synthetic Fiber Text	0	0	2
	Hosiery and Garments	0	0	2
	Wood Products	0	4	5
	Paper Products & Printing	0	2	1
	Rubber & Plastic Products	0	3	0
	Chemical & Chemical Products	8	14	15
	Non-Metallic Mineral	3	11	13
	Basic Metal Industries	2	2	7
	Metal Products	1	3	8
	Machinery & Parts	1	2	4
	Electrical Machinery & Apparatus	0	2	3
	Miscellaneous Manufacturing	0	1	12
	Services not classified	2	5	1
	Others	0	2	0
	Total	26	69	89

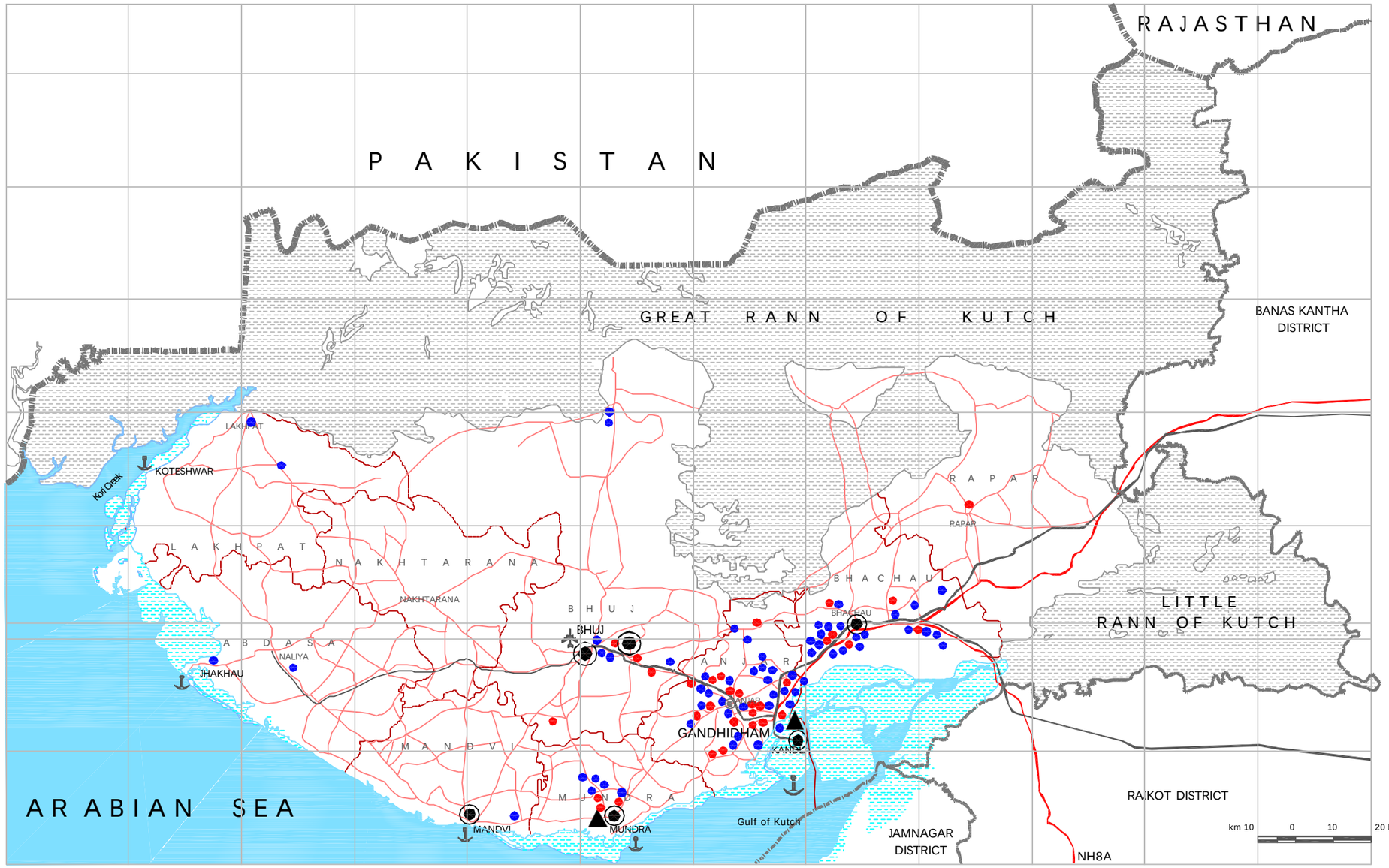
Source: Industries Commissionerate and iNDEXTb

4.4.2 Export Orientation of Medium and Large Industries

Till the year 2000, share of Kutch was negligible in terms of exports from large and medium industries in Gujarat. In the year 2000 total exports from these industries was INR 8.9 million which was 0.02 per cent of the total exports from Gujarat. Out of 26 industries only 6 were engaged in exports and their export to total production ratio was a negligible 0.86 per cent.

4.4.3 Spatial Distribution Pattern of Medium and Large Industries

Prior to the year 2000, industries in Kutch were mostly concentrated in Bhuj and Gandhidham talukas, however there were few standalone industries in other talukas, e.g. Sanghi Cement in Abdasa. But there is an interesting spread of this concentration towards Bhachau and Anjar talukas after 2001. Majority of the recently established industries are located in Bhuj, Gandhidham, Anjar and Bhachau.



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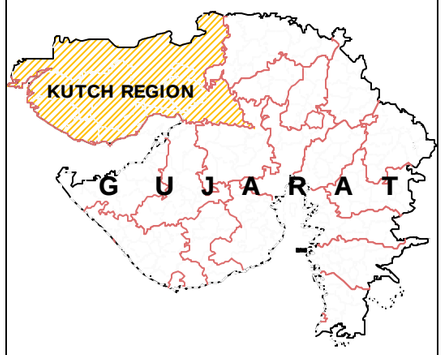


LEGEND

- International Boundary
- State Boundary
- District Boundary
- Taluka Boundary
- Railway Line - Broad Gauge
- Railway Line - Metre gauge
- National Highway
- Other Roads
- River / Stream
- Mud Flats
- Water Bodies
- Rann
- Major Port
- Minor Port
- Air Port
- GIDC estate
- Special Economic Zones
- Industrial projects comissioned
- Industrial projects under implementation

N

Source : Survey of India and Census of India & IndexT-b
Note: Indusrial locations are tentitive & based on information till 2004

Mott MacDonald
Dalal Mott MacDonald
501 Sakar II
Ellisbridge
Ahmedabad-380006
Gujarat, India.
Tel +91 (79) 2657 5550
Fax +91 (79) 2657 5558
Web www.mottmac.com

Gujarat Infrastructure Development Board
8th Floor,
Block No. 18
Udyoug Bhavan,
Sector-11,
Gandhinagar, 382 017
Gujarat, India.
Tel +91 (79) 3232701, 3232704
Fax +91 (079) 3222481
Web www.gidb.org

Rev.	Date	Drawn	Description	Ch'k'd	App'd
R0	29.10.04	MAS	Issue for ------ Report Submission	VG	AK

Kutch Region

Industrial Locations

Study on
Development Potential of Kutch

Drawing No.
214002/INDUSTRIAL-LOCATIONS/0006

Drawn	MAS
Checked	VG
Approved	AK
Scale	1:1200000
Rev.	R0
Status	APR

On the other hand projects under implementation are the largest in Anjar, followed by Bhachau, Bhuj, Gandhidham and Mundra. The recently developed national highways and the broad gauge railway line, existence of Kandla and Mundra ports, existence of administrative and large urban centres are the basic cause of such concentration. Industries are not getting attracted to the talukas of Rapar, Nakhatrana, Lakhpat, Abdasa and Mandvi, which are remote, without major transport infrastructures and urban centres.

Table 4.2: Taluka-wise distribution of industries

Sr. No	Taluka	2000	2004	Under Implementation
1	**Bhuj**	**13**	**22**	**12**
2	**Mundra**	**0**	**4**	**8**
3	**Mandvi**	**0**	**0**	**2**
4	**Abdasa**	**1**	**1**	**2**
5	**Lakhpat**	**0**	**0**	**2**
6	**Nakhatrana**	**0**	**0**	**0**
7	**Rapar**	**0**	**1**	**0**
8	**Bhachau**	**3**	**8**	**22**
9	**Anjar**	**1**	**14**	**30**
10	**Gandhidham**	**8**	**19**	**11**

Source:- Industrial Commissionarate and iNDEXTb

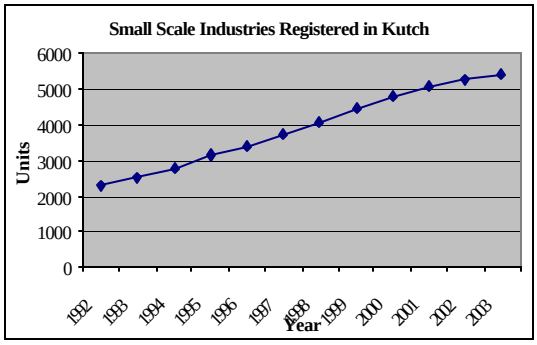
4.5 Small Scale Industries

Kutch is positioned at 16th in term of registration of small-scale industries in Gujarat. In 1992, registered small-scale units were 2294 and have increased to 5513 in 2004. In term of growth rate Kutch is 7th among the districts in Gujarat. Comparison shows that growth rate in Kutch is 8.2 per cent, which is higher than state's growth rate of 6.6 per cent. Total investment in small-scale industries in the district is approximately INR 1005.3 million and total employment is around 31898 in 2004.

Table 4.3: Growth of Small Scale Industries inTop Five Districts in Gujarat and Position of Kutch

Sr. No.	Name of the District	1992	2003	AAGR
1	Ahmedabad	34630	62909	5.5
2	Rajkot	16913	30564	5.4
3	Surat	20080	43015	6.9
4	Vadodara	7999	16309	6.5
5	Valsad/Dang/Navsari	8018	17545	7
6	Kutch	2294	5413	8.2
	Gujarat	138512	287860	6.6

Source: - Commissioner of Industries



Ahmedabad, Vadodara, Rajkot, Surat and Valsad are the top five districts in Gujarat with the highest number of small-scale industries. In 2003 around 53 percent of the total small scale industries registrations were in these five districts. The average annual growth rate in small-scale industries in Gujarat is 6.6 per cent from 1992 to 2003. Highest growth rate is observed in Gandhinagar district 9.9 per cent followed by Bharuch district 9.1 per cent. Figures of Porbandar, Anand, Patan, Dahod and Navsari districts are included in their parent districts.

4.5.1 Spatial Distribution Pattern and Typology of Small Scale Industries

Bhuj and Gandhidham are the leading talukas in registration of small-scale industries. Around 62.2 per cent of the total registered industries in Kutch are in these two talukas. Data from the District Industries Centre (DIC) exhibit that up to March 2004 around 5513 small-scale industries are registered in Kutch. Gandhidham was ranked 1st with 2088 small-scale industries, followed by Bhuj with 1341, Anjar with 865. In Lakhpat is the taluka with the least concentration of small scale units; it had only 30 registered small-scale industries. Along with Lakhpat, Abdasa and Rapar taluka are other two talukas backward in terms of development of small-scale industries; combined together these talukas have only 184 registered small-scale industries. Food products, cotton textile, wood product, chemical products, glass and glass ware, clay and cement industries dominate the small-scale industrial sector in Kutch. Composition exhibits 12.9 per cent units in chemical and chemical products, 12 per cent in cotton textile, 6.8 per cent units in metal products, 7 per cent in wood products and 6.1 per cent in glass, clay and cement products.

Table 4.4: Spatial distribution pattern of SSI, 2004

Taluka	Units	%	Rank
Bhuj	1341	24.3	2
Mundra	133	2.4	7
Mandvi	345	6.3	4
Abdasa	72	1.3	9
Lakhpat	30	0.5	10
Nakhatrana	280	5.1	5
Rapar	82	1.5	8
Bhachau	277	5.0	6
Anjar	865	15.7	3
Gandhidham	2088	37.9	1
Total	5513	100	

Source: - District Industrial Centre, Bhuj

Table 4.5: Small-scale industrial clusters in Kutch

Sr.No.	Industry	Taluka	Units
1	Common Salts	Mundra	37
		Bhachau	80
		Anjar	114
		Gandhidham	149
2	Printing of Cloth	Anjar	32
3	Spin. Weav. & Finishing of Mill Cloths	Bhuj	152
		Mandvi	66
4	Printing Publishing of Books Journals etc.	Bhuj	31
5	Diamond Processing	Anjar	35
	All Clusters		696

4.5.2 Small Industrial Clusters in Kutch

There are total 9 small industrial clusters in Kutch. Clusters of common salt industries are in Mundra, Bhachau, Anjar and in Gandhidham with a total 380 units. Cluster of printing of cloth industries is only in Anjar with a total 32 units. Clusters for spinning, weaving and finishing of mill cloths are in Bhuj and Mandvi with a total 218 units. Printing publishing of books, journals industries are in Bhuj with a total 31 units. Anjar is also having cluster of diamond processing industries with 35 units. According to the Census of Industries 1999 total investment in all these 9 clusters was INR 122.2 million and total production was worth of INR 151.2 million, which was 9.39 per cent of total production of small-scale industries in Kutch, around 3146 workers were employed in these 696 units.

4.5.3 Production in Small Scale Industries

According to Census of Industries conducted in 1999, a total 169020 functional small-scale units were there in Gujarat and out of these functional units 3235 units were in Kutch, which was around 1.91 per cent. Total production in small-scale industries in Gujarat was INR 102.23 billion and in that share of Kutch was only INR 1.61 billion, which is around 1.57 per cent. In Kutch production from hosiery and garments was the highest at around 20.32 per cent of total production. Second was in wood products, which was around 11.71 percent of total production. These wood product industries are basically concentrated in Gandhidham taluka and are dependant on import of wood from Malaysia, Indonesia and Australia through Kandla port. In term of production food product industries was positioned at 3rd with 10.12 per cent of total production. Other industries having significant contribution in production were basic metal industries, non-metallic products, and chemical product industries. These industries contribute around 5 to 7 per cent in total production of Kutch.

Table 4.6: Production in Small Scale Industries in 1999

Sr. No	Area	Functional Units	Production (Lacs)
1	Kutch	3235	16110
2	Gujarat	169020	1022313
	% of Gujarat	1.91	1.57

Source: - Census of small scale industries 1999

4.5.4 Export Orientation in Small-Scale Industries

Table 4.7: Export oriented small-scale industries in districts of Gujarat and position of Kutch

Sr No	District	Exporting units	Exports INR '0 million	Export %	Exports/ Production ratio	Rank
1	Ahmedabad	38	9.7	6.14	33.13	6
2	Junagadh	11	19.5	12.4	93.57	2
3	Kutch	8	1.9	1.2	23.8	13
4	Rajkot	48	18.8	11.96	42.91	3
5	Surendranagar	27	16.5	10.5	44.31	4
6	Valsad	20	48.7	30.94	77.6	1
7	Navsari	18	16.0	10.18	49.91	5
	Total	306	157.5	100	50.32	

Source: *Census of small scale industrial units 1999*

According to the Census of Small-scale Industries conducted in 1999, in Gujarat 306 out of 169020 units were export oriented units. Total export from small scale industrial units in Gujarat was INR 1.58 billion in 1999. Valsad was ranked 1st with total export of INR 487 million from 20 export oriented units. Share of export to total production from these export-oriented units in Valsad was 77.6 per cent. Kutch was ranked 13th with a total export of INR 19 million from 8 export oriented units. Export to total production ratio in these 8 units was 23.8 per cent only, which was far below than the average in Gujarat at 50.32 percent. Export to production ratio was the highest in Junagadh where it was 93.57 per cent.

4.6 Factory Sector in Kutch

According to Chief Inspector of Factories in 2001 number of working factories in Gujarat were 18880 in that share of Kutch was 238 which was around 1.2 per cent. Growth rate of factories in Kutch is higher than growth rate of Gujarat. In 1980 total 114 working factories were in Kutch it has increased

to 238 in 2001 which shows average annual growth rate of 5 per cent. In Gujarat total working factories in 1980 were 10674 it has increased to 18880 in 2001, with average annual growth rate of 4.3 per cent. In 2001 total workers employed in factory sector in Gujarat were 777597 in that share of Kutch in total employment was 1.3 percent.

4.7 Industrial Estates in Kutch

Gujarat Industrial Development Corporation has 11 industrial estates in Kutch, in which, there are 2 in Bhuj taluka, 2 in Gandhidham taluka, 2 in Mundra, 1 each in Nakhatrana, Rapar and Anjar taluka. Total area under these industrial estates is 531.39 hectares and out of that 166.97 hectare is developed with infrastructure and 76.89-hectare of land is already allocated to the industrial units. Available land for allocation is 90.08 hectare and recently GIDC had required 188.46-hectare land in Mundra taluka for industrial estate. Internal roads are completed in 6 industrial estates, water supply is available in 5 industrial estates, and Gandhidham Municipality is supplying water in Gandhidham industrial estate. Drainage lines are constructed in Bhuj, Gandhidham and Anjar industrial estates.

Table 4.8: GIDC Industrial Estates in Kutch Area in ha.

Sr. No.	Location	Taluka	Area	Developed Area	Allocated Area	Available Area
1	Bhuj	Bhuj	30.75	30.75	21.43	9.32
2	Nagor	Bhuj	6.47	6.47	3.9	2.57
3	Madhapar	Bhuj	2.12	2.12	1.27	0.85
4	Gandhidham	Gandhidham	10.66	10.66	6.48	4.18
5	Mithirohar	Gandhidham	170.44	40	0	40
6	Anjar	Anjar	21.04	13.71	10	3.71
7	Mundra	Mundra	189.91	1.33	0.98	0.35
8	Dhrub	Mundra	46.94	42	30.81	11.19
9	Mandvi	Mandvi	39.93	19.93	2.02	17.91
10	Nakhatrana	Nakhatrana	4.47	0	0	0
11	Makhel	Rapar	8.66	0	0	0
	Total		531.39	166.97	76.89	90.08

Source: - GIDC Bhuj

4.8 Kandla and Mundra Special Economic Zones

Kandla Special Economic Zone is located in proximity to Gandhidham and Kandla port and was converted from Kandla Export Processing Zone in the year 2000. Since then the zone has experienced rapid establishment of units for various types of industrial products. Presently there are 139 units mostly for garments and textile products, light engineering products and chemical and allied products. Zone's export has reached at INR 10.72 billion in 2003-04. It is evident that if expanded and infrastructure investments are made in a planned and integrated way, due to locational advantages Kandla SEZ can contribute largely to regional economic development.

Mundra Special Economic Zone is an ambitious mega-project promoted by Adani Group covering a 100 sq km of land near the Mundra Port. The group is planning to invest more than INR 20 billion for the project and currently initial project planning is being carried out. The business model envisages a

Table 4.9: Growth of Industry-wise Working Units at KA'SEZ by April 2004

Type of Industry	Decades					Total
	1961-70	1971-80	1981-90	1991-2000	2001-present	
Chemical & allied products	0	0	7	5	7	19
Engineering	1	3	1	3	9	17
Intra zone sale units	0	1	2	6	0	9
Plastics	0	1	1	21	2	25
Readymade garments	0	0	5	13	17	35
Service units	0	0	0	0	1	1
Trading units	0	0	0	7	16	23
Others	0	0	0	0	10	10
Total	1	5	16	55	62	139

Source: Kandla Special Economic Zone, Gandhidham

mix of developments in terms of the developer and through co-developers / units operating in the SEZ. The land acquisition is envisaged to be completed in a period of three years. The schedule provides for acquisition of the total land over the project period. The total land to be developed has been arrived at, based on the estimated uptake of land by the industrial, residential, commercial and support infrastructure, utilities, open spaces and social infrastructure for Diversified Industrial Streams as well as Mega Projects. It has been recently seen that many large multi-national and national groups are interested to invest in Mundra SEZ. With a large amount of land and planned state of the art infrastructure provisions, by attracting massive amount of investments, Mundra SEZ is capable of changing economic dynamics of the region.

4.9 Impact of Ports in Industrial Development in Kutch

Recently developed industrial base in the region is increasing leveraging on the existence of the countries second largest port Kandla and one of the most modern port and container terminal at Mundra. Changes taken place in few industries are good examples revealing such a strong relationship.

Box 4.1: Potential of Edible Oil Industry

As per Solvent Extractor's Association study, India's domestic demand for edible oil will grow by 5 to 6 million tonnes; while domestic production could expand by only 3 million tonnes, leaving enormous potential of edible oil industries in the country.

4.9.1 Timber and Wood Product Industry

After granting of permission in 1995, for import of timber under 'open general license', the timber industry in Kutch (Gandhidham) has grown leaps and bounds. The timber imports have grown with a CAGR of 11 percent from 1997 to 2002. The increase in the imports of timber has been 67 percent that is from 8.47 cbm in 1997 to 14.12 cbm in 2002. Over 300 saw mills are presently working in an around Gandhidham. The imports of timber have been mainly from Malaysia, Indonesia, Africa, New Zealand and Australia. As of today, 25000 people are estimated to

be employed in this industry. Overall in Kutch upto 2004, four projects with an investment of INR 20.87 million are commissioned and another five projects with an investment of INR 76.7 millions are on the anvil. Most of these projects are coming in Bhachau and Anjar talukas with proximity to Kandla Port for manufacturing veneers and other wood products.

4.9.2 Edible Oil Industry

Edible oil companies across the country are flocking Kutch to set up their units because of the tax incentives (INR 1000 per tonne) announced by the central government after the devastating earthquake of January 2001. These companies [1] import palm oil and crude palm oil from the East Asian countries. Proximity to Kandla and Mundra ports, which accounts for about 40 per cent per of India's edible oil imports, is another important reason from the oil majors shifting their bases to Kutch. By the end of 2004, around six big refineries would start there commercial production and this will add an additional refining capacity of 6,200 tonne per day.

According to the estimates, Kutch is expected to have an annual edible oil refining capacity to the tune of 2.38 million tonne by the end of the current financial year, which will be 37 per cent of the entire country's demand. At Rs 50,000 per tonne, this would translate into an annual turnover of Rs 118.75 billion for the region. The imports of edible oil in 2001-02 from Kandla and Mundra ports were 1.49 million tonnes, which is 30 percent of the total imports and has grown at a CAGR of 36 percent from 1996-97 to 2001-02. As per iNDEXTb information, projects with an investment of INR 1260 million is already commissioned and projects with another INR 3370 million is under implementation in this sector.

4.9.3 Metcoke Industry

Metcoke is largely employed by metal industry. The basic raw material for producing metcoke is coking coal, which is imported from Kandla and Mundra Port. In 2003-04 coking coal imports from Kandla Port was 234 thousand tonnes. Based on these imports a lot of industries are

Table 4.10: Metcoke Industries in Kutch

Status	No. of Projects	Investment (million INR)
Commissioned	1	21
Under Implementation	9	2710
Total	10	2731

Source: iNDEXTb

[1] Adani Wilmar Ltd, has set up an edible oil refining at Mundra Special Economic Zone (SEZ) with investment of over INR 1500 million.

The Indian arm of the US agri-business giant Cargill India has also signed a memorandum of understanding with Parakh Foods Ltd to set up unit for edible oil in Kutch since both companies have business interests in region. Once finalised, the joint venture will be the largest in the country with a daily refining capacity of 5,000 tonne.

Some of the big players setup up new refining facilities include Cargill India with its Nature Fresh brand, Parakh Foods with Gemini brand, Ruchi Industries with Ruchi brand and Param Industries with Mahakosh, each one setting up refineries with the capacity of 1,000 tonne per day, while Gokul RefOil with Gokul brand is setting up a refinery with capacity of 800 tonne per day.

under implementation in the Kutch region. Presently as per iNDEXTb information around 9 industries with an investment of INR 2731 millions are under implementation. Most of these industries are coming in Bhachau and Anjar, near Kandla Port. It is estimated that out of over 3 million tonnes per annum capacity in India, over 2 million tonnes per annum would be in Gujarat with majority of it in Kutch.

4.9.4 Fertilizer Industry

IFFCO is the largest producer of fertilizer in the country with four plants. One of these plants is located at Kandla to exploit the advantages of the Kandla port in its proximity. The inputs for fertiliser products are imported through Kandla Port which includes mainly DAP, ammonia and phosphoric acid. Kandla port has a captive jetty for specifically importing these chemical products. Mundra Port also has started importing these chemicals recently. These two growing ports in Kutch along with growing national demand for fertilisers therefore have created potential of expanding fertiliser industries in the region.

5. Regional Economy and Employment

5.1 Regional Economy

Estimates of Gross Domestic Product and Gross State Domestic Product are best and comprehensive indicator available at national and state level to know progress of country and state. But it does not reflect economic disparity and progress of districts or any specific regions within a state. Therefore an estimation of Gross District Domestic Product is required to know the progress of a district over the period of time. Central Statistical Organisation has been developing and improving every year the methodology for estimates of national and the state incomes, recently a similar effort has been made to develop a methodology for estimating of Gross District Domestic Product for different districts of the country by the statistical organisations of few states.

On the other hand, in absence of any regular indicator such estimates of domestic product or income for measuring economic growth at the district level, Centre for Monitoring Indian Economy has attempted to document and compare district level growth scenarios by developing a development index. It has prepared the relative index of development for different districts and also for states in the country, which is normally carried out in an interval of four to five years. It has been found that relative index of development of the states and their per capita incomes have significant correlation.

5.2 Gross District Domestic Product in Kutch

After the earthquake of 2001, the World Bank, the Asian Development Bank and Government of Gujarat had estimated income from various sectors of economy; inclusive of industries, trade, restaurants and hotels, transport, communication and storage, finance, insurance and real estate and community, social and personal service sectors. These estimates covered only secondary and tertiary sectors. Income in the individual sectors was calculated on the basis of the Economic Census of Gujarat by districts. According to their methodology firstly sector-wise employment share in Gujarat was worked out based on the 1998 Economic Census. The same proportions have been superimposed on the sector-wise GSDP of Gujarat to work out sector-wise income of five worst earthquake affected districts.

Table 5.1: Eestimated GSDP-Gujarat and GDDP-Kutch in 1998 (Current Prices)

Sr. No	Sector	GSDP-Gujarat INR billion	%	GDDP-Kutch INR billion	%
1	Primary	261.41	24.8	11.23	37.0
2	Secondary	392.74	37.3	6.23	20.5
3	Tertiary	398.88	37.9	12.89	42.5
	GSDP	1053.04	100	30.36	100
	Population (In '00)	472670		147.92	
	Per Capita Income (Rs)	22279		20525	

Source:- DMM Estimate

Extending this methodology to cover the remaining primary sector for the Kutch shall cover the complete estimate of the district domestic product of any district. The Economic Census of 1998 has estimated employment in Livestock, Fishing, Forestry, Logging and Mining and Quarrying sector. For the figures of cultivators and agriculture labours in Kutch, figures of cultivators and agriculture labours for Kutch 1991 and 2001 Census were interpolated. By interpolation it work out to be 255256 and its share in

Gujarat was 2.4 percent from which the income from agriculture in Kutch was derived for 1998. Estimated Gross District Domestic Product of Kutch in 1998 is INR 30.36 billion, it means Kutch had contributed 2.88 per cent of Gujarat's economy in 1998. Sector-wise analysis shows that in GDDP of Kutch share of tertiary sector is the highest with 42.46 per cent followed by primary sector with 37 and secondary sector with 20.52 per cent. Estimated per capita income in Kutch in the year 1998-99 was INR 20,525.

Similar exercise has been carried out to estimate the District Domestic Product of the Kutch for 2001-2002. For this assumption was that the share of cultivators and agriculture labours in Kutch will remain the same. The following table provides the Gross District Domestic Product of Kutch in 2001-2002 for primary, secondary and tertiary sectors, which ultimately led to worked out the per capita income of Kutch in the year 2001-02.

Table 5.2: Estimated GSDP-Gujarat and GDDP-Kutch in 2001-2002 (Cureent Prices)

Sr. No	Sector	GSDP -Gujarat INR billion	%	GDDP - Kutch INR billion	%
1	Primary	234.24	18.4	14.23	35.6
2	Secondary	476.96	37.5	7.43	18.6
3	Tertiary	560.70	44.1	18.26	45.7
	GSDP	1271.91	100	39.93	100
	Population (In '00)	512670		15832	
	Per Capita Income (Rs)	24810		25226	

Estimated Gross District Domestic Product of Kutch in 2001-2002 is INR 39.93 billion, which is around 3.10 per cent of Gross State Domestic Product of Gujarat. As activities related to mining and quarrying is intensive in Kutch, share of primary activities in the region contributed 35.6 percent of the domestic income, by contrast which is only 18.4 per cent in GSDP of Gujarat. In Kutch share of tertiary sector in GDDP has increase from 42.5 per cent in 1998-99 to 45.7 per cent in 2001-2002. Share of secondary sector has decreased from 20.5 per cent in 1998-99 to 18.6 per cent in 2001-2002. Estimated per capita income in Kutch in the year 2001-2002 is Rs 25,226.

5.3 Per Capita Expenditure

To estimate Per Capita Expenditure firstly the relationship between per capita income and per capita expenditure for the year 2001-02 for the states was estimated. The per capita income considered here is average of three years. Adjustments were also made with monthly per capita expenditure to get the yearly figures. It is found out that per capita income and per capita expenditure are high and significantly correlated.

Per Capita Expenditure = 4326 + 0.191 Per Capita Income

S = 1337.25 R-Sq = 65.5 % R-Sq (adj) = 64.0 %

Substituting per capita income of Kutch in the year 2001-02 the per capita expenditure of Kutch has been estimated at INR 9144.

5.4 Relationship between Relative Index of Development and Per Capita Income

The Centre for Monitoring Indian Economy had made significant effort to show disparity in development by preparing relative index of development for districts. The index has been calculated by using 11 indicators, 1. Villages electrified 2. Railway route length per 100 sq. km., 3. Surfaced roads per 100 sq. km. of area, 4. Un-surfaced roads per 100 sq. km. area, 5. Gross irrigated area as % of gross cropped area, 6. Bank branches per lakh of population, 7. Post offices per lakh of population, 8. Telephone lines per 100 persons, 9. Primary schools per lakh of population, 10. Hospital beds per lakh of population and 11. Primary health centres per lakh population.

Table 5.3: Disparity in Development of Districts in Gujarat

Sr. No	Districts	Relative Index of Development							
		1980	Rank	1985	Rank	1991	Rank	2000	Rank
1	Ahmedabad	377	1	301	2	185	2	95	5
2	Amreli	109	9	87	13	100	10	75	13
3	Anand	NA							
4	Banaskantha	52	14	49	16	55	14	83	8
5	Bharuch	118	9	121	5	96	11	81	10
6	Bhavnagar	107	11	103	11	106	9	79	11
7	Dahod	NA							
8	Gandhinagar	301	2	307	1	192	1	127	1
9	Jamnagar	132	6	110	8	126	4	77	12
10	Junagadh	123	7	105	9	106	9	74	14
11	Kutch	107	11	104	10	110	8	81	10
12	Kheda	86	12	77	14	73	13	114	2
13	Mehsana	47	15	39	18	40	16	98	3
14	Narmada	NA							
15	Navsari	NA							
16	Panchamahal	135	5	117	7	119	6	82	9
17	Patan	NA							
18	Porbandar	NA							
19	Rajkot	82	13	54	15	51	15	84	7
20	Sabarkantha	143	4	138	4	154	3	94	6
21	Surat	107	11	98	12	76	12	96	4
22	Surendranagar	35	16	43	17	37	17	75	13
23	Dangs	234	3	201	3	167	2	68	15
24	Baroda	120	8	121	5	125	5	95	5
25	Valsad			120	6	114	7	98	3

Source: Centre for Monitoring of Indian Economy (CMIE)

Kutch is ranked 10th among all districts of Gujarat in relative index of development. Gandhinagar, Kheda, Mehsana, Valsad, Surat and Ahmedabad are top five and Dangs, Surendranagar, Junagadh and Jamnagar are low ranked districts.

The relationship between relative index of development and per capita income of states is significantly correlated. To estimate linear relationship, firstly per capita income of the states are converted into index of per capita income by taking per capita income of India as 100 and then the

linear regression model was developed.

Index of Per Capita Income = 16.2 + 0.721 Relative Index of Development

S = 25.0091 R-Sq = 38.2% R-Sq(adj) = 34.1%

By using the above mentioned linear regression model, index of per capita income of districts in Gujarat was estimated on the basis of relative index of development for the year 2000. Using these relationships, the per capita income of Kutch in the year 2000 was estimated at INR 16,693. However these estimates can be more authentically prepared only when relative index of development are available at regular interval for districts. These estimates only provide the aggregate figure not the sectoral distribution.

5.5 Employment

5.5.1 Sector-wise employment in Gujarat and Kutch

Table 5.4: Sector-wise employment in Gujarat

Sr. No.	Sector	1991		2001		Growth Rate
		Persons '00 thousand	%	Persons '00 thousand	%	
1	Primary	108.3	65	131.2	62	1.94
2	Secondary	25.8	16	33	16	2.50
3	Tertiary	32	19	48.2	23	4.18
	Total	166.2	100	212.5	100	2.49

Source: - Census of India 2001 and Economic Census 1998

In Gujarat work force has increased at exponential rate of 2.49 percent per annum from 1991 to 2001. Work force in primary sector has increased at the rate of 1.94 percent but its share in the total work force has decreased from 65 percent in 1991 to 62 per cent in 2001. Work force in secondary sector has increased at exponential rate at 2.5 per cent but its share in the total work force has remained the same. Tertiary sector has observed the highest growth rate of 4.18 per cent per year from 1991 to 2001. Its share in the total work force has increased from 19 per cent in 1991 to 23 per cent in 2001.

Table 5.5: Sector-wise employment in Kutch

Sr. No.	Sector	1991		2001		Growth Rate
		Persons '00 thousand	%	Persons '00 thousand	%	
1	Primary	2.7	60.6	2.9	49.3	0.75
2	Secondary	0.64	14.1	0.79	13.2	2.18
3	Tertiary	1.1	25.4	2.2	37.5	6.92
	Total	4.5	100	6	100	2.83

Source: Census of India and Economic Census 1998

Kutch has observed a growth rate of 2.83 per year in the work force, which slightly higher as compare to Gujarat. Work force in tertiary sector has increased at the rate of 6.92 percent per year from 1991 to 2001. Share of tertiary sector in the total work force was 25.4 percent in 1991, which has increase to 37.5 per cent in 2001. Work force in secondary sector has increase at the rate of 2.18 per cent and primary sector has observed a growth rate of 0.75 per cent.

5.5.2 Employment in Organised and Unorganised Sector in Gujarat

Directorate of Employment and Training, Gujarat State maintain data on employment in public and private sector for Gujarat. According to the data collected from Directorate, employment in organised sector has decreased at the rate of 2 per cent from 1998 to 2002. Data collected from Directorate of Employment and Training and data from Census on workers were used to estimate employment in the organised and unorganised sectors in Gujarat.

Table 5.6: Estimated employment in organised and unorganised sector in 2001

Sr. No	Sector	Gujarat '00 thousand	%	Kutch '00 thousand	%
1	Organised	16.22	7.6	0.41	6.7
2	Unorganised	196.33	92.4	5.64	93.3
	Total	212.55	100	6.05	100

Source: - Directorate of Employment and Training, Gujarat State and Census of India 2001

In Gujarat approximately 16 hundred thousand workers are employed in organised sector which is around 7.6 percent of total work force. In Kutch approximately 6.7 per cent work force is employed in the organised sector, which lower than Gujarat.

6 Tourism and Recreation

6.1 Study on Existing Destinations

Although having unique geomorphic and historic-cultural assets and attributes, Kutch is not yet a very attractive tourist destination. On the other hand, in comparison to few other states, Gujarat as a whole is not an attractive destination in India. Destinations in Kutch only exhibit the general trend available in the state and are not developed. Opportunities and potentials are also not yet explored. But historic-religious and some amount of efforts from the state agencies have created few places as areas of tourist interest.

6.1.1 Dholavira, the Planned Harappan Urban Settlement

With the discoveries in Dholavira potential of Kutch for archaeological, historic and research based tourism has increased up to a great extent. But yet the site has not attracted tourists in large-scale due to lack of publicity, proper documentation and related infrastructure facilities.

The Archaeological Survey of India has been conducting large scale archaeological excavation since 1990 at Dholavira located in the island of Khadir in the salty marshes of the Great Rann of Kutch. The 123.5 acres site has revealed advanced town planning, monumental as well as aesthetic architecture, an ingenious water harvesting system, the finest stone dressing, sophisticated technology, funerary architecture, lapidary and shell-working, copper smithy and ceramic industries. The evidences suggest a nearly continuous habitation from about 2900 to 1500 B.C in Dholavira and there are traces of strong trade linkages with their contemporary Mesopotamians. The pride of place goes to the inscription of signboard comprising ten Harappan large sized letters painted on a wooden board in the citadel's north gate, and to the recent finds of a headless stone monitor lizard, seals, sealings copper implements, stone beads, large reservoirs one having a damaged flights of 50 steps and another rock cut one are among the finds of extraordinary significance in the Harappan context.

The settlement had an extensive and remarkably sophisticated water supply system that included finely chiselled reservoirs, wells and rainwater tanks. A third of the city's 50 hectares was devoted to the collection and distribution of fresh water. Planners developed the city on a slope, between two streams that even now run after a rainstorm. At the point where one of the streams meets the city walls, Dholavira's inhabitants carved a large reservoir out of the rock. This was connected to an intricately engineered complex of large (the largest measuring 263 feet by 39 feet and 24 feet in depth) and small reservoirs that provided the entire settlement with a year-round supply of water. The giant reservoirs together held more than 325,000 cubic yards of water. These reservoirs were connected to wells that filled cisterns for drinking and bathing. A 4.25-m-wide well, the largest ever found in a Harappan ruin, leads through a spill channel into the citadel itself.

Similar to Harappa and Mohenjodaro, Dholavira traces a parallelogram, encircled by a stone-and-brick wall 5 m thick at its base. Inside, the wall of the citadel is 18.5 m thick, while the so-called ‘middle town’ with spacious homes suggesting occupation by well-off traders, had its own fortification. A developed public space nearly 300 m by 50 m edges the citadel; Archaeologists

hypothesise it to be a multi-purpose sports stadium, assembly arena and occasional bazaar. Farther out, a more densely packed colony of houses adjoins the middle town. Beyond the walls, yet another settlement has been found. The city was a vibrant place. Most walls, roads, floors, and possibly even building roofs were likely constructed of pink-and-white clay. The well-preserved site has offered up a trove of Harappan artefacts--pottery, clay figurines and animals, beads made from lapis lazuli, gold, silver and shell, and the objects most associated with Harappan digs: weights and seals depicting bulls, unicorns and other beasts. In addition to these, excavations in a cemetery west of the city have uncovered tombs, idols, and ritual objects belonging to ethnic groups that practiced a variety of religious rituals.

Around 2100 B.C. the culture began to show signs of decay: the citadel was abandoned, building repairs displayed shoddy workmanship and houses encroached on the well-planned streets. By around 2000 B.C. the city was abandoned, to be partially rehabilitated nearly 100 years later. The quality of artisanship crumbled still further, producing weights made not only of stone but also of pottery fragments. After abandoning it again the city appeared to be reoccupied around 1500 B.C., this time by rural folk who lived in circular houses similar to ones built by villagers today. About 50 years later, the site was abandoned for good. Scientists believe that floods and earthquakes may have doomed most of the civilization. As for Dholavira itself, experts believe that the disruption of trade with war-torn Mesopotamia chipped away at the city's economy, even as rapidly increasing aridity forced a return to a simpler lifestyle.

A wonderful and sophisticated town planned 4000 years ago is not only pride for India, but is an asset for the whole world. It is a milestone in the human civilisation and an important heritage site. Dholavira therefore, in addition to normal tourists, can create immense interests for city planners, architects, civil engineers, archaeologists, geographers and for various professionals world-wide.

6.1.2 The Great and Little Rann of Kutch, Banni Grass Lands, Flamingo City and Mangroves

Ecological tourism is an important aspect of the industry. Kutch provides extremely unique ecological regimes creating vast potential in this sector. The Great and the Little Rann of Kutch and their associated features such as Banni Grass lands are unique physical features in the world.

The Great Rann of Kutch is a unique geomorphic feature with an identical ecology. It is a massive low lying area with 18,130 sq. km of land mass; a saline desert and a flat land formation with alluvial and colluvial silt and sand deposits. It merges with the Thar Desert of Pakistan and Rajasthan in the north and surrounded by Banaskantha district in the east, the Little Rann of Kutch in the south-east, Banni Grass lands and Kala Dungar in the south and Kori Creek in the Arabian Sea in the west. The Great Rann has thirteen islands in it and seasonal inundation by rain water and diurnal inundation by sea water, coupled with a high inherent salt content of the soil are the major characteristics. Leaving the islands or the raised lands and for a few highly salt tolerant halophytes like Suaeda spp. and Atriplex spp., etc the Rann is devoid of any vegetation.

The Little Rann of Kutch is the southward extension of the Great Rann and is very similar in physiography, edaphic conditions, eco-climate and vegetation. It has 23 small islands and an area of 5180 sq. km. Little Rann, however is different from the Great Rann in terms of inundation regime. It serves as a nursery during the monsoons for many marine animals and fishes including prawns. It is also the last home of endemic Asiatic Wild Ass, *Equus hemionus khur*, locally called *Ghorkhur* normally found in the islands.

Banni Grass lands are ecologically disguised grass lands with very sparsely distributed small settlements. It is about 3000 sq. km. flat but slightly raised newly formed land. Silt deposition and receding of the sea are two main reasons of its formation. Today, a land locked mangrove of some fifty odd '*Cher*' (Avicinnia marina) trees in the southern border of Banni is the sole evidence of the ancient shoreline, and indicates that Banni is mainly a benthic silt deposition exposed due to the receding of the sea. Though a very flat land having a gradient as low as 1 in 6000 to 1 in 10,000, it is slightly raised towards north. In the south towards the mainland, it forms a depression which gets inundated during monsoon, forming a saline desert once the water gets evaporated. The raised lands are good grasslands though some of these are occupied by exotic Prosopis julifera, Suaeda fruticosa, Suaeda nudiflora, etc are the pioneer species. Urochondra setulosa, Sporobolus diandrus are salinity tolerant grasses and later in the successional stages are palatable grasses and Fabaceae plants such as Cenchrus setigerus, Crotolaria spp. and Indigofera spp. colonises. These grasslands are providing a good habitat for Chinkara, Nilgai, Reptiles and Birds of prey. Wolf and Jackals are the main predators. In the south, low lying areas experiencing seasonal inundation provide breeding site to many migratory birds. The Banni is inhabited by a community called *Maldhari*, which is a traditional livestock breeder community. The villages in Banni area are famous for traditional Kutchi huts called *Bhunga* and embroidery by women.

Flamingo City the marshes of Kutch are only known breeding grounds for flamingos in India. In a cycle of once in a decade, when favourable condition prevails, plenty of flamingos breed in islands of Great Rann, following a good rainfall. These can be seen in Dhand, in Banni, which is accessible by 48 hours journey on camel though marshy land.

Moreover, around 293 sq. km. of area in the western Kutch is covered by mangrove forests. Main species of these mangroves are Avicinnia marina, Rhizophora mucronata and Ceriops roxburghiana. Mangroves are extremely useful ecosystem as they provide breeding ground for many marine animals and some of which have high commercial value products. They also prevent coastal erosion and high turbidity, which results in an environ-suitable for survival of marine life.

6.1.3 Bhuj and Mandvi

Kutch also has potential of urban-recreational and monumental tourism in the places such as Bhuj, Mandvi etc.

6.1.3.1 Bhuj, a Historic City and the District Headquarter

Bhuj is a historic city, presently a C class city is the district head quarter of Kutch. The city surrounds a hillock known as Bhujia Hill with an old fort a top and has typical physical settings. The high-density historic city surrounded by walls was developed adjacent to the hillock with a man made lake. In the 19th and 20th century, the city expanded towards south and east. Many of the landmark buildings built in the British Period are found scattered outside the historic old core city. Important buildings of tourist importance are Aina Mahal, Pragmahal Palace, the Sharad Baug Palace, Royal Cenotaphs (Chatris), Kutch Museum, Ethnology Museum and Bharatiya Sanskriti Darshan complex etc. Aina Mahal is a royal palace built in the 18th century while Pragmahal Palace was designed as an elegant Italianate palace. Kutch Museum is the oldest museum in Gujarat. Aina Mahal, Kutch Museum, Chatris have been major tourist attracting places, which have suffered severe damage during the earthquake of 2001.

An Urban Development Plan for Bhuj has been prepared and adopted through government procedures during the post earthquake reconstruction period. New development control regulations were formulated and adopted to support it. Later on detailed land pooling schemes in the severely destroyed and congested old areas has been also prepared. Subsequently a massive up gradation of utility infrastructure with state of the art drinking water treatment and supply, underground sewerage system, roads development and up gradation, a new solid waste management system, new relocation colonies, etc has been carried out.

Implementation of the urban development plan and the town planning schemes and the urban infrastructure development project is substantially changing city's physical appearance with wider roads, new earthquake resistant buildings and with opening up of huge amount of land for future development. Simultaneously a massive amount of investments has been injected in up-gradation of social infrastructure facilities inclusive of few state of the art hospitals and newly constructed schools and colleges. A new Kutch University is also being established in the city which also has the potential of developing the city's image as a centre of educational activities and research. With all these, Bhuj is undergoing a massive and unprecedented transformation creating a lot of tourism potential.

But poor traffic management and a lack of street level planning in the few of the older roads such as in the Bus Stand Road gives an anarchic and dirty impression of the city. Lack of landscaping, cycle and pedestrian friendly environment, greenery and recreational facilities are the major hurdles to portray the city as a very attractive tourist destination.

6.1.3.2 Mandvi, Its Beaches and Palaces

Mandvi it is situated 60 km south of Bhuj and approximately 100 km west of Gandhidham. The town was founded in 1581 A.D. by the rulers of Kutch and was a historic harbour. The port of Mandvi was an important sea trade port between the near east and the far east, and brought considerable prosperity to the royal family of Kutch. The sailors of Mandvi were known to be adventurous and it is said even

Vasco Do Gama used a sailor from Mandvi to navigate to Zanzibar. As most of the top ports of India were controlled by Europeans, especially the Portuguese, even the Mughals held the Maharaos of Kutch in high esteem, as they needed the port of Mandvi for exports, imports and for pilgrimages to Mecca. Mandvi town was therefore as important to the Maharaos as their capital city of Bhuj and they endowed it with some splendid palaces and buildings.

The famous Aina Mahal of Mandvi, built in the mid-18th century by Ram Singh, who had been ship wrecked in Europe, learnt the arts of foundry, glass blowing, stone carving etc in the Dutch and Venetian tradition, and was patronized by the Maharao Lakhpat Sinhji of Kutch, is no longer as grand as the same sort of extravaganza they created in Bhuj, having been converted into a college for girls, but still has interesting sculpture of Dutch sailors and dancing girls. The Vijay Vilas palace, erected in the 1940s, with splendid architectural features such as umbrella domes and cupolas of the Rajasthani and Bengali styles consort with Gothic arches and Baroque features.

There are few good and virgin beaches in the town. Apart from the popular beach in the town, where wind mills have been planted, there is also a two kilometre long private beach of the Maharao with beautiful white sands accessible with a minimum fee. Next to the beach are the docks where wooden ships are being built. There is also a large private sanctuary of the royal family known as *Pragsar*.

In the town, one can visit numerous old buildings of princely times. The Rukmavati Bridge in its entrance is the longest stone bridge; built in 1883 A.D. Mandvi is well known for handicraft industry particularly for its relief, filigree and enamel work. One can pick up handicrafts such as silverware, shell-work, Kutchi embroideries, *bandhini* tie-and-dye *saris* and block prints.

Traditional Ship Building at Mandvi, a Potential Tourist Attraction

6.1.4 Lakhpat, Koteshwer and Narayan Sarovar

Lakhpat, Koteshwer and Narayan Sarovar situated in the extreme western part of the country are important religious destinations and surrounding areas also have potential of ecological tourism.

Lakhpat is situated in the Kori Creek, approximately 135 km from Bhuj. It was named either after Rao Lakha or many *Lakhpatis* (millionaires) residing there in the peak days of its glory. There are many temples and dargahs inside the Lakhpat fort, which is 500 year old. It has one Gurudwara and as per popular believes Gurunanak made his sojourn to Mecca from it.

Koteshwer and Narayan Sarovar are located 183 km west of Bhuj and are famous for the lake and temples, which are sacred as per Hindu belief. Mata-no-math on the way to Koteshwer is a very popular religious destination in Gujarat.

Moreover, the Chinkara Sanctuary located in the proximity to Narayan Sarovar is the home of the Chinkara (Gazella gazelle) of the Indian Gazelle and Naliya/Lala Sanctuary is famous for the Great Indian Bustard. Jhakhau with views of the mangroves and natural lagoons is a small port in proximity.

6.1.5 Gandhidham, Kandla and Mundra

Kutch has great potential of port based and business tourism, which has not been sufficiently exploited yet. The state of the art ports, Kandla and Mundra and rapid development of Gandhidham near Kandla can act as catalysts for development of port based, business and urban-recreational tourism.

Moreover, Bhadreshwar, located 25 km west of Gandhidham, nestles ruins of the ancient town of Bhadrawati. A famous Jain temple of 10^{th} century is also located there. Anjar 15 km from Gandhidham is famous for Jesal Toral Tomb and there is also a museum for Kutchi art.

6.1.6 Kutch as a Jurassic Park!

Valuable Jurassic and post Jurassic fossils are also being collected from Kutch. The region had been an attractive habitat of dinosaurs and other extinct animals, birds and plants in various geologic time periods. Out of more than 10,000 dinosaur eggs found and documented in India the Kutch region itself has yielded more than 2,000 of such eggs. At personal levels dinosaur fossils and eggs are being collected and even there is a private museum of such kind in Kutch. Geologists have even found pugmarks embedded in the land, and plant and elephant fossils, which suggest that the now arid desert of Kutch was once a dense forest complete with rivers and they also believe that desertification in the region started due to tectonic activity taken place around 10,000 years ago.

Moreover, the extinct volcano Dinodhar, which is the highest point in Kutch, 2300 years old Nani Rayan Excavation site, camel breeding farm at Wandh, Fossil Farm at Vithan, etc have potential of being good tourist spots in future.

6.2 Routes and Circuits

Kutch tourist circuit is one of the five major tourist circuits in Gujarat. The existing major tourist routs in Kutch originate from Bhuj.

1. Bhuj- Bhirandiara (Banni) - Khavda-Black hills-Indira Bridge (the Great Rann of Kutch).
2. Bhuj- Mata no Math- Lakhpat- Koteshwer- Narayan Sarovar
3. Bhuj- Mandvi - Bhadreshwar - Bhuj
4. Bhuj- Anjar- Bhachau- Rapar- Dholavira

Various other routes and destinations in the region are being followed by national and international tour operators.

6.3 Fairs and Festivals

Kutch Mahotsava is an initiative by Tourism Corporation of Gujarat Limited of the Government of Gujarat in the month of March/ April every year. It is organised in the form of a guided tour, which offers wide range of sights and scenes to the visitors. Moreover, there are two religious and cultural fairs of local importance called Ravechi-no-melo and Navratri Fair being held in the region. Ravechi-na-melo is organised at Ravechi, which is 170 km from Bhuj in Rapar taluka. The fair is organized in month of September every year near the temple of Goddess Ravechi. The Navratri Fair is held twice a year at Mata no Math, 100 Km west of Bhuj, during March-April and Sept-October.

6.4 Tourist Flow Patterns

Tourist inflow in Kutch, in major destinations (Bhuj, Gandhidham and Mandvi) in year 2003-04 was 156 thousand. It has gone down in comparison to the last year by 38 percent. Decrease in inflow of people concerned with rehabilitation and reconstruction activities which were mainly business tourists, may be one of the reasons.

Table 6.1: Type Wise Tourist Inflow at Major Destinations in Kutch, 2003-04

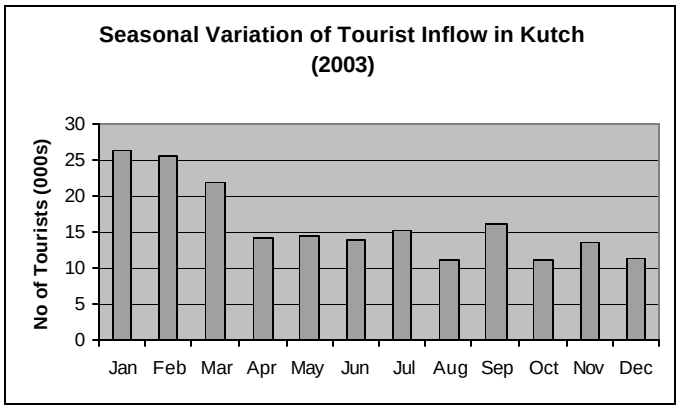
Major Destinations	Number of Tourists as per Origin						
	Local	From Ahmedabad	From other parts of Gujarat	From other Indian states	NRIs	Foreign Tourists	Total
Mandvi	5962	2643	6172	3326	0	703	18806
Bhuj	17144	19746	25384	16873	2	482	79631
Gandhidham	7158	14772	15999	19900	7	286	58122
Total	30264	37161	47555	40099	9	1471	156559

Source: Gujarat Industrial & Technological Consultancy Org. Ltd. (GITCO)

Notes: 1. Definition of tourist includes tourist staying for minimum one night in a formal place of accommodation
2. Local word stands for tourists coming form a radius of 150 km from the destination
3. Similar details for other destinations in Kutch are not available

A major portion (73 percent) of tourists visiting Kutch is from different parts of Gujarat itself, 26 percent of tourists come form other parts of India and only 1 percent are foreign tourists. The largest numbers of tourists visit Kutch in winter season i.e. in the months of January and February.

Approximately 51 percent of the tourists visiting Kutch visit Bhuj, while Gandhidham receives 37 percent and Mandvi 12 percent (2003-04). Among other destinations Dholavira receives around 5000-6000 people every year (Indextb in http://www.vibrantgujarat.com, 2003).



6.5 Economics of Tourism

Share of tourism in GDP at national level is 5-6 percent. In Gujarat according to CII, a rough estimation of contribution of tourism is around 2-3 percent accounting for approximately INR 3000 million to the state exchequer (report on preparation of 20 years perspective plan for development of sustainable tourism in Gujarat, 2003).

The state government has projected an outlay of INR1255 million for tourism in the Tenth Plan, which is a meagre 0.26 percent of the total outlay. As per annual plan of the state, for the year 2002-03 the approved outlay for tourism was INR 172.3 million, which is a 0.21 percent of the total. An amount of INR 3 million has been provided for development of Kutch as a special tourist area in this year.

Employment created by tourism in Kutch is not exactly known. As per estimates, around 45 jobs are created with a direct investment of INR.1 million in tourism and also one foreign tourist generates one direct job while 17 domestic tourists generate one direct job (study report on preparation of 20 years perspective plan for development of sustainable tourism in Gujarat, 2003).

6.6 Tourism Infrastructure

6.6.1 Accommodation

3 major destinations in Kutch have a total of 59 hotels (July, 2004), providing a total of 2451 bed capacity. The highest numbers of hotels are located in Gandhidham catering an increasing need of business and industrial activities followed by Bhuj and Mandvi.

Table 6.2: Details of Accommodation and Estimated Bed Capacity in Kutch, July, 2004

Destinations	Number of Hotels				Estimated Hotel Beds			
	High	Medium	Economy	Total	High	Medium	Economy	Total
Bhuj	4	2	16	22	187	175	594	956
Gandhidham	9	10	8	27	387	416	249	1052
Mandvi	1	2	7	10	41	115	287	443
Total	14	14	31	59	615	706	1130	2451

Note: High: tariff> Rs. 500, Medium: tariff> Rs.150> Rs 500; Economy: tariff< Rs150 per day per room.

Source: Gujarat Industrial & Technological. Consultancy Org. Ltd. (GITCO)

6.6.2 Connectivity

Most of the tourist places are connected with the network of surfaced roads. Presently there is only one airport located in Bhuj. Broad gauge rail lines connect Bhuj, Gandhidham and Mundra.

6.6.3 Utility Services

Eating joints and restaurants are available in Bhuj and Gandhidham and few other towns. Power supply is inadequate and majority of the hotels uses generator sets. Un-metered taxis and auto rickshaws are available in the major cities for local conveyance.

6.7 Existing Proposals and Initiatives

Gujarat Tourism and Tourism Corporation of Gujarat Ltd. are the state public sector agencies responsible for development of tourism in Gujarat. Gujarat Tourism operates tour programmes, manages a chain of hotels called '*Toran*' and is responsible for publicity of the tourist destinations. In Kutch, Gujarat Tourism organises 'Kutch Mahotsava' every year to attract international tourists. The state government has taken special initiatives during 'Vibrant Gujarat' (an initiative to attract investment to the state in various sectors) to develop tourism as an important industry in Gujarat and has documented 26 projects with an estimated investment of INR 66185 million, out of which a total of two projects were conceptualised for Kutch with an investment of INR 4270 million.

Moreover, during past few years, there is considerable increase in the number of private tour operators with tour programmes in Kutch. Along with many of such Indian operators, there are also few foreign ones offering tour programmes in the region.

Vol. I, Part II

Identification of Sectoral Potentials and Development Actions

1.2

Mott MacDonald

Dalal Mott MacDonald

1. Potential Identification Process – An Approach

1.1 Preamble

For identification of growth imperatives and possible growth options for the region, it is essential to understand the current situation of the region in terms of:

- Relative strengths and weaknesses in various sectors of importance
- The pace of development in different sectors (Agriculture, Industry, Infrastructure, Social)
- Readiness and preparedness of the region to capitalize the opportunities emerging at regional, state, national and global level

Based on the detailed resource mapping exercise carried out and analysis of above aspects in right perspective, it is felt that the region Kutch is uniquely positioned with respect to following aspects:

- Availability of vast land for development
- Long maritime coastline and availability of 2 ports (i.e. already developed mega port at Kandla and another one at Mundra emerging as major port).
- Nearness to thriving markets of Gulf and Middle East
- Good mineral reserves, i.e. Salt, Lignite, Bauxite, Bentonite, Clay, Kaolin, etc
- Establishment of Special Economic Zones (i.e. Kandla and Mundra)
- Sparse population, i.e. less issues involved in displacement and resettlement required while implementing large projects
- Peaceful social climate

At the same time, the region has certain challenges / limitations, which needs to be addressed somewhere during the course of development. These are:

- Perennial water scarcity in the region due to scanty rainfall and lack of irrigation facilities
- Climatic conditions not very pleasant for living
- Environment sensitivity of some of the pockets (some of which falling in Mineral reserve areas)
- Low level of agricultural, industrial & trading activities (i.e. Overall low value addition in the region)
- Low literacy level and difficulty of getting skilled manpower
- Inadequate social infrastructure, i.e. Educational Institutes, Health facilities, Entertainment facilities
- Proneness of the region to natural calamities (i.e. earthquakes and cyclones in the coastal belt).

Apart from considering above pros and cons specific to this region, it is also essential to dovetail prospects and constraints emerging from the recent trends of development occurring at regional, national and global level.

- India on the path of high economic growth
- Excise exemptions accorded to the region
- Increased post earthquake R&R activities in the region
- Improving rail and road connectivity in the region
- The climate of economic liberalization in the country, Increasing FDI Flow and Open Door Policies of the Central and State Government
- WTO Impact
- Large and mega projects planned in the region

1.2 Identification of Growth Drivers for Development

Various aspects described above were first deliberated internally and then with various stakeholders (i.e. Various Departments of Gujarat Government; Business houses / Industries operating in the region; NGOs working in the region; prominent leaders, citizens and intellectuals of the region). Various views and opinions emerged from these discussions (see: Annex 1) were analyzed with a view to identify important growth drivers for Kutch. The analysis was done keeping in mind global and domestic perspective and competitiveness of the region.

Any growth / development plan needs to be both forward looking and realistic, i.e. forward looking in the sense that it envisages optimistically for the future and realistic in the sense that it recognizes practical difficulties / constraints, which can be partly surmountable and partly insurmountable.

For developing possible options for regional development, it is essential to identify first the possible growth drivers for the region. Based on the resource mapping exercise and analysis of various responses / ideas gathered during the focus group discussions and field survey conducted in Kutch, following evaluation matrix have been derived. This matrix indicates short and long term impact various sectors of economy can have on regional economic development. Interpretation of these could lead to identification of growth drivers for the region and subsequently possible development options for the region.

Table 1.1 : Identification of Growth Drivers

Sector	Impacting Factors		Overall Impact on Regional Growth
	Favourable	Unfavourable	
Agriculture	▪ Sizeable dependent population ▪ Some pockets amenable for cultivation ▪ Good scope for Oilseeds, Isabgul, Mung, Jatropa, Gugal and Organic Farming	▪ Scanty Rainfall ▪ Low yield ▪ Lack of Irrigation facility ▪ Trend of farmers migrating to other occupations ▪ Poor connectivity	Short Term : Low Long Term : Low to Medium Comment : Possibility of bringing Agricultural Revolution virtually not existent at the moment. However, this sector holds importance as it engages sizeable population.
Industry	▪ Vast Land Available for Development	▪ Problems of Water and Power –unfavourable	Short Term : Medium Long Term : High

	▪ Less environmentally sensitive region (Ideal for Chemical / mining Industry) ▪ Large reserves of minerals ▪ Ports & SEZs providing s Excellent Infrastructure for importing raw materials and exporting finished products ▪ Nearness to thriving markets of Gulf and Middle East ▪ Availability of Incentives ▪ Many projects (small. Medium and large) in the process implementation / planning	situation for certain industries ▪ Inadequate road and rail logistics ▪ Limited availability of skilled manpower ▪ Lack of Social Infrastructure facility ▪ Low value addition in the region ▪ Environmental issues in some mining pockets ▪	Comment : Most impediments are addressable to a large extent. Possibility of creating exponential growth if synergistic infrastructure issues are also addressed.
Infrastructure	▪ Long maritime coastline – offering immense potential for expanding port and port related facilities ▪ Possibility of expanding existing SEZs and creating new SEZs ▪ Sparse population and settlement and hence less issues in resettlement and rehabilitation in case large infrastructure project comes	▪ Large land area- For linking with rail-road means huge investments ▪ Lack of adequate water and Power Infrastructure ▪ Sparse population and settlement and hence less issues in resettlement and rehabilitation in case large infrastructure project comes ▪ Lack of Airports, Air Transportation Infrastructure	Short Term : Medium Long Term : High Comment : Most impediments are addressable to a large extent if appropriate models for development and financing are devised . Infrastructure development is crucial for the development of other economic segments also.
Tourism	▪ Various attractions for boosting tourism in the region -Heritage, Historical, Beach, Pilgrimage, Wild life, Sanctuaries, Archaeological , Traditional Handicrafts, Cultural ▪ Good prospects if connected with Saurashtra	▪ Long distances to cover ▪ Poor connectivity ▪ Lack of good accommodation ▪ Lack of organized tour operators and guides ▪ Circuits not planned ▪ Non-availability of liquor	Short Term : Low Long Term : Medium Comment : Top end tourism may not be possible to develop. However, some thrust is essential as this sector has high employment generation potential.

	or Rajasthan tourist circuit		
Trade/ Business/ Services	▪ Excellent possibility for port related activities, export-import houses, logistic companies, tank terminal operators, etc	▪ Poor rail & road connectivity with hinterland ▪ Lack of social infrastructure facilities	Short Term : Medium Long Term : High Comment: Most impediments are addressable to a large extent. Possibility of creating exponential growth if synergistic industry & infrastructure issues are also addressed.

From the above analysis, following inferences can be drawn:

- All the sectors one or the other way are important and can not be excluded from the development thrust (e.g. Agriculture and Tourism may have low potential for providing accelerated growth but they definitely contribute in terms of addressing livelihood issues of sizeable population of the region)
- Though Industry, Infrastructure and Trading sector, each holding immense scope and potential for accelerated growth of the region, the extent of growth depends on the extent to which synergistic linkages among these are simultaneously addressed / exploited.

1.3 Development Options

The aim of any development plan should be "to promote economic and social progress and a high level of employment and to achieve balance, equitable and sustainable development."

Following this philosophy, it is felt that the approach to development should be multi-pronged and should not be limited to specific sectors / sub-sectors. But at the same time, the focus and thrust ought to be accorded to major growth drivers. Considering this view, it is felt that though the study like this ought to identify potential in each important sector, the major focus ought to be on sectors / drivers holding potential for accelerated growth.

The major growth drivers for the region could be any or combination of the following:

- Promoting industrialization through:
  - Focusing on industries based on local resources
  - Attracting New Industries or consolidating existing industrial base
  - Cluster Development
  - Special Economic Zones
  - Integrated Area Development Program
  - Port based industrialization
  - Attracting mega projects in the region and dependent ancillary projects
  - Strengthening port infrastructure and linkages to develop the region as an important logistic hub and trade / business centre
  - Strengthening of Infrastructure (Industrial, Urban & Social)
  - Policy Level Initiatives

Under industrial development strategy following two-pronged strategies can be adopted:

a) Selection of Mega Projects which are attracted based on the unique zone attributes in terms of immediate / extended hinterland resources, strategic geographic location, and availability of natural resources in the region and presence of a functional and efficient port.

The economic activities, which need to be probed / explored, further in this regard, are:

- Mineral Based Industries based on Bauxite, Lignite, Limestone, bentonite, Kaolin, etc
- Salt and Salt based industries
- Edible Oils
- Refinery
- Mega Chemical Complex
- LNG Terminal

b) Cluster those economic activities which have a global interaction either in terms of import or export / re-export and are attracted because of SEZs and efficient ports

The economic activities, which need to be probed / explored, further in this regard, are:

- Textile
- Light Chemical Processing
- Food Processing
- Electronics and mechanical engineering
- Services(new economy)
- Pharmaceuticals & health care
- Light metallurgy industry
- Gems & Jewellery
- Tank farm terminals
- Trading
- Logistic / Trade Hub

Development needs and potential for Infrastructure sector need to be ascertained based on assessment of current situation and estimation of strengthening and specific infrastructure needs emanating from the development process.

Since, Agriculture & other primary sector, Tourism, Handloom and Handicraft sector engages sizeable population, it is imperative to identify potential opportunities in these sectors too.

Subsequent sections discusses potential in above sectors and also attempts assess likely investment flow in the region in a medium term (i.e. 10 years time frame) and its probable socio-economic impact on the region. It also includes specific action plan for each sector. Potential analysis chapter has been organized as follows:

- Agriculture and Primary Sector Potential
- Industrial Potential
  - Local Resource based Industries

  - Salt and Salt based industries
  - Minerals and Mining based Industries
  - Handicrafts
  - Linkage and Incentive driven Industries
  - Mega Projects (LNG Terminal, Mega Chemical Industrial Estate)
- Tourism – Development Needs and Potential
- Trade & Logistic Hub
- Infrastructure – Development needs and Potential
  - Ports
  - Roads
  - Power
  - Water
  - Airports
  - Social Infrastructure – Health, Education & Recreation

2. Agriculture and Allied Sector Development Potential

2.1 Overview

Kutch is the largest district in Gujarat, in term of geographical area and covering 23.28 % of the total land area of Gujarat state. Its total area is 45652 Sq. km. As per district statistics total geographical land area available is 19, 57,629 hectares. However, in terms of population Kutch is having only 1.58 million (3.12 %) of total population of Gujarat with a low population density of 35 persons per sq. km, as against the average population density of 258 persons / sq. km for the state. Thus, Kutch has very thin population in many talukas of the district.

2.2 Geography and Locational Aspects

Kutch has a very strategic location on west coast of India and having 408 Km long coastal line covering almost three sides of the district, exposing the district to Arabian Sea (west side), Gulf of Kutch (South) and Kori Creek (Part of north side). Kutch is far more different in terms of agro-climatic parameters, than rest of the Gujarat. It has large part covered under Great Rann of Kutch in north-eastern part of the district extending up to south- east corner of the district, which is known as "Little Rann of Kutch". There are several rivulets flowing on north side as well as on south-western side in the district. Kutch is also having variety of flora and fauna, giving it a unique identity in Gujarat and also in India.

2.3 Land Utilization Pattern

Land is the primary resource for any agriculture activity, hence it is important to review current land use pattern of the district, before reviewing the status of agriculture and allied sectors in the Kutch district. Land utilization pattern is summarized in following table no.1.1.

Table 2.1: Land Utilisation Pattern in Kutch District (Year 1999-2000)

Sr. No.	Land Use Type	Area in Hectares	% of Total Land Area
1	Area under Forest	2,87,948	14.70
2	Uncultivable Fallow land	4,30,968	22.02
3	Land under non-agriculture use	72,973	3.73
4	Permanent Pasture	70,058	3.58
5	Cultivable Fallow land	3,48,179	17.79
6	Current Fallow land	256183	13.09
7	Net cropped Area	491320	25.10
8	Land use for more than once	10024	2.0
9	Gross Cropped area	501344	25.61
10	Total Land Area in Ha.	19,57,629	100.0
11	Net area under Irrigation	1,31,328	26.73 % NCA Vs Net irrigated Area

Source: Kutch district profile statistical book 2001-2002.

As observed from above table, the district is having total reported land area 19, 57, 629 hectares (excluding Kutch desert area) and out of which gross crop area is 501344 Ha (45.75 %) under

agriculture and net crop area is 491320 (44.84%) hectares. Net area under irrigation is 1.31 Lakh hectare, which is only 3.77 % of the state Net irrigated area of 34.75 Lakh hectares. Thus, in proportion to the land area of district in the state, the Net irrigated area of Kutch is very small. This has direct impact on the development of agriculture and allied sector development in Kutch and significant agriculture activities have developed in only 5 talukas of the district, out of total 10 talukas.

2.4 Area under Major Agriculture Crop Groups

In the year 1999-2000, area under food crops was 155405 hectares (31 %) and under non-food crop it was 345939 hectares (69 %). Food crops mainly includes area under cereal crops, Pulses, Fruits and vegetables and non-food crops includes Cotton, all Oilseeds, spices and medicinal plant crop like Isabgul. Details of crop area are summarized in Table 1.2.

2.5 Major Crop Area and Irrigated area

In Kutch out of total net crop area, only 1, 31,328 hectares (26.73 %) area is under irrigation at present. Total gross irrigated area in Kutch is 1, 87,007 ha. Particulars of Crop area, area under irrigation and % of irrigated areas for major crops are summarized in following table 1.2.

Table 2.2: Details of Major Crops' Area & Irrigated area in Kutch

Sr. No	Name of Crop	Crop Area in Ha	Irrigated area in Ha	% of Irrigated of Total Crop Area
A	Food Crops			
1	Wheat	18518	18518	100
2	Bajra (K+S)	67692	12040	17.79
	Sub total cereal	86210	30558	35.44
3	Green Gram (K+S)	35572	97	0.27
4	Val	1554	N.A	
5	Math	9611	N.A	
6	Other Pulses	211	N.A	
	Sub total Pulses	46846	812	1.73 %
7	Sugar Cane	533	533	100
8	Chilly	1010	N.A	
9	Coriander	499	N.A	
10	Cumin	2663	N.A	
11	Garlic	235	N.A	
12	Fenugreek	09	N.A	
	Sub total Spices	4416	4416	100
	Sub Total A	155405	53617	34.50
13	Total Vegetables $$	4240	N.A	
14	Total Fruits (Incl. Dates & Coconut) $$	12274	N.A	
B	Non Food crops			
15	Cotton	32,131	17,012	52.95
16	Groundnut (K+S)	77373	52,541	67.91
17	Sesame	13,290	1,435	
18	Rape & Mustard	11,125	8,844	10.80

19	Other oilseeds (Sunflower)	239		
	Sub Total Oilseeds edible	1,41,540	62820	44.38 %
20	Castor seed	39,513	20,733	52.47 %
21	Medicinal Plant (Isabgul)	7,141	7,138	100
22	Fodder crops	1,57,634	25,170	15.97 %
	Sub Total B for Non-food crops	3,45,939	1,33,391	38.56 %
	Total of A+ B		187008	Gross irrigated area

N.B: K+S (Kharif + Summer) Directorate of Horticulture $$ statistics N.A=Not Available

Source: Kutch district profile statistical book 2001 -2002

2.6 Irrigation Sources in Kutch

At present Kutch is having Net irrigated area of 1,31,328 hectares and gross irrigated area is 187008 Hectares for various crops as indicated in table 1.2 above. As per target of providing irrigation to Kutch total 2.06 Lakh hectares area have been projected. Out of this area, SSP will irrigate 0.37 Lakh hectare, other major & medium schemes will irrigate 0.21 Lakh Ha and 1.39 Lakh Ha will be covered under minor irrigation schemes. Thus, target for area under irrigation have been reached to 90.77 % even without the SSP water have been given to Kutch.

As per information available regarding availability of Narmada water for Kutch, from SSP Facts booklet about 37000 hectare land is proposed to be covered under KBC (Narmada Kutch Branch Canal) for irrigation. This will be increasing Net irrigated area in the district by 28.25 % and will have impact in boosting up of agriculture activities in the district.

During the interactions with experts and various officials in irrigation and other departments at the district, it is found that, there is possibility of getting additional water in Narmada Kutch Branch Canal, especially during the monsoon period, when there is relatively less off take for irrigation in the other areas towards canal head side, and this additional water from Narmada KBC if stored at high land in Kutch, in various water bodies and distributed to other areas through gravity, link canals or pipelines, there potential of getting irrigation for additional 80,000 Hectares approx.

Thus, there is potential of getting additional area under irrigation approx. 117000 Hectares, which is approx. 90 % of the current net irrigated area of the district. On realization of this irrigation potential activities in agriculture and allied sector would be proportionately increased in the district. This will be having substantial impact and ***'An Important Leap Forward'*** in the development of Kutch district in coming period.

Although, Narmada water will mainly be used for giving relief for supply of drinking water in Kutch through bulk pipeline supply. It is expected that about 200 MLD (million Litres / day) would be available to Kutch from March 2005. This water will be supplied to 10 urban centres and 948 villages. Out of 948 villages, 77 villages are currently fluoride affected, while 494 villages are facing problems of salinity. These villages and urban areas will get relief from water starvation in coming period.

There is possibility of recycling of part of this water with proper planning for used water collection and treatment and using it for agriculture and allied sector activities. At a conservative estimate of

possibilities of recycling of at least 50 % water from this source, it will be significant quantum available for additional irrigation to agriculture and allied sector for e.g. it can be used for fodder growing in the district.

2.7 Status of Agriculture and Allied Activities

Due to arid agro-climatic conditions in large part of Kutch, its development in the areas of Agriculture and other related primary sectors have been stunted in last several decades. This situation is further aggravated due to repetitive failure of monsoon, leading to severe draught situation in many talukas of Kutch. This has also compelled local population to migrate from Kutch for want of livelihood and survival.

Even though, agro-climatic conditions are not very favourable in Kutch for agriculture and related activities development, still those are the main activities in the district, which is reflected from the fact that out of total working population of 6.06 Lakhs (in 2001) in Kutch, 2.56 Lakhs (42.24 %) population (1.13 Lakhs farmers and 1.43 Lakhs farm labours) depends on agriculture and related activities for their livelihood. Since, this segment forms the major portion of working population it assumes the top most importance in any developmental plan for the district.

In making the review of present status of Kutch district, attempt has been made to cover these details in the following segments:

a) Agriculture

- Food crops (Cereals and Pulses)
- Non food crops (Cotton and Oilseeds incl. Castor seeds)
- Horticulture (Fruits, Vegetables, Spices, Médicinal Plants, Plantation crops etc.)

b) Animal Husbandry

- Milch Cattle rearing (Dairy farming- Cows & Buffaloes)
- Other animal rearing(Sheep & Goat, Camel, Donkey rearing)
- Poultry Farming

c) Fisheries - Marine fishing (In Kutch there is only sea water fisheries)

A brief review of the present status prevailing in Kutch district is made in the following table 1.3 to give the overview of current scenario in the district, as regards the above referred areas.

Table 2.3: An Over View of Current Status of Agriculture in Kutch 1999 -2000

Sr. No.	Crops	Area in Hectares	Production in MT	% Production of Gujarat
A	Food Crops			
1	Food Grains	86200	79735	1.62
2	Pulses	46950	8874	2.19
3	Oilseeds	142000	233000	9.62
a.	Castor seeds**	52700	58600	12.60
B	Non food Crops			
4	Cotton	32000	150000 bales	6.21
C	Horticulture			
5	Fruits	12274	101921	4.29

b.	Date Palm*	8662	51972	98.73
6	Vegetables	4240	34100	1.25
7	Spices	3745	3013	
8	Medicinal Plants (Isabgul)	6700	4500	38.26
9	Plantation crops (Coconut)	291	2037000 in Nuts	7000 nuts / ha

Source: Kutch district Statistical Data base & Agriculture Statistics Govt. of Gujarat

*Included in total Fruits Area and Production shown above. ** Included in total Oilseeds Area and Production.

Table 2.4: An Over View of Current Status of Animal husbandry and Fisheries sectors in Kutch Year 1999-2000

Sr. No.	Animal Husbandry	Quantity in no. s	(% to total of Gujarat)
1	Milch Cattle		
a.	Cows & Ox	372000	5.51
b.	Buffaloes	165000	2.63
c.	Sheep & Goat	10,83,000	16.54
d.	Milk Production in Litres	209790	3.27
2	Poultry Farming (Egg Production in No.s)	218000	0.44
3	Other Cattle rearing	30,000	2.18
4	Marine Fisheries		
a.	Fish Production in MT	80191	12.10

Source: Kutch district Statistical Data base & Agriculture Statistics Govt. of Gujarat

As observed from above table Kutch is having significant position as regards Cows and Buffalo, Sheep & Goat, and other cattle rearing population in Gujarat. Development of Poultry farming is insignificant. As regards Milk production, though it has not very significant contribution at state level it has made significant progress in last five years period as Milk production increased from 1,35,000 Litres per day to current level of 2.09 Lakh litres. This becomes even more significant if we take into consideration the adverse environmental factors faced by the district for two consecutive years in this 5 years period.

As regards Marine Fisheries development Kutch is having significant position naturally. Kutch is contributing 12.10 % of Marine fish catch of the Gujarat state. However, looking to the longest coastal line available in the state, still there is considerable potential for development remains unexploited.

2.8 Potential Areas for Development

With the availability of Narmada water in Gujarat and possibility of supplying this water to some water starved areas of Kutch in near future, there is a ray of hope now, for reviewing the primary sector development potential in the district and this study is focusing in this direction, keeping in mind the present resources, present status and future possibilities / potential in Agriculture and other primary sectors in Kutch district. As per irrigation potential estimate for Kutch, by Sardar Sarovar Project authorities, additional irrigation will be available in 37000 hectares of land in five talukas of Kutch, this will amount to rise in present net irrigated area by 28.24 % and approx. 7.5 % of Gross cropped area in the Kutch.

Development potential in Kutch is analyzed in two ways, a) Potential in existing crops / areas and b) Potential for New crops / areas. Animal husbandry and Marine fisheries have also been analyzed as allied activities sectors, since these are directly contributing in the overall economic activities in the Kutch district.

2.8.1 Development Potential in Existing Areas

We have previously summarized current status of agriculture crops and other primary sectors' production in Kutch and their contribution at state level in table 1.3 and 1.4.

As it can be observed from above details, though Kutch is having diverse activities and it has edge only in select items. It is therefore logical to put stress on development of these select items, for following reasons:

- Development should be emphasized where Kutch is having natural advantage and has proven its edge over other activities. We will discuss in details about the development potential of these proven activities.
- Kutch will have synergy in development of these activities due to prevailing agro-climatic conditions, availability of skilled manpower and these activities are directly related with economy of Kutch district.

2.8.1.1 Agriculture Development Potential

Kutch is having various agriculture crops, which can be classified under Food crops and Non-food crops. Food crops, further can be classified as food grain crops (which includes various cereals like (Wheat, Bajri and Sorghum etc), Pulses crops (which includes Green Gram / Mung, Math, Val etc), and Oilseeds (Which includes Groundnut, Rape & Mustard, Coconut, Sesame and Castor seed etc). Cotton is the main crop under non-food crop in Kutch.

Kutch is not having any significant contribution in food grains and pulses crops as compared to other districts in the state. This situation is due to following reasons:

- In case of cereals and pulses crop, due to uncertainties of weather in Kutch, productivity is fluctuating substantially, as large areas are under rain-fed cultivation, and that is the only source for them. In case of cereal crop approx. 35 % areas are under irrigation while for pulses crops only 1.73 % area is under irrigation.
- Furthermore, Cereals and pulses are having average realization lower than Oilseeds and hence farmers prefer to cultivate oilseeds crop on the same land area, than Cereals and Pulses.
- In Oilseed there are draught resistant varieties of Castor and Rapeseed available in Gujarat, which are not affected adversely, even if there is a low rainfall in crop area, hence they are preferred crops for farmers in arid areas.
- At country level India is vegetable oil deficit country and has to heavily depend on imports of vegetable oils, while country is self sufficient in case of cereals production. Since, Kutch is contributing almost 9.62 % of State Oilseeds production and it has potential to enhance this production, the Oilseeds should be included for development.

Potential of Oilseeds

In Gujarat, Kutch is having 9.62 % contribution in total oilseeds production of the state. Amongst Oilseeds, Kutch has significant position in productivity of Ground nut, Castor seed and Rape and Mustard seeds. As regards Sesame, though Kutch is at fifth position in Gujarat it has potential for development. Oilseeds production trend in Kutch has been summarized in following table 1.5.

Table 2.5: Area and Production of Oilseeds Crops in Kutch

A: Area in '00 Hectares, P: Production in'00 MT

Oilseeds	1996-97		1997-98		1998-99		1999-2000		2000-2001	
	A	P	A	P	A	P	A	P	A	P
Groundnut	757	703	1120	1638	920	1416	763	1153	761	1087
Sesame	221	16	278	170	245	110	121	32	252	60
Rapeseed	42	58	62	63	194	269	118	111	32	39
Castor seed	363	233	397	647	436	466	241	225	618	1078
Total Oilseeds	1383	1010	1857	2518	1795	2261	1243	1521	1663	2264
Cotton & Cottonseeds										
Cotton Prod. In Bales	825	757	502	822	480	1190	200	515	443	702
Cottonseeds Prod. in"00 MT		252		274		397		172		234
Oil seeds for Crushing in"00 MT	2208	1262	2359	2792	2275	2658	1443	1693	2106	2498

Source: Directorate of Agriculture, Agriculture crop statistics booklet, for respective years.

As observed from above table, as regards Total oilseeds crops, there is increase in the crop area and production, except for two consecutive years 1998-99 and 1999-2000, when area and production declined as against previous years. This is also the case for Cotton crop and it can be attributed to draught conditions in these years. On an average in Oilseeds crop Kutch is contributing approx. 5 % in terms of area and approx. 5 to 12 % in terms of production quantities.

There can be further development of Oilseeds crop in terms of area and production both, which can be brought at par with the top districts in terms of area and production of these oilseeds, with integrated measures as given in action plan given subsequently.

It may be noted that Kutch is already having oilseeds processing facilities for value added products at Gandhidham, Bhachau, Bhuj and Mundra and all end products will have ready domestic and international markets, as India is a deficit country for vegetable oils. Oil cakes obtained from oilseed processing will find ready market as Cattle-feed (Groundnut, Rapeseed, Sesame and Cottonseed cakes) and as Organic manure (Castor Cake) in Kutch itself.

Potential of Cotton

Gujarat is the leading state in cotton production in India, producing 23.83 lakh bales. Kutch has produced 150,000 Bales of Cotton in the year 1998-1999, which is 6.30 % contribution in the state production. Thus, cotton is an important non-food crop having potential for development in Kutch.

Due to dry climatic condition during cotton harvesting time, Kutch gets very fine quality in terms of whiteness and long staple fibre length, as compared to other major cotton growing districts of Gujarat. Kutch is enjoying better position in terms of superior quality of cotton growing in the district.

Cotton farmers in Kutch are progressive minded and they have also adopted new concept of Organic Cotton cultivation, which is a newer opportunity for Kutch and Gujarat alike. Similarly, Kutch farmers

are also adopting cultivation of BT cotton in many areas and they have produced remarkable success in terms of higher productivity, as compared to other areas in the state.

Both above opportunities have potential for development in Kutch and intensive efforts should be put in this direction, as given in action plan for Kutch in subsequent paragraphs.

It may be noted that, Kutch is having cotton textile processing developed in an unorganized sector. Kutch is also having cottage industries for cotton dying and printing and they have to bring cotton grey from outside the district. Kutch is also having development of embroidered cotton and woollen garment manufacturing in cottage industry sector generating supplementary employment for rural women. Value added processing of cotton in Kutch will provide benefit to this lot as they will get their input materials from Kutch itself.

As regards other value added processing of Cotton, Kutch is lagging behind and most of the cotton from Kutch is going outside the district for value added processing like ginning, pressing, spinning, weaving / knitting, dying and printing. Such value added processing should be encouraged in Kutch.

2.8.1.2 Horticulture Development Potentials

As observed from table 1.3, in the area of horticulture there are three existing crops with development potential in Kutch, viz; a) Mango b) Date Palm and c) Isabgul.

Mango Potentials

Mango is an important fruit crop being cultivated in Kutch. Mango is mainly cultivated in Bhuj, Anjar, Mandvi and Nakhatrana taluka in Kutch. "Kesar" is the main cultivar in these areas. Last 3 years area, production and yield of Mango are summarized in following table:

Table 2.6: Trend of Mango Area, Production and Yield in Kutch

Sr. No.	Crop Year	Area in Ha	Production in MT	Yield MT/ ha
1	1999-2000	1090	10900	10
2	2000-2001	1273	12730	10
3	2001-2002	1444	14400	10

Source: Directorate of Horticulture, Gandhinagar

It is worth noting here that Mango crop area and production are expanding at approx. 15 % per annum growth rate in Kutch. As per reliable sources, more than 50 % area of Mango in Kutch has been developed using modern system of micro irrigation "Drip Irrigation" to optimize the use of water in this water scarcity areas.

As per information available from Kutch, currently major quantity of Mango is sold as fresh fruit and there is no processing done. Looking to the growth of Mango cultivation in Kutch there can be potential of setting up of a Mango Pack House for collection, grading, cleaning, packing and cooling for marketing it in domestic as well as in export market. Kutch has advantage of proximity and easy availability of Refrigerated containers at Kandla port for making export to Gulf countries and Europe, as against other Kesar Mango producing areas like Junagadh and Valsad. There will also be potential for setting up of small / medium scale Mango processing unit in future to manufacture Mango Pulp and other Mango based food products.

Date Palm Potentials

Horticulture department and private agencies are putting efforts for Date Palm development in Kutch, as it is observed that Kutch is having almost 99 % Date Palm area of the state. Last 3 years area, production and yield of Date Palm cultivation in Kutch are summarized in the following table:

Table 2.7: Trend of Date Palm Area, Production and Yield in Kutch

Sr. No.	Crop Year	Area in Ha	Production in MT	Yield MT/ ha
1	1999-2000	8662	51992	6
2	2000-2001	8973	53838	6
3	2001-2002	9841	59046	6

Source: Directorate of Hortialture, Gandhinagar

State government has also focused their efforts in adoption of high tech agriculture for Date Palm farming in the form of development of tissue culture plants for making available disease free quality planting materials for production of improved quality of Date fruits in Kutch. Due to suitable agro-climatic conditions for Date Palm in many areas of Kutch, it is expected to produce results in next 4 to 5 years period.

It will be desirable to make available necessary harvesting and post harvest technology to farmers and also to encourage value added processing of Dates for supply in domestic and international markets. Date Palm is considered a wish tree in Saudi Arabia, Iraq and other Gulf countries. This can be made true in case of Kutch also, as it can provide avenues for employment generation in agriculture sector in Kutch by utilizing various parts of Date Palm tree.

Kutch Date Palm fruiting season is in summer season and at the time of ripening of Date Palm fruits monsoon showers are affecting adversely the fruit quality and ripening process. There is need for developing suitable harvesting and post harvest technology for overcoming this problem.

India is importing average 2.0 Lakh MT dates at present mostly from Gulf countries. Import-Export details for Date are summarized in following table.

Table 2.8: Indian Import and Export of Dates, FAO Trade Statistics

Country	Element	Unit	Years			
			2000	2001	2002	2003
India	Imports - Qty	Mt	192619	244367	171523	193755
India	Imports - Val	1000$	41554	52786	27798	33011
India	Exports - Qty	Mt	5	53	10	89
India	Exports - Val	1000$	7	37	10	62

Source: FAO statistics for India.

As observed from above table, India is importing average 2.0 Lakh MT of Dates from Gulf countries, as against this there is meagre exports of Dates from India. Dates produced from Kutch are marketed as fresh fruit at present. The total import in terms of rupee value was Rs. 186.4 Crores in the year 2000-2001 (Source: Manage, May 2002).

Looking to present import of Dates in India and there is demand for it. Further, considering growth of Date production in Kutch, there is a potential for setting up of a dry dates processing unit of small or

medium size, which can cater domestic and export market demands. This will further boost up Date cultivation in Kutch.

Isabgul Potentials

Isabgul cultivation and processing is mainly concentrated around Unjha and Sidhpur in Mehsana district. However, in recent period due to dry climate in Kutch at flowering and harvesting period, Isabgul cultivation has developed. Area, production and yield per hectare for Isabgul in the last 3 years are summarized in the following table. Details of Isabgul production at state level have also been summarized in the same table to make the comparative information readily available.

Table 2.9 : Trend of Isabgul Area, Production and Yield in Kutch and Gujarat

Sr. No	Crop Year	Kutch			Gujarat		
		Area in Ha	Production in MT	Yield Kg / ha	Area in Ha	Production in MT	Yield Kg / ha
1	1999-2000	6700	4500	672	20000	11760	588
2	2000-2001	6484	6484	1000	14769	20881	1474
3	2001-2002	7128	7128	1000	25220	17922	711

Source: Department of Agriculture statistics, Krishi Bhavan, Gandhinagar

Isabgul produced in Kutch is also being traded in APMCs of these two places. Isabgul is having continuous growing demand both in domestic and export markets. Details regarding export of Isabgul from India are summarized in following table.

Table 2.10: Export of Psyllium Seed (Isabgul) and Husk from India (2000-2001)

Sr. No	Export Item Particulars	Quantity in Kg.	Value in Rs. In Lakhs
1	Psyllium (Isabgul) Seeds	1001451	746.82
2	Psyllium (Isabgul) Husk	1927767	19993.81
3	Total	2929218	20740.63

Source: Agri-watch Monthly-September 2001

Isabgul husk demand is likely to grow further, with introduction of Isabgul containing food products like Ice creams and Biscuits in domestic market. Looking to the growing potential of Isabgul husk in domestic and export markets and incentives available in Kutch for setting up an industrial unit, there is potential for setting up of an Isabgul processing unit for catering to domestic and export market demand.

2.8.1.3 Animal Husbandry Potentials

Animal husbandry is the second largest employment providing activities in Kutch after agriculture. Animal husbandry is a supplementary activity with agriculture as well as it is adopted as sole activity by many castes and communities in Kutch. Animal husbandry is the main source of livelihood for Shepherds and many nomadic tribes in Kutch. Cows and Buffaloes are reared as milch cattle in all talukas of Kutch, mainly by farming communities as a supplementary income source from milk.

Sheep, Goat, Camel, Horse and Donkey are reared mainly by nomadic tribes and shepherds and this lot keeps on moving from one place to another, even outside Kutch regularly. Sheep and Goat are reared for wool and meat purpose, Camel, Horse and Donkey are reared for breeding purpose and selling them as load carrying animals.

Shepherd and nomadic tribes rearing animal in Kutch, are having age old expertise in traditional techniques of animal breeding to produce best quality animals and they supply these animals in other parts of the state. Cows and Bulls from Kutch are preferred for breeding by other districts of Gujarat. In Cow and Bull, "Kankrej" breed and in Buffaloes "Banni" breed are most demanded animals in whole of Gujarat. "Banni" breed name has been given to the breed which originated from the large green pasture (grass lands of "Banni") area in north-eastern part of Kutch. This breed is giving good high milk output and long period, but relatively very delicate animal for rearing in captive condition of animal dairy farm.

In case of Sheep breeding also Kutch is leading in Gujarat. "Patanwadi" and 'Marwari" are two main breeds being reared in Kutch. Live stock population in Kutch as against Gujarat for two livestock census period 1997 and 2003 (P) are summarized in following table.

Table 2.11: Live stock Population summary Kutch Vs Gujarat State

Live stock Population in Kutch in '000					Population in Gujarat in '000		
Sr. No	Live stock type	Population in 1992	Population in 2003 (P)	% Increase / decrease over previous period	Population in 1997	Population in 2003 (P)	% Increase / decrease over previous period
1	Cow & Ox	345	328.3	-5.09	6749	7328	7.90
2	Buffaloes	128	177.1	27.72	6285	6952	9.59
3	Sheep	475	494.1	3.87	2158	2054	-5.06
4	Goat	436	458.1	4.82	4386	4494	2.40
5	Pigs	5	26.8	81.34	199	322	38.20
6	Camels	18	10.5	-71.43	65	53	-22.64
7	Donkey	53	59	10.17	74	66	-12.12
8	Horses	1	1.6	37.50	15	18	16.67
9	Total	1461	1554.6	6.02	20970	22453	6.60
10	Poultry	26	24.8	-4.84	7236	8100	10.67

Source: Bulletin of Animal husbandry / poultry, dairy farming statistics Gujarat state 1997-98 & 2003 (P), Gandhinagar.

"Patanwadi" breed is reared for milk, meat and wool. It is giving coarse wool, which is mainly used for carpet making. "Marwari" breed sheep and "Kutchi" Goat are mainly reared for milk & meat purpose.

As it can be observed from above table, though Sheep population at state level has negative growth rate, in Kutch it has positive growth rate. Similarly for all other animals except Cows Kutch is having positive growth rate in last five years period, despite two years of draught. As regards reported reduction in cattle population in Kutch and its causes, it was found during the discussions with animal husbandry department experts at District level that due to frequent draughts in the district people rearing cow are migrating from Kutch in search of fodder for their animals.

Animal rearing activities is adversely affected from time to time, due to frequent draughts in Kutch. It is expected that after the availability of Narmada water for irrigation there will be positive impact on agriculture and water availability will improve substantially even for animal rearing activities. Milk and milk production will also increase due to round the year availability of fodder for milch cattle, at relatively cheaper rates.

Development of Animal Breeding

Animal breeding and rearing can be further emphasized as important economic activities in Kutch, looking to the age old expertise in animal breeding available with the local population and superior local breeds of animals. Sheep and Goat rearing is being done in Kutch, but there is ban on meat production and processing in Kutch, hence currently these animals are illegally sold outside Kutch and slaughtering is done outside the district for meat / meat processing. As informed by local trade sources, illegal slaughtering of animals and meat production and processing is being done in unhygienic manner as cottage industry in many parts of Kutch. Due to such illegal activities, full economic advantage of animal rearing is not available to animal rearing communities. This is also hampering the development of by products industries in Kutch like meat and bones processing, and leather processing.

Milk and Milk Products Potentials

Milk and milk products production has increased substantially in Kutch in last one decade. Milk production increased from 1.35 Lakh litres /day to more than 2.10 Lakhs litres / day. Gujarat Dairy Development Board was having their milk processing unit in Kutch, which was also manufacturing Cheese. This unit has close down since last few years, due to organizational policy issues.

Other value added milk products, such as milk based sweets and butter, Ghee etc; are also manufactured in Kutch.

At present Kutch is not having very large quantity of milk production and hence milk products manufacturing is also done in limited way in isolated pockets. After the increase in milk production in Kutch, value added milk processing can be done and manufacturing of various milk products can be undertaken as major economic activities. There is potential for a small / medium 40,000 to 50,000 LPD size milk processing unit in Kutch at suitable location like Bhuj / Gandhidham.

2.8.1.4 Fisheries Potentials

Kutch is having nearly 406 Km long coastal line, which is 25.37 % of total 1600 Km coast line of Gujarat. 7 out of 10 talukas in Kutch is having coastal line. Kutch is having two well developed major ports (Kandla and Mundra) for commercial cargo movement. It is also having 4 other developed ports for smaller vessels, fishing boats and country crafts at Narayan Sarovar (Koteshwar), Bhachau, Mandvi and Jakhau

Kutch is having 52 fishing centres for landing and from where fishermen venture into sea for fishing activities. Fisheries activities directly provide employment to approx.3300 persons in Kutch. Total fish production in the year 2000-2001 was 80000 MT, forming 12.10 % of the total fish production from Gujarat.

As per the census made in the year 2002-03, Kutch district was having 1531 fishing boats, out of which 1293 were mechanized vessels, while 238 were non-mechanized vessels. Kutch is having only 5.09 % of total Boats of Gujarat. Fish production for last 5 years period, in Kutch and Gujarat is reviewed in the following table.

Table 2.12: Last 5 Years Marine Fish Production in Kutch and Gujarat

Sr. No	Year	Kutch		Gujarat	
		Marine Fish Production in MT	Value Rs. in Lakhs	Marine fish Production in MT	Value Rs. in Lakhs
1	1998-99	69686	11498	551660	91019
2	1999-00	75030	13108	670951	117239
3	2000-01	64697	12538	620474	120261
4	2001-02	80014	17467	650829	142127
5	2002-03	80714	18419	743638	169682

Source: Gujarat Fisheries Statistics 2002-03, Department of Fisheries, Govt. of Gujarat.

As observed from the above table Marine fish production in Kutch has grown from 69000 MT to 81,000 MT in last 5 years period, and in rupee value term it has grown from Rs.11498 Lakhs to Rs. 18419 Lakhs. Thus, Kutch has significant contribution in Marine fisheries development in Gujarat. Jakhau has been developed as fishing port and fishermen bring their capture at this port. Marine fish landing at Jakhau port has been summarized in the following table.

Table 2.13: Last 5 Years Marine Fish Production in Kutch and Gujarat

Sr. No	Year	Marine Fish Landing at Jakhau Port in MT	% of Total State Marine Fish Production
1	1998-99	51830	9.40
2	1999-00	53930	8.04
3	2000-01	47964	7.73
4	2001-02	56753	8.72
5	2002-03	59000	7.93

Source: Gujarat Fisheries Statistics 2002-03, Department of Fisheries, Govt. of Gujarat.

In terms of Fish varieties also Kutch is offering good potential. Large quantities of "Zhinga" fish captured from Gulf of Kutch are being sent to Mumbai by road transport for further processing by exporters. This "Zhinga" fish is packed in tins and sent to Mumbai, where these are converted in frozen fish for making export. White and Black "Prom prêt", Prawns / Shrimps, cat fish, ribbon fish and Bombay Duck are also captured from Arabian Sea and Gulf of Kutch. There will be need to undertake study regarding type of fishes available from this area, so that suitable processing activities can be initiated.

Even though, Kutch is having significant contribution in Marine fish capturing in Gujarat, there are no major Fish Based industries in Kutch. There are no Ice plants, Cold storage, freezing plant or Frozen product cold storages in Kutch. There is only 1 fish pulverizing industry with 5 TPD capacity and 1 Boat Building yard with 4 Boat building capacity.

Due to lack of fish processing industry in Kutch, almost all the fish captured by Kutch fishermen has to be processed in Junagadh district, at Veraval or Porbandar, and there is substantial losses suffered by fishermen for want of basic infrastructure like Ice plants, cold storages and fish freezing plants for development of fisheries activities in Kutch.

2.8.2 Potential Newer Areas

2.8.2.1 Development of Land and Practice

Additional Cultivable land

Kutch is having very large fallow land, and in many areas it has unutilized virgin land for agriculture activities. There is total 604362 (3, 48,179 + 2, 56,183) hectares fallow land available as Cultivable waste land and Current fallow land, which can be developed further. Due to non-availability of adequate irrigation facilities in these areas agriculture has not developed. After the availability of Narmada water, approximately (37000 + 80000) Hectares of such areas will be developed for agriculture activities as additional areas in Kutch.

Improvement of Saline Land

There is acute problem of land salinity in many coastal areas of Kutch. At present no agriculture crops are cultivated in these areas. Marine Gypsum is available in ample quantity from coastal areas in Kutch. Saline land can be converted into fertile agriculture land using Marine Gypsum and organic matters like Organic manures, green leaves and agriculture / horticulture waste.

Agriculture and Horticulture crops can be cultivated in this saline land using Israel technology and thus additional land can be made available for intensive agriculture activities in Kutch. As per this technique root stock of plants growing in saline land are used for grafting of fruits or vegetables crop plants. Such root stock can survive salinity of water and provides necessary nutrients for growth of the plant which has been grafted on it. Israel has successfully developed several citrus fruit crops like Lime, Orange, Grape fruits etc; using this techniques. There is also possibility of developing Date Palm in land with Salinity.

Use of Micro Irrigation in Kutch

Use of micro irrigation techniques such as drip irrigation and sprinkler system will provide solution for water scarcity in the area. This newly developed agriculture land can be given to unemployed youths free of cost and high yielding agriculture crops including oilseeds crop, fodder crop and cotton can be developed in this land.

2.8.2.2 Organic Farming Potential

Organic cultivation is a newer concept, fast developing in India and also in Gujarat. Since, Kutch is having very little rain-fall, traditionally there is very little use of chemical fertilizers and Chemical pesticides in crop cultivation. Organic farming has been developed successfully in Kutch for many food crops (Wheat, Pulses, vegetables, Sesame, Cumin etc;) as well as in non-food crop like Cotton.

Kutch is having natural advantage and necessary resources for development of Organic farming on large scale. Such organic produce will also fetch minimum 10 to 15 % higher prices than conventional produce, once they are marketed as identifiable (Certified by international agencies) organic produce. Such organic cultivation for varied crops like cereals, Pulses, Oilseeds, fruits, vegetables, spices and medicinal plants and can be adopted in Kutch.

2.8.2.3 Potential of New Horticulture Crops

In the area of horticulture there is scope of developing arid-semiarid area crops in many areas of Kutch. Aonla, Ber, Bael, Pomegranate and Custard Apple etc; can be developed as fruit plantations in arid and semi-arid areas of Kutch as new horticulture crops.

In the medicinal plants category, Kutch has potential for development of Aloe Vera, Senna, and Henna apart from Isabgul which already exists in Kutch.

Aloe Vera

Agro-climatic conditions of Kutch are most suitable for Aloe Vera. Aloe Vera is finding multiple applications as cosmetics ingredient for skin and hair preparations, for burns treatment medicines, for herbal uses and as health food supplement for Cancer patients. Aloe Vera demand is limited at present but it is growing steadily in domestic as well as in international markets

(Specially in USA, Canada, Europe and CIS countries). Kutch can also have organic cultivation of Aloe Vera, which is very less all over the country. Water demand for Aloe Vera cultivation is very less and hence it can be developed even in water scarcity areas of Kutch also. Thus, Aloe Vera development can be adopted as newer activities under horticulture development in Kutch. Aloe Vera cultivation with value added processing industry for Aloe Vera, in small way has already been develop by one NGO in Kutch.

Senna

Senna is another herbal crop, growing mainly in arid area and it is growing naturally in many pockets in Kutch. Senna leaves are used as herbal laxatives alone or blended with other laxatives like Isabgul. Looking to the market potential in domestic and international markets and the suitability of agro-climatic conditions of Kutch, it is recommended as newer crop in water scarcity talukas of Kutch. In fact Senna cultivation on commercial scale has already started in Kutch district. Senna leaves processing is already being done at Gandhidham, especially to cater export demand. Like Isabgul, value added processing of Senna can be done in Kutch area, provided Senna leaves collection net-work is developed.

Henna

Traditionally, Marwar region in Rajasthan is cultivating Henna on commercial scale in India. The agro-climatic conditions of Henna cultivating areas in Rajasthan (Jodhpur, Barmer and Pali districts), is identical with agro-climatic conditions of Kutch area. It is therefore suggested to develop Henna as commercial crop in water scarcity areas of Kutch and also to develop value added processing of Henna like it has been developed in Rajasthan. Henna based cosmetics products are marketed in domestic as well as international markets. Henna can be used for hedge for farms, where they work as wind breaking plants and thus it can also provide protection against spread of desert area in Kutch.

Jatropha

Jatropha is a minor oilseeds crop, growing in variety of climatic conditions. Jatropha is being viewed as source of Green (renewable) Fuel, as oil obtained from Jatropha seeds can be converted into “Bio-diesel” with chemical conversion process. Kutch is having vast fallow land 604362 hectares (Cultivable waste land 348179 and current fallow land 256183 ha) where due to non-availability of water for

irrigation no agriculture activities are being done. In such fallow land, with proper measures of water harvesting and also arranging minimum water for irrigation Jatropha plantation can be developed. This way it can contribute in getting Green Fuel for Kutch area.

Some initiatives have already started in Kutch in the form of developing Jatropha plantation on trial basis, and results are encouraging. Importance of Jatropha as source for Green fuel has also been emphasized by our Honourable President of India, Dr. A.P.J. Abdul Kalam, as one of the five most important opportunities for India, as anticipated by him after visiting leading research laboratories and interacting with the scientist there. Thus, Jatropha development in Kutch is in line with the national priority for developing Green fuel source.

After development of sufficient size of plantation, necessary processing industry for manufacturing "Bio-diesel" can be set up. It will take minimum 3 to 5 years before Jatropha plant can start giving full production and economical yield. Since, the Jatropha plant is having commercial life of 20 to 30 years, after the mature plantations are developed in sufficient size for making continuous supply for a economical size processing unit for extracting Jatropha oil, it can run as Green Fuel supplying system for the area. The cake which will be produced as by product can find market as organic manure in Kutch.

2.8.2.4 Potential New Areas in Animal Husbandry

Milk and Milk Processing

As indicated earlier, Kutch is having limited milk production at present. However, still there is potential for development of milk and milk based products in Kutch. Milk production will develop with the development of animal breeding activities in Kutch. There is potential for development of mini dairy for milk processing with 40 to 50 KL milk processing, for manufacturing liquid milk and other milk products.

Meat Processing

There is scope for meat production and meat processing in Kutch, but after careful examining of the socio-cultural aspects and impact of such industry, recommendation can be made for setting up of such unit with modern processing technology. Leather processing industry can also be developed in Kutch as it will be important co-product of meat production activities. Such project may be set up as export oriented activities near the port, so that finished products can be exported to Gulf countries.

2.8.2.5 Potential New Areas in Marine and Fisheries Development

Shrimp Farming

Due to very long coastline availability and where shallow shelf is extended in the sea, there is possibility of development of shrimp farming. Due to lack of adequate infrastructure for fisheries industry such shrimp farming have not developed. There is also major constraint in development of shrimp farms in Gujarat in general and Kutch in particular as there are no Fish seed hatcheries in Gujarat. Currently Fish seed is brought from Andhra Pradesh and Orissa by air hence cost is prohibitive for common entrepreneurs. Shrimp farming will provide alternate employment for Fishermen and women, when they can not go in sea for Marine fish capture.

There is scope for development of fish processing around port area in Kutch, like it has developed around Porbandar and Veraval in Saurashtra region. Jakhau can be ideal location looking to the current fish landing quantities available at this port. Fish oil extraction can also be developed if suitable variety of fish is available from Kutch coastal areas.

Organic waste available from fish processing can be used for manufacture of organic manure and Fish-feed manufacturing by blending it with other organic ingredients already available in Kutch area.

2.8.3 Harnessing Agricultural Potential in Kutch, Action Plan

2.8.3.1 Action Plan for Agriculture Development

Oilseeds

Integrated efforts should be put in improving the productivity of Oilseeds crops in Kutch to exploit the development potential of Kutch. The average contribution of Kutch is 7.5 % in Gujarat crop which can be further increased to 10 % level by such intensive actions. These efforts should be from agriculture extension agencies and in the form of following actions:

- Make available irrigation facilities on priority basis, to these crops.
- There will be need of introducing improved hybrid seeds, improved agronomy practices to increase Oilseeds productivity in the district.
- Give intensive training to Kutch farmers in these crops cultivation.
- By creating value added processing for Oilseeds in Kutch it will provide market for local Oilseed growers, hence this should be done by providing incentives like power subsidy and tax concessions.

Cotton

Kutch is having average 80,000 Bales production in the district, which keeps on fluctuating between 50,000 to 1,20,000 bales, depending upon the monsoon condition. Thus, on an average Kutch is having approx.3.5 % share in total cotton production in Gujarat. This can be raised to average 6 % level by an integrated crop specific action plan for Kutch: This will include following:

- Ensure availability of necessary farm inputs like hybrid seeds, drip irrigation facilities and training to farm ers in improved agronomy practices as per need of Kutch.
- Setting up of value added processing industries like ginning , pressing and cottonseed crushing units in cotton growing areas of Kutch

Organic Cotton Cultivation

Looking to agro climatic conditions of Kutch organic cotton cultivation is having advantage as against conventional cotton cultivation using chemical fertilizers and chemical pesticides. Currently Kutch is having about 1000 hectares under such cultivation, which is forming 2 % of district crop area, which should be increased to 10 % of the district area with following actions:

- Bring awareness about the advantages of Organic cultivation in farmers like soil and water quality improvement, farm worker health improvement etc,
- Provide incentives t o farmers in terms of premium for organic cotton as against conventional cotton.

- Help farmers to get their land approved by international certification agencies for organic cultivation and subsidize the expenses involved in these procedures.

Organic Cereals (New Opportunity)

Kutch is having cultivation of cereals in 112600 ha area at present. Looking to the fast growing demand of various organic produce within and outside the country, it is suggested to explore the possibilities of cultivating Organic Cereals by bringing at least 5 % of crop area under organic cultivation. This can be done by following actions;

- Bring awareness about the advantages of Organic cultivation in farmers like soil and water quality improvement, farm worker health improvement, etc.
- Creating organic villages (like it has been done in every development block in Madhya Pradesh) in Kutch where all crops will be cultivated as Organic crop.
- Provide incentives to farmers in terms of premium for organic Cereals as against conventional crop to compensate any production loss occurring initially during the change over.
- Provide them necessary marketing support to market their produce at premium price in domestic and export markets.
- Help farmers to get their land approved by international certification agencies for organic cultivation and subsidize the expenses involved in these procedures.

2.8.3.2 Actions for Horticulture Development

As discussed earlier Mango, Date Palm, Isabgul and Senna are important crops of Kutch. Action plan for development of each these existing crops is given here below:

Mango

Kutch is having average area expansion at 10 % rate in last 3 years period, which can be enhanced to 15 % increase, with following interventions;

- Provide necessary inputs like quality planting materials and training in improved agronomy practices for Mango cultivation.
- Provide incentives for using high-tech agriculture practices like drip-irrigation in increasing the productivity of crop.
- Encourage contract farming to give assure returns for cultivators.

Date Palm

Kutch is covering almost 99% of the state Date palm cultivating area, and producing 53838 MT Dates. India is importing average about 2.0 Lakhs MT dates per year, with approx. Rs. 125 Crores value. Kutch can be developed as a major dates supplying district in the country, by following actions:

- Target to increase present 20 % level production to 30 to 40 % level.
- Ensure availability of necessary farm inputs, training and post harvest technology comparable with international standards in Kutch.
- Create Value added processing, which will help cultivators to get remunerative prices of their produce.
- Provide incentives to growers on quantity basis for production, as producing import substitute crop

Isabgul

Kutch is having Isabgul cultivation in about 5300 ha and producing 3700 MT Isabgul, this is contributing approx. 38 % of state Isabgul production. Isabgul is export oriented crop, making Rs.20740.63 Lakhs export to overseas countries.

Looking to the dry climatic conditions in Kutch, which is favourable for Isabgul cultivation, this crop production can be enhanced to 50 % level by following actions:

- Encourage area expansion and productivity improvement by providing incentives to growers as Export oriented product crop.
- Create Value added processing of Isabgul, which will give local market and remunerative prices to farmers.

Senna

Kutch is having approx.7000 hectares land under Senna and producing approx.12, 600 MT of Senna leaves & pods. This is contributing 35 % of the India's crop. Looking to the favourable agro-climatic conditions of Kutch for Senna cultivation and availability of large fallow land, Kutch share in Senna cultivation can be increased to 50 % of the countries' present crop area of 21000 hectares or say up to 10,000 hectare crop area, by following action plan:

- Ensure availability of necessary farm inputs & Post harvest technology training to cultivators
- Create Value added processing, which will give remunerative prices to farmers
- Providing incentives to growers as Export oriented product crop

New Horticulture Crops

There is potential for development of new horticulture crops, which are suitable for Kutch agro-climatic conditions and has in general potential for development. These crops are Aloe Vera, Henna, Jojoba and Jatropha. Development of these crops can be done by tanking following actions:

- Provide training to youths from rural areas for cultivation of these crops and introduce cultivation of these crops under Employment Guarantee Scheme (EGS), like it has been done for horticulture development in Maharashtra.
- Provide necessary inputs like quality planting materials & training in agronomy practices to farmers
- Assured Buy back or contract farming will increase the cultivation area immediately.
- Create Value added processing, which will give remunerative prices to farmers.
- Looking to the horticulture potential of Kutch for existing and new crops, setting up of horticulture development cell at district level and making focused efforts with the external funding agencies like NABARD or NCDC or under National Horticulture Board schemes will help in enhancing the development.

2.8.3.3 Actions for Animal Husbandry Development

As mentioned earlier, animal husbandry is the second largest employment providing activities in Kutch after agriculture. Due to frequent draughts in Kutch its growth has been stunted, and even reported negative in some species of animals, between last two live stock censuses in Kutch. However, Kutch has potential for reviving its position and further develops this as economic opportunity for the district. There will be need of following actions for doing this:

- Study the Livestock rearing and trade system of Kutch and find out reasons of negative growth in some species like Cow & Ox.
- Study the Livestock rearing and trade system of Kutch and find out factors of positive growth in some species like Buffaloes, Sheep and Goat rearing, despite adverse situation in the district.
- Integrate modern science of Animal breeding, with age old experience of local caste and tribes who are rearing animals in Kutch since centuries.
- Ensure vital inputs for animal husbandry development, water & grass land management and animal health care in Kutch.
- Create Value added processing of Milk, Wool and Mohair which will give remunerative prices of their end produce, to animal rearing communities in Kutch.
- Like Employment Guarantee Scheme (EGS) mentioned for horticulture development, similar scheme can be formulated for Animal Husbandry development for rural youths, specifically from castes and tribes who are associated with animal rearing in Kutch and they can be provided financial and technological support for encouraging development of animal husbandry sector in Kutch.

2.8.3.4 Actions for Marine Fisheries Development In Kutch

Kutch is having longest coastline in Gujarat, 406 Km almost 25 % of the total 1600 Km coastline of Gujarat. Kutch is producing approx. 80,000 MT of Marine fish and contributing approx. 12.6 % of the state Marine Fish production. There will be need for developing necessary support infrastructure for such fish processing industry, like Ice plants, Cold storages, Fish net making plants and ensuring availability of power for fish processing units and refrigeration plants..

Looking to these facts, Kutch has further potential for development, for which following actions are required:

- Provide necessary basic Fisheries infrastructure like Ice plants, cold storages, Fish net manufacturing units, Fish Boat building and repair yards etc;
- Development of support infrastructure for fisheries development is suggested as immediate action and as potential projects in the area.
- There is no Fish seed hatchery in Kutch and Gujarat, and Shrimp farms in the state has to bring fish seedlings by air transport from other states like Orissa, Tamil Nadu, Kerala and Andhra Pradesh. There is an urgent need to set up 1 or 2 hatchery farms, for encouraging Shrimp farm development in the Kutch.
- Areas for Shrimp farm development in Kutch has been identified by Fisheries department, and local & outside entrepreneurs should be encouraged for such projects by providing suitable incentives for such activities.
- Provide necessary technical, financial and marketing support to fishermen communities for development of value added fish processing in Kutch, like frozen fish manufacturing, Fish powder, Dried and salted Fish production, Fish oil and fish meal producing units.
- Develop Jakhau, as Fish processing industry centre and develop basic infrastructure for fisheries development at this location, as it is having approx. 7.9 % of state Marine fish production landing. at this port.

2.8.4 Expected Socio-Economic Impact of Agriculture and Other Primary Sector Development In Kutch

2.8.4.1 Agriculture Sector

Oilseeds and Cotton Development (Existing crops)

- This will increase vegetable oil production in the state, and help in reducing imports
- This will give remunerative prices to Oilseeds and Cotton cultivators in the district
- Value added processing will give additional revenue to state in the form of taxes.

Organic cultivation of Cotton and Cereals (New crops)

- This will improve soil and surface water quality in the area
- This will improve health of Farmers, farm workers and their families as they will not be affected by adverse effects of chemical pesticides.
- This will improve economic conditions of farmers as they will get better, remunerative prices and save on cost of pesticides.
- This will earn foreign exchange for the country as there is good export potential for organic crops in international markets.

2.8.4.2 Horticulture Sector

Mango, Date Palm, Isabgul and Senna (Existing crops)

- This will provide alternate sources of income for farmers in the district
- This will open up new employment opportunities in rural areas for youths.
- This will open up new opportunities in food processing sector, as value added processing will be undertaken.
- Dates will save valuable foreign exchange by producing import substitute products.
- Mango, Isabgul and Senna will earn valuable foreign exchange by export of value added products to overseas countries.

Aloe Vera, Henna, Jojoba and Jatropha (New Crops)

Development above mentioned new horticulture crops in Kutch will have following socio-economic impact in the district:

- This will provide alternate sources of income for farmers in the district
- This will open up new employment opportunities in rural areas for youths.
- Aloe Vera, Henna and Jojoba will open up new opportunities in medicinal herbs and cosmetics ingredient processing sector, as value added processing will be undertaken.
- Jatropha will provide alternate income to farmers and open up new opportunity in rural areas of Kutch.
- Jatropha will provide employment generation by value added processing.
- Jatropha will provide raw -material for Green Fuel “Bio-diesel” and thus generate renewable sources of energy.
- Jatropha will help in reducing pollution in the region due to less utilization of fossil fuels.

2.8.4.3 Animal Husbandry Sector

Cows and Buffaloes Rearing

- This will provide survival opportunities to castes, tribes and families associated with this activities and help them to revive their activities in more stable manner

- Animal Breeding activities will provide quality live stock to farming communities, and in turn will improve their income from milk production and animal rearing.

Sheep and Goat Rearing

- This will provide survival opportunities to castes, tribes and families associated with this activities and help them to revive their activities in more stable manner
- This will provide organic manure for development of organic farming in the district.
- Wool based industry will give remunerative prices to Sheep rearing folks.
- This will provide additional income from Goat milk and Mohair based industry will provide additional income to Goat rearing community.
- Wool processing will generate employment opportunity in rural areas by producing value added woollen products like carpets, blankets and shawls.
- This will make available live stock for development of meat and meat based processing industry in Kutch and in Gujarat.
- This will generate export oriented business of live stock trading and meat and meat products manufacturing in Kutch or in Gujarat.

2.8.4.4 Marine Fisheries Sector

- This will create basic infrastructure for development of Marine fisheries in Kutch for which there is good potential for development.
- Provide stable employment for coastal area people (Fishermen communities) who are not having other income sources like agriculture or animal husbandry.
- This will help in development of new activities like Shrimp farming in Kutch an attract investment from other states / areas.
- Shrimp farm development will provide alternate means of employment for fishermen and women, who can not go to sea for fishing.
- This will help in earning valuable foreign exchange by export of fish and fish products and there by help in generating employment in rural and backward areas of the state.

Table 2.14: SUMMARY OF AGRICULTURE AND OTHER PRIMARY SECTOR DEVELOPMENT POTENTIAL IN KUTCH

Sr. No	Sector & Component Particulars	Current Status in Kutch	Development Potential Estimates
A	Agriculture		
	Existing crops Potential		% of Gujarat
1	Oilseeds	A: 166300 Ha P: 226400 MT	Average 7.50 % can be raised up to 10 %
2	Cotton	A: 44300 Ha P: 70200 Bales	Average 3.50 % can be raised up to 6 %
	New Crops		
3	Organic Cotton	A: 944 Ha P: 600 MT	About 2 % of Kutch can be raised up to 10 % in terms of area.
4	Total Cereals current situ. Organic Cereal New Opportunity	A:112600 Ha P:117900 MT	N.A , but can be covered up to 5 % looking to its domestic & export demand
B	Horticulture		

Sr. No	Sector & Component Particulars	Current Status in Kutch	Development Potential Estimates
	Existing crops		
3	Mango	A: 1273 Ha P: 12730 MT	Increasing at about 10 % rate, can be up graded to 15 % growth rate
4	Date Palm	A: 8973 Ha P: 53838 MT	Producing about 20 % of India's import of Dates, can be increased to 30-40 % level
5	Isabgul	A: 5300 Ha P: 3700 MT	Producing about 38 % of State crop, can be increased up to 50 %, with integrated action plan & incentives
6	Senna	A: 7000 Ha P: 12600 MT of Leaves and pods	Producing about 35 % of countries' crop, can be increased up to 50 %, with integrated action plan & incentives
	New Crops		
7	Aloe Vera	Not Available	About 100 hectares under cultivation can be raised up to 1000 hectares
8	Henna	Not Available	About 50 to 100 Hectares in sporadic manner can be increased to 500 hectares
9	Jatropha	Not Available	About 50 Ha on trial basis. Looking to fallow land availability and importance as Green fuel crop can be raised up to 1000 hectares
10	Jojoba	Not Available	Cultivated on trial basis in about 50 Acres, has potential up to 500 hectares as it is having proven market of Cosmetics industry
C	Animal Husbandry		
d.	Animal Breeding farm		Current Growth Rate in %
e.	Cow & Ox	3,28,300 No.s	-5.09 can be changed to positive growth rate of 3 to 4 % by integrated measures
f.	Buffaloes	1,77,100 No.s	27.72 % is good growth rate but animal breeding for quality animal production should be encouraged
g.	Sheep	4,94,100 No.s	3.87 can be enhanced to growth rate of 5 to 6 % by integrated measures
h.	Goat	4,58,100 No.s	4.82
11	Milk Production Per year	P: 2,27,880 MT	Can be increased by 10 to 15 %
12	Wool Production	P: 8,94,000 Kg	Can be increased by 15 to 20 %
13	Meat and Meat processing	NIL There is no slaughter house in Kutch at present and no slaughtering of animals permitted at present.	Details on industry growth rate not Available as activity is banned at present
D	Marine Fisheries		
	Marine Fish Production	P: 80,000 MT V: Rs. 184.20 Crores in Kutch	Kutch is having 12.6 % share in state production. Increase in production at 3.5 % CAGR can be increased to 5 % CAGR

Sr. No	Sector & Component Particulars	Current Status in Kutch	Development Potential Estimates
e.	Fisheries Infrastructure like Ice plants, Cold storages	NIL	3 to 5 necessary near to main fish landing points like Jakhau, Kandla, Mundra etc; places
f.	Fish seed farm (Hatchery)	NIL	1 or 2 necessary for Shrimp farming development in Kutch
14	Shrimp Farming	NIL	5 to 10 Shrimp farms of small to medium size can come up in Kutch
15	Fish Processing	NIL	Looking to present status of Marine fisheries in Kutch at least 5 to 10 units can come up near to main fish landing ports and value added processing can be started.
16	Fish Oil & Fish Powder	1 unit of Fish powder with 5TPD capacity	Looking to present status of Marine fisheries in Kutch at least 5 to 10 units can come up near to main fish landing ports and value added processing can be started.

2.8.5 Agro and Allied Sector based Industries Prospects in Kutch

2.8.5.1 Potential Agro-industrial Projects

As discussed earlier, Kutch has significant contribution (9.62 % in the year 1999-2000) in Oilseeds production of the state. Groundnut, Rapeseed, Sesame and Castor seed are main oilseeds cultivated in Kutch. Out of these oilseeds, some quantities of Castor seed is processed in Kutch, at Kandla- KFTZ and Bhachau. However, since, Castor oil export in bulk is mainly done from Kandla port, there is potential for setting export oriented Castor seed processing unit in Kutch.

In non-food crop Cotton is an important crop in Kutch, and there is average production of 80,000 Bales in Kutch. Cottonseed, the main by-product of cotton ginning is cottonseed which is also processed for obtaining washed cottonseed oil, a raw-material for refined cottonseed oil. Thus, there is potential for development of oilseeds processing industry in Kutch, for manufacturing both edible and non-edible vegetable oils, and oil cakes will be by-product from such processing. These oil-cakes will be processed in Solvent extraction plants to get more oil and de-oil cakes. De-oil cake of Groundnut, Rapeseed, and Sesame are finding market as Cattle-feed ingredient in domestic and export markets. Export of de-oilcakes is largely done through Kandla port. Details of potential of Agro-based small and medium scale industrial projects in Kutch are given in following table.

Table 2.15: Small and Medium Scale Value-added Agro-based Projects

Sr No	Agro Based Raw material	Project	Capacity Per annum	Unit	Estimated Investment Rs in Lakhs	Potential for No. of Projects in Kutch
1	Oilseeds , Cotton and Castor seed processing	Cotton Ginning & pressing	50000	Bales of 170 kg	50.00	1 units
2		Cottonseed crushing Oil mill & Refinery	15000	MT	100.00	1 unit
3		Multi-seed Oil mill & solvent extraction unit	60,000	MT	350.0	1 unit

4	Castor seed Oil mill, solvent extraction and refinery	30,000	MT	400.0	1 unit
5	De-oil Cake based Cattle feed industry	30,000	MT	250.0	1 unit
6	Castor De-oil cake based Organic Manure unit	15000 MT	MT	50.0	1 unit

Source: Potential derived based on Agriculture & Horticulture statistics of Kutch

As observed from above table 6 type of projects are suggested with total 6 units in Agro based-processing, with total investment outlay of Rs.1200 Lakhs.

India is exporting more than 4 million tones of various de-oilcakes and Bedi-Jamnagar was major port. However, in recent years, Kandla and Mundra has come up as largest port in break-bulk cargo handling and now there de-oil cakes are being exported from these ports.

2.8.5.2 Horticulture

Horticulture is another important sector for development in Kutch. Mango, Dates Palm, Isabgul and Senna are main produce in Kutch. Agro processed industry for value added processing of these resources are suggested in following table.

Table 2.16: Agro processed industry for value added processing

Sr No	Horticulture produce based	Project	Capacity/Annum	Unit	Estimated Investment Rs in .Lakhs	Potential for No. of Projects in Kutch
7	Dates, Isabgul, Senna, Mango	Dates Processing	20,000	MT	250	2
8		Isabgul Processing	3000	MT	90.0	2
9		Senna Processing	3000	MT	60.0	3
10		Mango Pack house	6000	MT	50.0	1

Source: Potential derived based on Agriculture & Horticulture statistics of Kutch

In horticulture based project total 4 types of projects are suggested, and considering 8 units for investment, total investment envisaged is for Rs.910 Lakhs.

2.8.5.3 Potential of Port Based Large size Agro Process Industries

Kutch is having two important bulk cargo handling ports, Kandla and Mundra. These ports are also handling food grains for export like Rice and Wheat. Similarly, these ports are also importing agro based materials like vegetable oils, Soybean, Gram and other pulses. Looking to these activities there is potential for development of large size agro based processing projects in Kutch.

India is importing about 4.0 million tones of vegetable oils for meeting demand and supply gap in domestic market. Out of this about 3 million tones of vegetable oils are imported through bulk cargo handling ports located in Kutch, viz; Kandla and Mundra. Similarly, India is also importing 3 to 5 million tones of pulses, depending upon the domestic production of pulses, through Kandla and Mundra ports. Looking to these activities there is potential for setting up of Vegetable oil refineries, Pulse & Besan mill near to port areas for catering to domestic market and also re-export after value added processing to third world countries.

India is exporting cereals like Rice and Wheat through Kandla Port. India is also exporting Sugar from Kandla Port. There is potential for export oriented Wheat Flour mill project near to major port area. Similarly, a unit for bulk cleaning, handling and storage of food grain, with mechanized grain handling facilities for loading and unloading of food grain, also has potential near to bulk cargo port like Kandla.

Table 2.17: Details of potential of such port based projects are summarized in following table.

Sr No	Port Based Agro - process industries	Project	Capacity/Annum	Unit	Estimated Investment Rs in .Lakhs	Potential Projects no. s in Kutch
11	Import of Vegetable oils, Pulses, Soybean Export of Wheat	Pulse Mill	30,000	MT	350	2
12		Vegetable Oil Refinery	90,000	MT	800	2
13		Besan Mill	6000	MT	300	2
14		Wheat Flour mill	9000	MT	500	2
15		Bulk Grain cleaning & Handling, incl. Bulk Storage for Export	150,000	MT	1000	2

Source: Estimate based on Import-Export statistics of Kandla Port cargo movement.

In large size port based units, 4 types of projects are suggested with total no. of units proposed are 11, with estimated total investment outlay of Rs.5900 Lakhs.

2.8.5.4 Livestock Products Based Industries Potential

Animal husbandry is second most important primary sector in Kutch. Cow, Buffaloes, Sheep and Goat are mainly reared in Kutch. In livestock based products Kutch is having Milk, Wool and Mohair as main products. Apart from these products, live stock is also exported to Gulf countries through Kandla port. Details for livestock product based processing units potential is given in following table:

Table 2.18: Details for Livestock Product Based Processing Units Potential

Sr No	Live Stock Based Raw material	Project	Capacity per Annum	Unit	Estimated Investment Rs in .Lakhs	Potential for No. of Projects in Kutch
16	Milk, Wool & Mohair processing and Organic Manure	Mini Milk Dairy	12500	KL	250	2
17		Wool & Mohair Processing	4000	Kg	40.0	2
18		Organic Manure unit	6000	MT	40.0	3
19						

Source: Potential derived based on Bulletin of Animal Husbandry & Dairying Statistics 2003-04, published by Directorate of Animal husbandry, Gujarat State, Gandhinagar

In live stock based projects, total 4 types of projects are suggested, and total no. of units suggested is 7, with investment estimates of Rs.700 Lakhs.

2.8.5.5 Marine Fisheries Related Industries Potential

Kutch is having 406 Km long coastal line, longest in Gujarat. Kutch is having significant contribution in Marine fisheries activities of Gujarat State. There is an urgent need for developing basic infrastructure for fisheries industry like Ice Plants, cold storages, Fish freezing units and Fish Boat repairs & maintenance dry dock etc;. Kutch is currently having Marine fish production of approx. 80,000 MT (12.6 %) of total Gujarat Marine fish production and valued approx. Rs.184.0 Crores. Jakhau is the

main fish landing port, where almost 8 % of the state Marine fish production fish are landed, apart from this there are 52 fish landing points identified in Kutch, by fisheries department, where fisher men bring their captured fish.

However, for want of basic infrastructure for fisheries development in Kutch district, almost total captured fish are sent to Jamnagar and Junagadh districts for further value added processing. Some special varieties are also sent to Mumbai by road. In this process there is loss due to deterioration in quality, for want of proper handling and storage infrastructure for Marine fisheries. Thus, there is potential for Marine fisheries related industrial units in Kutch. Details of such potential projects are summarized in following table:

Table 2.19: Potential of Marine Fisheries Based Industries

Sr No	Marine Fisheries Related Industries	Project	Capacity per Annum	Unit	Estimated Investment Rs in .Lakhs	Potential for No. of Projects in Kutch
20	Fish seed Hatchery	Fish seed Hatchery	1 million	No.	300	2
21	Shrimp Farm	Shrimp Farm	6000	MT	400	3
22	Fisheries Infrastructure projects like Ice plant, Cold Storage, Freezing unit and Fish boat repairs dock Fish processing Industry	Ice Plant	6000	MT	90	4
23		Cold Storage	3000 Storage	MT	250	6
24		Freezing units	9000	MT	300	4
25		Fish Boat Building & repair yard	300 Boats repairs & maintenance	No.s	200	2
26		Fish Oil extraction & Fish meal	6000	MT	150	2

Source: Potential derived based on Gujarat Fisheries Statistics, 2002-03, Commissioner of Fisheries Gujarat State, Govt. of Gujarat, Gandhinagar.

In Marine fisheries related projects, 6 types of projects have been suggested, with total number of units envisaged are 23 and estimated investment outlay will be Rs. 5560 Lakhs. Investment for this sector can be attracted from other states of India or from NRG entrepreneurs from overseas, in the form of joint venture projects or as buy-back arrangement basis.

Agriculture (incl. Horticulture), Animal Husbandry and Marine Fisheries are three prime sectors making main contribution in Kutch economy. In this section we have discussed details of potential for development of industries, based on produce from these three sectors. Moreover, Kutch is having two major Bulk Cargo handling ports of India, Kandla and Mundra. Large agro-processing projects are proposed considering the type of cargo being handled at these ports. Estimate for Agriculture and other primary sector based industrial project is summarized sector wise in following table.

Table 2.20: Estimates for Agriculture and Other Primary Based Industrial Projects

Sr. No.	Sector	No of Type of projects	Total no. of units	Estimated Total Project out lay Rs. In Lakhs
1	Agriculture	6	6	1200
2	Horticulture	4	8	910
3	Port Based units	4	11	5900
4	Livestock based Products	4	7	700

5	Marine fisheries related units	6	23	5560
6	Total	24	55	14270

As observed from above table there are 24 different types of projects in small, medium and large size are suggested for investment in these 3 sectors. Total numbers of projects suggested are 55 with Rs.14, 270 Lakhs of envisaged investment.

3. Industrial Potential

The industrial potential analysis has been carried out according to the following sub-sectors organised in the following manner:

Sr. No.	Sub-sectors
1	Local Resource Based Industry
2	Linkages and Incentive Driven Industry
3	Mega-projects

3.1 Local Resource Based Industries

Three types of local resource based industries are analysed here. There are: salt and salt based industries, minerals and mining based industries and handicraft.

The local resource based industries are divided into three basic categories:

Sr. No.	Local Resource Based Industry Types
1	Salt and Salt Based Industry
2	Mineral Based Industry
3	Handicraft and Handloom

3.1.1 Salt and Salt Based Industry

3.1.1.1 Global Salt Industry

The annual world production of salt has been estimated currently at 225 million tons. The major salt producing countries with their approximate production figures have been enlisted in the table below:

Table 3.1: Major Salt Producing Countries (Figures in '000 Tonnes)

Salt Producing Regions	Year	
	2001	2002
United States	44800	43900
Australia	9500	10000
Brazil	6000	7000
Canada	12500	13000
China	31000	35000
France	7000	7100
Germany	15700	15700
India	14500	14800
Italy	3600	3600
Mexico	8900	8700
Poland	4200	4300
Russia	2800	3000
Spain	3200	3200
Ukraine	2300	2400
United Kingdom	5800	5800
Other countries	53200	48000

World Total	227001	227502

Source: Salt Institute

Approximately one-third of total production is by solar evaporation of sea water or inland brines (solar salt); another third is produced mining rock salt deposits, both underground and on the surface (rock salt); and the balance is gathered as brines, mainly by solution mining. Brines can be used directly or thermally evaporated to produce vacuum salt.

Figure-1 Salt Production by Type

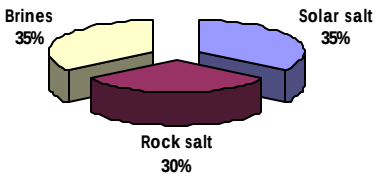
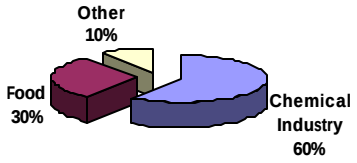


Figure-2 Salt End-use Consumption Pattern



Salt production in Asia, Gulf and Middle East is mainly by evaporation and desalination process. While in Europe, USA and Canada, Salt is produced by several routes like mining of rock salt, solution mining and mechanical evaporation of brines.

The purity of washed solar salt can reach 99 to 99.5 per cent (NaCl, dry bases) in India and China, and 99.7 per cent in Australia and Mexico. The purity of processed rock salt fluctuates between 97 and 99 per cent plus in the USA and Europe. Vacuum salt is usually between 99.8 and 99.95 per cent pure.

The chemical industry is the largest consumer of salt using about 60% of total production. The industry predominantly converts the salt into chlorine, caustic and soda ash, without which petroleum refining, petro-chemistry, organic synthesis, glass production and so on would not be possible.

The second largest user of salt is humankind. Humans need about 30% of total salt production to support their physiological functions and eating habits. Salt for food is the most 'taken for granted' commodity; available from thousands of sources in hundreds of qualities as table, cooking and industrial salt for food production.

About 10% of salt production is used for road de-icing, water treatment, production of cooling brines and other smaller applications.

Growth rates are not expected to increase in the coming five years and hence output should reach around 244Mt in 2009. End use patterns are very similar among developed nations, where the chemical industry is dominant, while in lesser-developed countries food and agriculture tend to be more important applications. The two main salt consuming regions are Southeast Asia and North America. While the economic downturn of 2001 and 2002 has restricted growth in demand in many regions, demand for downstream products in Southeast Asia, in particular PVC has shown relatively strong growth and consequently salt demand here has grown at a rate faster than the world average.

Salt consumption in food has risen by 1.4 percent per annum in the past 28 years and will continue to rise in line with world population growth, with proportionately more being consumed in developing countries.

The fact that salt is a bulky, low value commodity, which tends to be consumed near to where it is produced means that only 18% of world production (approximately 32 million tones) was traded internationally in 2003.

Mexico and Australia accounted for 41% of all salt traded in 2003; the main destinations for exports from these two producers are Japan, and other countries in East and Southeast Asia.

There are four principle end uses for salt. The manufacture of chlorine and caustic soda in the chlor-alkali industry, which is driven mainly by the demand for chlorine in PVC production, accounts for 37% of the market total, while use in the manufacture of synthetic soda ash accounts for 19%. A further 21% of the total demand takes the form of edible salt for human consumption. Approximately 10% is used as de-icing salt, although this does not follow a predictable pattern as it is affected by the severity of winter weather in the northern hemisphere.

World production data for salt is often distorted by lack of information about captive production by chemical companies where salt never reaches the commercial market. In this report world output includes estimated captive production by a large number of chemical companies, especially chlor-alkali producers in the USA, Europe and the Middle East.

3.1.1.2 Indian Scenario

India is the third largest salt producing country in the world (after the US and China) with an average annual production of about 148 lakh tonnes. From an era of short fall and import at the time of independence, the country has made spectacular progress in the production of salt due to the pragmatic policies of the Government. In a very short period of time sufficiency was achieved (in 1953) and made a dent in the export market. Since then, the country has never resorted to imports. Exports touched an all time high of 1.6 million in the year 2001.

Salt is one of the essential items of human consumption. The per-capita consumption of salt in the country is estimated at about 12 Kg, which includes edible as well as industrial salt. The current annual requirement of salt in the country is estimated to be 60 lakhs tonnes for edible use (including requirement of cattle) and 65 lakhs tonnes for industrial use. Caustic soda, soda ash, chlorine etc., are the major salt-based industries. Besides these about 15 lakhs tonnes of salt are exported every year.

Salt is manufactured mainly by solar evaporation of seawater, sub-soil brine and lake brine. Sea salt constitutes about 70% of the total salt production in the country. Salt manufacturing activities are carried out in the coastal states of Gujarat, Tamil Nadu, Andhra Pradesh, Maharashtra, Karnataka, Orissa, West Bengal, Goa and Rajasthan.

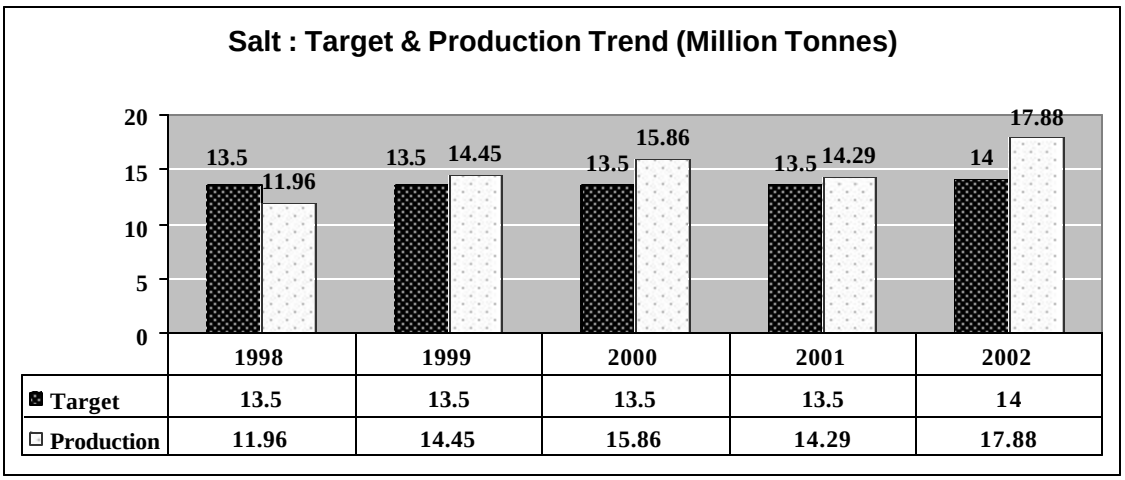
Among these States only Gujarat, Tamil Nadu and Rajasthan produces salt surplus to their requirement. These three states produce about 70%, 15% and 12% respectively of the total salt produced in the country and cater to the requirement of all the salt deficit and non-salt producing states.

Private sector plays a dominant role contributing over 95% of the salt production, while the public sector contributes about 2-3%. The co-operative sector contributes about 8% whereas the small-scale sector (less than 10 acres) accounts for nearly 40% of the total salt production in the country.

The salt manufacturing season commences with the closure of monsoon i.e. by 15th October and lasts up to June next year till the onset of monsoon season.

Production

The target of salt production and actual production achieved during the last five years is shown in the graph.



Scanty rainfall and drought in major salt producing states of Gujarat and Rajasthan resulted in prolonged salt manufacturing season and thereby in substantial increase in salt production during 2002.

For iodisation of salt and to meet the needs of industrial sector, emphasis is being laid on the manufacture of high-grade quality salt. Up-gradation of raw salt quality to meet this requirement is done by encouraging establishment of salt washaries and refineries. Salt Department has registered 43 salt washaries / refineries till date, out of which 31 units have commenced commercial production.

Salt Works and Acreage under Salt Production

There are about 10107 salt works, mostly in small sector engaged in the production of salt. The total area under salt production is about 5.0 Lakhs acres. The salt manufacturing activities provide direct employment to about one lakh persons per day.

Table 3.2: Category Wise Area Held In Acres

Year	I	II	III	IV	Total
1998	388794	24506	37298	32572	483170
1999	399521	23602	36247	33123	492493
2000	400298	23632	35097	36777	495804
2001	430384	23128	35096	36183	524791
2002	419723	23146	34973	42095	519937

Note:
Category 1 : Area > 100 Acres
Category I1 : Area > 10 Acres and < 100 Acres
Category II1 : Co -operative Societies holding areas up to 10 Acres Per Member
Category IV : Area < 10 Acres

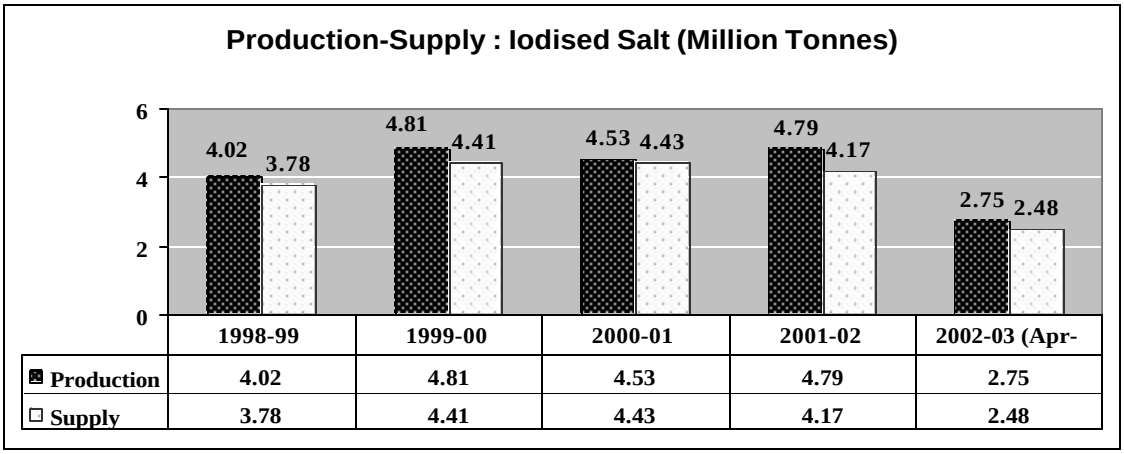
Distribution of Salt

Railways play an important role in transporting salt from three surplus states to the entire length and breadth of the country. On an average, 55% of edible salt is transported by rail from production centres. The remaining quantity moves by road and waterway.

The zonal scheme formulated by Salt Department in consultation with Railways, State Govt. and Salt Manufacturers Associations ensure adequate supply of this essential commodity to all the areas. During 2002-03, no scarcity or abnormal price rise was reported from any part of the country.

Iodized Salt

With a view to ensure universal access of iodised salt for the prevention and control of goitre and other iodine deficiency disorders in the country, Salt Commissioner's Office has been identified as the nodal agency for creation of adequate salt iodisation capacity, its distribution and quality monitoring at production centres, under NIDDCP. Salt Department has granted permission to more than 878 salt Iodisation units with an annual installed capacity of 112 lakhs tonnes so far. Promotional Activities Salt Department periodically reviews availability, price and quality of iodised salt associating state Governments, Iodised Salt Manufacturers, traders and other stake holders.



Region-wise capacity details are shown in the table below:

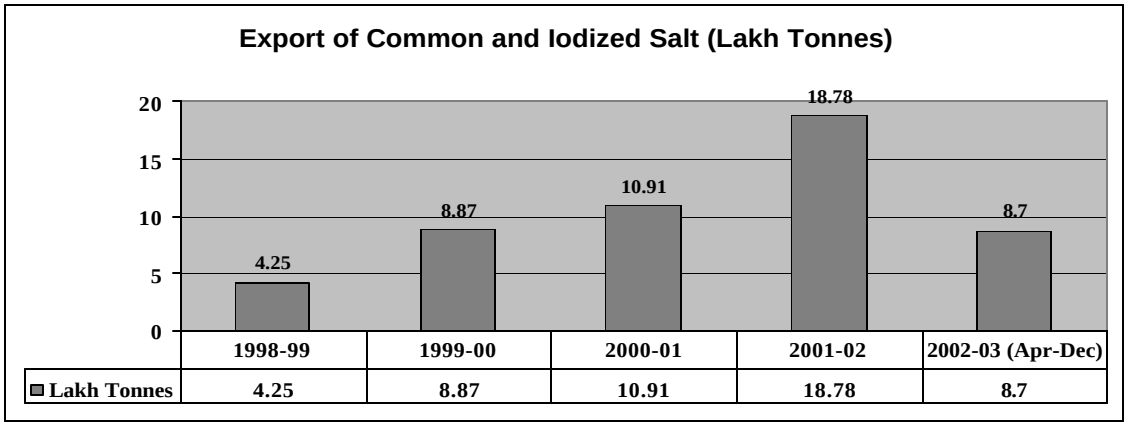
Table 3.3: Region-wise Capacity and Production of Iodized Salt (Lakh Tonnes)

State	No. of Iodisation Plants	Installed Capacity	Production
Gujarat	320	66.7	24.35
Rajasthan	291	17.5	8.22
Tamil Nadu	119	16.8	2.71
Maharashtra	13	2.2	0.10
Other States	135	8.9	

Total	878	112.1	44.80

Exports

Export of common salt and iodised salt is permitted under Open General License (O.G.L). Salt is exported mainly to Japan, Philippines, Indonesia, Malaysia, Nepal, Bhutan etc.



India has, for the first time, exported 32,500 tonnes of common salt to the US during December, 2002, creating a history of sorts.

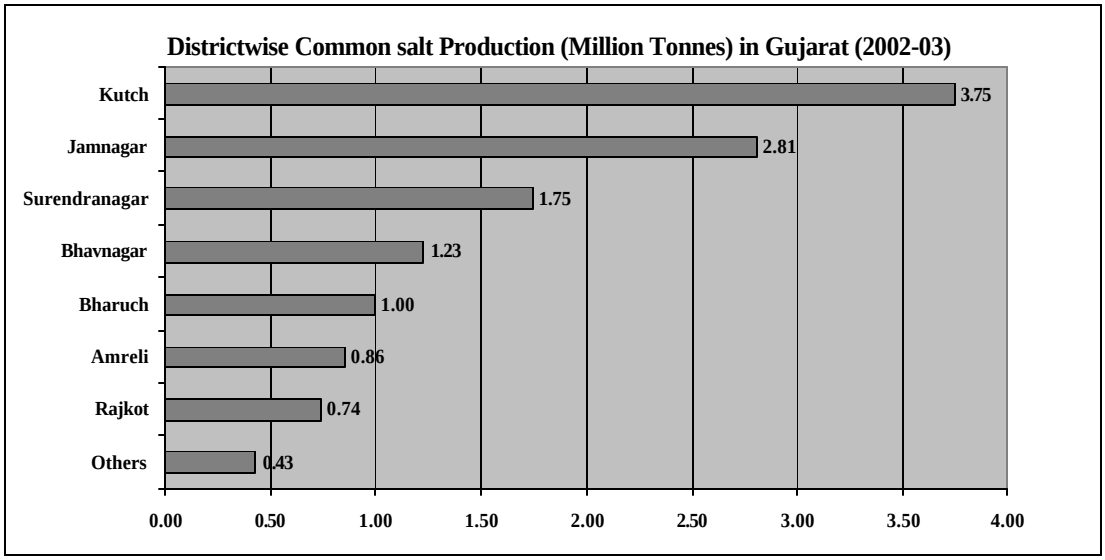
Already increased exports to the large salt importing countries namely Japan, the North & South Korea and Malaysia, are being projected. Traditionally, exports from India have largely been confined to the small markets of Bangladesh, Nepal, East Africa, and some of the South East Asian countries. Though India succeeded in making entries into the large salt importing markets of Japan and DPR Korea as far back as the mid sixties, it could not sustain this for long.

Japan turned its back on imports from India because apart from the quality differential, the vessels engaged for transporting this cargo had to suffer idle time delays because of pre-berthing detention and slow turnaround because of poor cargo handling productivity. Mexico, another major exporter of salt, exploited the situation. It not only improved quality standards but also developed state-of-the-art loading facilities at ports.

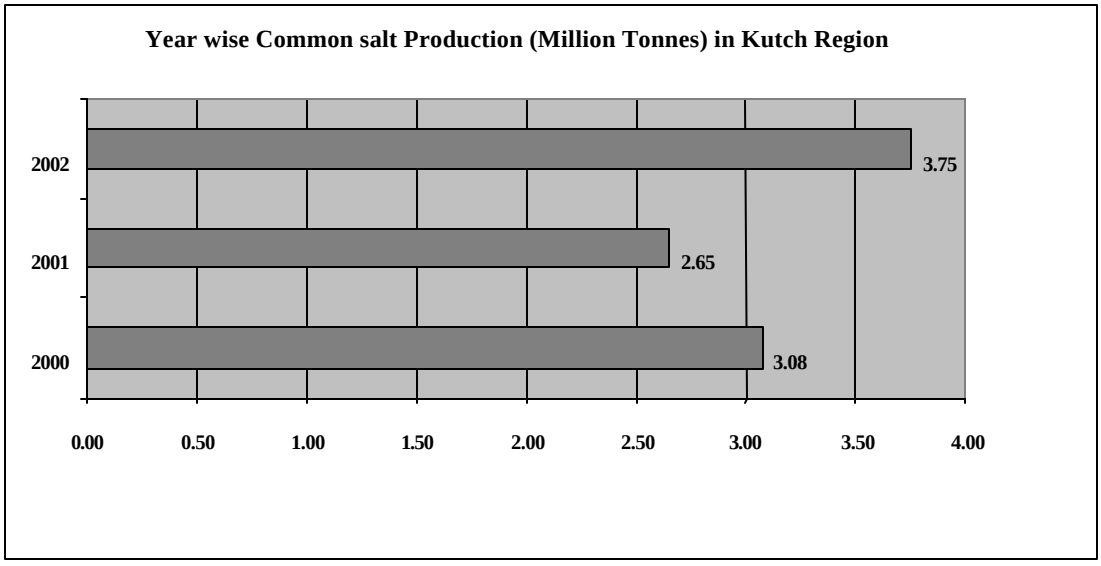
There is a substantial scope for improving export performance provided India attends to certain pre-conditions necessary for making dent in the International Salt Trade.

3.1.1.3 Gujarat and Kutch Scenario

Out of the average annual production of 17.8 Million Tonnes of salt in India, Gujarat produces about 13.2 million tonnes (74 percent) and Kutch is the largest producer in the state. The main salt production season begins in the month of November and is up to the month of March, often extending up to the month of June. There are more than 1600 salt producing units in Gujarat. The production units vary in sizes of 10 to 100 acres plots, 100 to 500 acres and more than 500 acres plots. The individuals, cooperative societies and the bigger private companies own these salt pans. About 80,000 – 85,000 workers are employed by the Salt Industry in Gujarat. Considering 29% share of Kutch in Salt production of Gujarat, it is assumed that Salt Industry in Kutch employs about 24000-25000 workers (i.e. about 100,000-125000 population dependent on salt industry).



In Gujarat, apart from Kutch, other major producing districts are Jamnagar, Surendranagar, Bhavnagar, Rajkot, and Bharuch. Out of the total common salt produced in Gujarat, 29 percent is produced in Kutch. The percentage change of growth over the previous year was 41% in the region.



Kutch is bestowed with a long coastline and due to scanty rainfall, dry-weather; fairy high temperature, high wind velocity and suitable soil conditions, the region is most amenable and ideal for salt production.

Out of the total production of 3.75 Million tonnes, about 50% is Industrial Grade, while the rest constituted by Iodized and Refined Grade. About 1.3 Million tonnes of salt is exported annually. As of 2002, there are 115 iodisation plants and 14 refiners located in different coastal talukas of Kutch with an aggregate installed capacity of 3.7 million tonnes per annum. However, only 65 percents of this capacity has been utilized for producing iodized salt.

Table I. Table 9.24: Kutch: Capacity & Production of Iodized and Refined Salt

Type	No. of Plants	Production (million tonnes)			
		Capacity	Actual		
			2000	2001	2002
Iodization Plants	115	2.24	1.24	1.08	0.95
Refinery	14	1.50	0.43	0.27	0.38
Grand Total	129	3.74	1.67	1.35	1.33

Source: Chamber of Commerce and Industry, Gandhidham

From 2001 to 2004, three new iodisation plants have commissioned and another three plants are under implementation with an investment of INR 232 millions and INR 3100 millions respectively in Kutch.

Growth of salt industry in Kutch is restricted to production of edible, industrial and common salt. There is lack of initiatives for developing salt based and allied industries with greater sophistication within the region.

3.1.1.4 Kutch Salt Industry: Present Constraints

In spite of being one of the largest producers of salt in the world today, India has not been able to make a dent in the international salt trade. The volume of international trade of Salt is about 32 Million Tonnes and India's share is meagre 3 - 6 % (i.e. exports hovering between 1.0 – 1.8 Million Tonnes). The reasons for this scenario have been explained in the subsequent sections.

High Trade Logistics Cost Compounded by Infrastructural Bottlenecks

The Indian salt industry has been unsuccessful on the export front (although salt from India is probably the cheapest in FOB terms compared to other large exporters) and has not been able to export to its full potential largely on account of high trade logistics costs compounded by infrastructural bottlenecks which cause interminable delay in turnaround of vessels and also result in phenomenal increase of Indian salt's CIF value.

While traffic at major ports has been growing at an annual rate of 8 per cent in the past decade, physical infrastructure, support facilities and cargo handling productivity have shown only marginal improvement. And in their attempt to combat increasing congestion at ports, port managements are giving short shrift to low value items like salt. Salt loaders invariably have to suffer several weeks of pre-berthing detention on each call. Not surprisingly, the freight rates demanded by the owners and operators of salt loaders have an in-built component to compensate for idle time delays. These uncompetitive freight rates eat into the shippers' margins. They have no choice but to live with it since any increase in the delivered price of the commodity at the destination would serve to neutralize whatever little price advantage the consignors may have over their rivals in the international market. This largely explains the aversion displayed in the past by Indian shippers to contract deliveries on a CIF basis. Not only that, even though shippers generally offer old vessels of 18-20 years vintage for transporting salt in view of its highly corrosive nature, no concessions are given in freight rates.

Lack of Appropriate Institutional Mechanism

Another factor that has contributed to India's poor performance on the export front is the fact that there is no institutional mechanism in place for disseminating information about real and potential buyers in foreign markets.

Poor Quality of Indian Salt

Apart from lack of infrastructure and mechanized loading facilities at ports, what has hindered India's forays into the export arena is the relatively poor quality of salt. It is observed that the washaries in the Kandla region, one of the most fertile in terms of salt production, are equipped with the obsolete sprinkler technology. There is little possibility of any improvement in the quality of salt with this type of technology. The best quality offered by India is 99.25% NaCl content, while Mexico and Australia, who has almost 40% share in the International trade are offering 99.5% NaCl salt at competitive prices. There is an urgent need to switch over to centrifuge technology which would require substantial initial investment but will reap rich returns later. But in this case too, the bottleneck, apart from infusion of fresh funds, is the mindset. Since manual labour is far cheaper and available in plenty, manufacturers are content with maintaining the status quo. The cost of setting up state-of-the-art washaries and the resultant increase in cost of refining will have to be borne by the trade till export volumes increase substantially or till the price situation in the international market turns more favourable.

Absence of Large Refineries

One of the major reasons for India's inability to make its presence felt in the international salt market is the absence of big refineries that can supply large quantities over a long period. What any importer looks for is not only large supplies from a single source but also the assurance of uninterrupted supply over a long period. Unfortunately, in India, barring two or three (i.e. Tata, Nirma, BILT), there are not many players in the salt sector with the capacity of supplying more than 5 lakh tonnes of salt. Though India has excess production, it is scattered since it is concentrated in the small and medium sector. The problem is that to make a large export consignment, several small quantities have to be transported from various places to a port by which time the transportation costs themselves have become prohibitively high.

3.1.1.5 Kutch Salt Industry: Present Prospects

Increasing exports is a lucrative proposition in view of the rising price spiral of salt in the international markets. The export demand for bulk as well as bagged edible salt is increasing. While Japan and the Koreas are undoubtedly the largest markets for bulk salt, the markets with the best potential for absorbing edible salt exports are Kenya, Nigeria, Tanzania, Zambia, Zimbabwe, Dubai, Muscat, Kuwait and Oman.

Turning India into a global player in Salt trade is not a farfetched dream. Once the pre-conditions of containing trade logistics costs, improving quality of salt and setting up mechanized handling facilities at ports are fulfilled, India, which is today ranked the fourth largest producer of salt, has the potential to emerge as a dependable source of supply.

Even if India corners reasonable 20% share in the International trade, it would need to boost its current production by 30-40%. The only option for enhancing production is to bring more area under salt cultivation since the prospects of any increase in per acre yield (presently in the range of 60-65 tonnes per acre in Gujarat and well below that in other states) is remote. There is a need to increase area under salt cultivation approximately by 1 Lakhs Acres.

Kutch is best positioned to grab this opportunity for the following reasons:

- Kutch region is most amenable and ideal for salt production and it has best yield in the country (i.e.65-70 Tonnes per Acre).
- Large tracts of wasteland available for salt cultivation.
- Availability of two large ports in the region (i.e. Kandla and Mundra), which are advantageously placed for exporting Salt to Middle East and African markets

3.1.1.6 Action Agenda

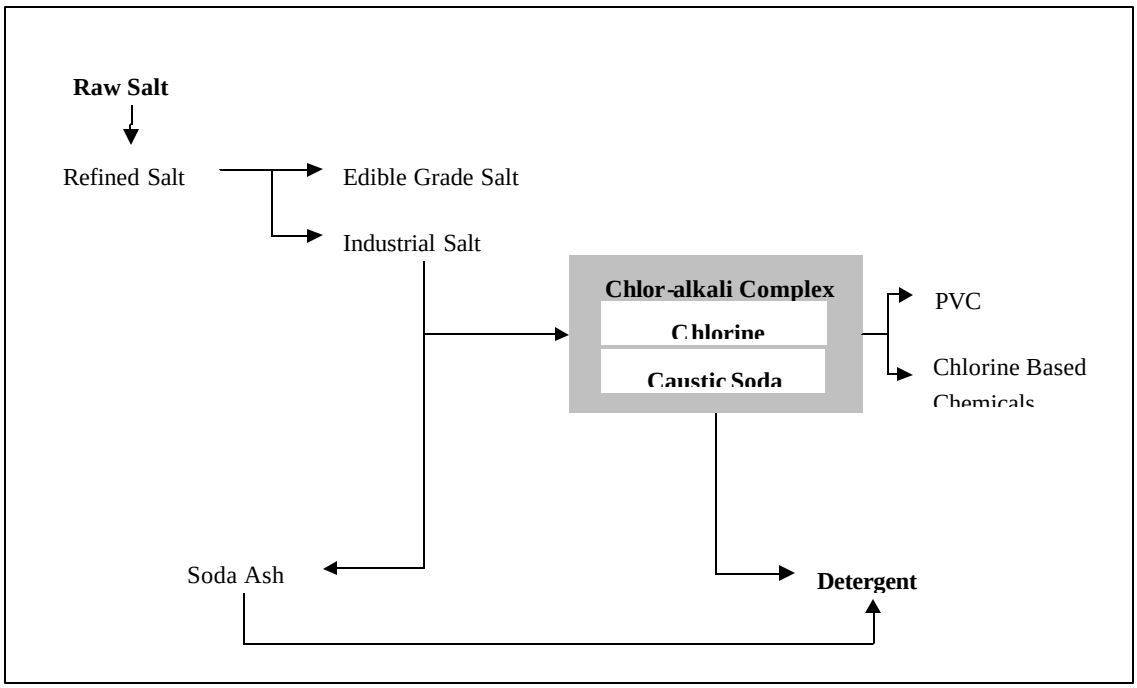
In order capitalize such opportunities; attention will therefore have to be focused on following specific areas:

- Bringing more land under salt cultivation in Kutch.
- The Kandla port will have to be geared to take on the task by not only installing mechanised salt handling facilities but also considering setting up a dedicated jetty for the salt industry. Mechanizing loading facilities at ports would improve loading rates and bring them at par with international standards thereby minimising idling of ships and large demurrage costs. There would be substantial investment need and part of it can be borne by the industry.
- Drastic steps also need to be taken to improve the loading rates which are currently the lowest in the world. Compared to over a lakh tonnes being loaded per day in Australia and 50,000 tonnes in Mexico, India's loading rates are pitifully low at 6-8,000 tonnes a day. At this rate, we can never hope to compare favourably with the other salt producing countries since, our CIF costs become unremuneratively high.
- Licensing new salt works in close proximity to the port may also serve to minimize inland transportation costs.
- Technology up gradation at existing salt units to produce salt of internationally acceptable standards.
- According preferential treatment to salt consignments by port authorities.

Apart from potential for exporting raw and refined salt, the region can also explore the possibility of developing value added salt based industry. The prospects of salt based down-stream units have been covered in subsequent sections.

3.1.1.7 Salt Based Projects – Value Added Propositions for Kutch

Salt is one of the basic building blocks of chemical industry. The following diagram illustrates various value added propositions based on Salt:



Since the overall prospects of edible and industrial salt have already been covered earlier, this section focuses only on prospects of Chlor-Alkali and Soda Ash Complex. There is another good opportunity for setting up of an additional Liquid Bromine Project from seawater bittern in the Kutch (BILT is already operating one plant at Khavada in Kutch). The prospects of this industry are covered separately at the end.

3.1.1.8 Chlor Alkali Industry

Chlor-alkali Industry (Caustic Soda and Chlorine) is one of the basic building block and finds number of applications in terms of feed stock for derivatives as well as important chemical for certain intermediate processing step in chemical Industry.

Caustic soda is largely consumed in the Alumina; Man made fibre, Pulp & Paper, Soap & Detergent industry. The co-product, chlorine is essential to the needs of the PVC, Pesticides, bleaching and other significant industrial uses.

Global Scenario and Outlook

Globally, the caustic chlorine industry is driven by the demand supply of chlorine and caustic soda is considered a by-product. Demand for chlorine is higher than that of caustic and sometimes, some of the caustic produced remains unutilized. Globally, the consumption pattern for caustic soda in various end use sectors is as follows:

Table 3.4: Consumption Pattern for Caustic Soda in Various End-use Sectors

Sr	End use sector	% Share in consumption
1	Chemicals	40
2	Paper	18
3	Alumina	8
4	Soaps and detergents	7

5	Manmade fibres	7
6	Others	20
	Total	100

Source: India Chem 2002

Table 3.5: Worldwide capacity and regional share of caustic soda is given in the following table.

Region	Installed Capacity (Million TPA)
North America	21.30
South America	2.00
Europe	12.50
Middle East / Africa	1.00
Asia Pacific	18.20
Total world Capacity	55.0

Source: Chemical Marketing Reporter

World consumption of caustic soda is 45 million tons (USD 6 billion) and is growing at 3% p.a. USA is the largest producer of caustic soda , with production of almost 14 million tons per annum, which is 30% of world production. North America is the largest consuming region of caustic soda, accounting for 31% of world consumption while demand is growing fastest in Europe, which is experiencing, on an average, a 5% growth per year. USA, Germany and France are the major exporters of caustic soda, while Australia and the Netherlands are the leading importers.

The global chlor-alkali industry is likely to remain in surplus in the medium term due to the slow growth in chlorine based derivatives. According to CMAI, most chlor alkali growth will occur in the low cost energy regions, such as the Middle East and US Gulf Coast. Although regional production costs are higher in Asia than in the US gulf and Middle East, Asian producers who are integrated into chlorine derivatives and who have low cost power are likely to add chlor-alkali capacity.

Demand for chlorine, caustic and derivatives is expected to grow at higher rates in the developing regions of Asia, South America, Africa and Middle East. Therefore, exports of chlorine derivatives and caustic from low cost regions will be required to meet the demand for chlorine and caustic in high demand regions.

Northeast Asia will continue to be competitive on caustic soda because of its geographic proximity to Southeast Asia. Total trade volume for caustic is expected to increase by 3.7% p.a till 2009-10.

West European chlor-alkali producers have made commitments to replace part of the mercury cell (technology) capacity with membrane cell technology. Rising demand in West Europe will provide opportunities for increased caustic soda imports.

Domestic Scenario and Outlook

The current installed capacity for Caustic Soda in the country is about 1.95 Million TPA. There are about 40 chlor-alkali units operational. Gujarat Alkalis and Chemicals (Dahej and Baroda) is the largest caustic soda manufacturer in India with a share of 13.7% of the production. The estimated production during 2003-04 was about 1.55 million tons. The total investment in the Chlor-alkali

industry is about Rs.9000 crores. The industry generates a turnover of Rs.3000 Crores per annum and employs about 3.0 Lakh workers.

Caustic soda is used in a wide range of end user industries such as Alumina, paper and pulp, soaps, viscose staple fibre, various chemicals, dyes and dye intermediates.

Table 3.6: Use of Caustic Soda in Different Industries

Sr	End use industry	%age Total Consumption
1	Paper & pulp	30
2	Viscose Fibre	25
3	Soap industry	14
4	Alumina	12
5	Chemicals	9
6	Water treatment	2
7	Others	8
	Total	100

The key factors that determine the competitiveness of the chlor-alkali industry are

- Energy Cost (energy constitutes 65% of the overall costs)
- Ability to sell chlorine at reasonable prices or convert by-product chlorine into value-added derivatives on a sustained basis
- Economies of scale

In the future, only those producers who have access to large capacity, cheap gas based captive power, cost efficient membrane cell technology and forward integrated high value added chlorine derivatives will be able to sustain in the long term.

3.1.1.9 Soda Ash Industry

Soda Ash (Sodium Carbonate) finds its usage in a wide range of applications including soaps, detergents, glass & silicates and in the manufacture of chemicals.

Global Scenario and Outlook

The global capacity is estimated at about 46 million tons per annum, while production is estimated to be about 38-39 Million Tonnes. The global distribution of Soda Ash manufacturing capacity is given in the table below:

Table 3.7: Global distribution of Soda Ash manufacturing capacity

Region	Installed Capacity (Million TPA)	% age of Total Capacity
North America	14.40	32
Europe	14.85	33
China	10.80	24
Asia Pacific	4.05	9
Middle East	0.90	2
Total	45.00	100

Source: DMM Analysis

USA is the largest producer of soda ash in the world and all its capacities are based on trona (a naturally occurring soda ash ore), due to its abundant availability in the country. The reserves of trona in Wyoming alone were estimated to be 55,000mn tonnes.

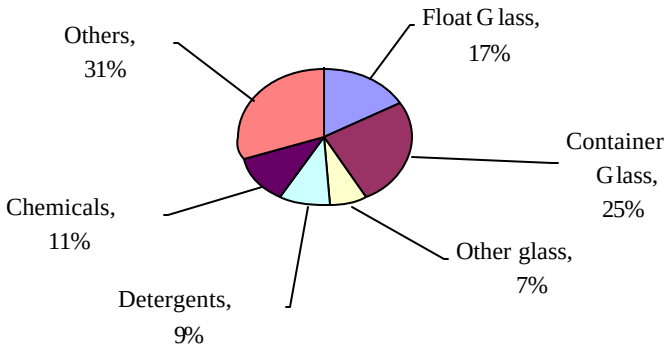
China is a major exporter of soda ash in Asian region. Significant capacity additions over the years have seen China emerge from being a net importer of soda ash in the early nineties, to being a net exporter now.

In Asia the demand for soda ash has reduced sharply after South East Asian crisis and consequent depreciation of currencies of these countries. It is for the same reason that there has been a downward pressure on the prices. Surplus capacities in China will put further pressure on prices.

The current world demand for soda ash is estimated at 37 million tons. Global soda ash demand has grown at an average growth rate of 4-5%. Significant capacity additions in the Asian region, especially China have led to an overcapacity situation in the global soda ash industry.

Globally, the main end user segments of soda ash are glass, detergents and other chemicals. The current global consumption pattern is as shown in the chart below:

Soda Ash : Global Consumption Pattern



The growth in consumption of soda ash in global market has been negligible in the recent years compared to that of in 70's and 80's. This can be understood if one examines the major user sectors of soda ash and the growth pattern of these sectors.

Main reason for poor growth in consumption of soda ash in the world is the shrinkage of demand from the container glass industry. The reasons for this decline are as follows:

- Replacement of glass bottles by PET bottles to a very large extent in soft drinks industry. PET bottles are finding competitive new uses in other industries too, where glass bottles were used earlier.
- Increase in the use of recycled glass cullets in the manufacturing of glass. Cullets represent a cheap raw material for the manufacture of glass.

Indian Scenario

The current installed capacity for Soda Ash in the country is about 2.3 Million TPA. The domestic soda ash sector consists of six major players. Tata Chemicals is the largest among them followed by Gujarat Heavy Chemicals. Large capacities are located on the west coast, mainly Saurashtra region of Gujarat, due to easy availability of salt and limestone - the key inputs for production of soda ash. This region accounts for more than 90% of the total capacity. The estimated production is estimated at about 2.0 Million TPA.

The total investment in the soda ash industry is about Rs 4500 crores. The industry generates a turnover of Rs.2000 Crores per annum and employs about 4.5 Lakh workers.

At the moment the industry is amidst recession besides decline in volumes and cheap imports. Detergents and glass industries consume more than 55% of the total domestic production of soda ash. The demand grows at the rate at which the user industries grow. Since last few years, the industry growth has been about 3.5 – 4.0%. The reason for the slowdown in demand is primarily user industries like the detergents and the glass industries are registering very low or virtually no growth rate. This has led to falling margins due to stiff pricing competition therefore resulting in over supply.

Table 3.8: Soda Ash : Domestic Consumption Pattern

End use industry	%age Total Consumption
Detergents	36%
Glass	20%
Silicate	11%
Chemical industry	15%
Others	18%

Demand for soda ash is mainly affected by decrease in demand from glass industry all over the world. This was on account of fall in demand for container glass. Bottles made of container glass are being replaced with PET (Polyethylene Terephthalate) bottles, this has affected the demand for soda ash.

Domestic demand is dependent on price to a large extent because of the following reasons:

- Soda ash is a commodity product, hence competition is mainly on the basis of price.
- Soda ash is a major raw material for its key end-user sectors, as a result, users attempt to reduce their expenses on soda ash either through low usage (by increasing process efficiencies) or by paying lower prices through long-term contracts and price negotiations.
- Demand for soda ash also suffers from the substitution effect. To some extent substitution by caustic soda takes place based on economic considerations such as availability and costs.
- Problems of transportation also affect off-take of soda ash from the producers. Transportation costs, especially to the eastern and southern regions ranges between Rs1500 -2000 per ton. It is because of this reason that users located farther from the west coast, especially in the eastern region find it cheaper to import soda ash due to reduction in customs duty.
- Cheap soda ash imports have adversely affected domestic companies who can manage to sell only 70% of their production. Cheap caustic soda imports from China, Taiwan and Korea has increased pressure on margins raising demands for antidumping duties.

- Easy availability of key inputs (power, limestone and salt) at low cost, becomes critical to sustain margins. Power accounts for 30% of the total cost of input. Such a high cost acts as a deterrent in the competitiveness of the domestic players.

3.1.1.10 Prospects of Salt based Downstream Industries in Kutch

Caustic Soda and Soda Ash is widely traded product globally and hence the cost competitiveness is the sole factor deciding prospects of these projects. This specific aspect of cost competitiveness is evaluated below considering Kutch as a potential location for these projects.

3.1.1.11 Chlor Alkali Project

As described earlier, the key factors that determine the competitiveness of the chlor-alkali industry are:

- Energy Cost (energy constitutes 60-65% of the overall costs)
- Ability to sell chlorine at reasonable prices or convert by-product chlorine into value-added derivatives on a sustained basis
- Economies of scale

The assessment of prospects of Chlor-alkali Unit in Kutch in light of above factors is done as shown in following table.

Table 3.9: Prospects Evaluation – Chlor Alkali Unit in Kutch

Key Factors	Remarks
Energy Cost	▪ Feasible if lignite is made available for captive power generation (upto 15-10 MW).
Chlorine Utilization for Value added Products	▪ No Chlorine consuming industries at the moment ▪ Possibility of large demand if project like Mega Chemical Industrial Estate (housing PVC / EDC / VCM Complex and other chlorine downstream projects) takes shape in the region
Economies of Scale	▪ Would not be a problem if few large downstream projects (i.e. Alumina, PVC/EDC, Detergent) comes up.

Inference on Overall Prospects

The prospect of this project is crucially dependent on:

- Availability of Lignite for Captive Power Generation.
- Development of large Caustic-Chlorine end-user industries in the region (i.e. Alumina, PVC / EDC, Chlorine based chemicals, Detergents, etc) crucial for attaining Economies of Scale and good price realization so as to offset disadvantage of higher power cost.

3.1.1.12 Soda Ash Project

The important factors determining prospects of Soda Ash project are:

- Cheap availability of Key Raw Materials (i.e. Salt and Limestone)
- Energy Cost (energy constitutes about 30% of the overall costs)
- Nearness to Soda Ash consuming markets (i.e. Glass, Detergents, Silicates)
- Economies of scale

The assessment of prospects of Soda Ash in Kutch in light of above factors is done as shown in following table.

Table 3.10: Prospects Evaluation – Soda Ash Unit in Kutch

Key Factors	Remarks
Cheap Availability of Key Raw Materials	▪ Salt and Limestone abundantly available at lowest possible price. ▪ However, same advantage to other large units (Tata, DCW, GHCL and Nirma) set up in Saurashtra Region .
	▪ Current market situation (dumping, cheap imports) may not remain for longBeing low value product, selling in distant market not feasible. ▪ Local market important for project success ▪ A Glass & Detergent project in Kutch may change the scenario in favour
Energy Cost	▪ Feasible if lignite is made available for captive power generation (up to 5-10 MW).
Economies of Scale	▪ Would not be a problem if few large soda ash consuming projects (i.e. Glass, Detergents) comes up.

Inference on Overall Prospects

The prospect of this project appears bleak at this juncture for the following region:

- Availability of Lignite for Captive Power Generation.
- Setting up of large downstream projects (i.e. Glass, Detergents) in the region

Table 3.11: Project Details

	Caustic – Chlorine	Soda Ash
Plant Size	100 TPD	600 TPD
Investment	Rs.160 Crores (incl. 15 MW Power Plant)	Rs.300 Crores
Turnover	Approx. 80 Crores	Approx. 80 Crores
Employment	4500 – 5000	4500 - 5000
Salt Requirement	60000 Tonnes (Industrial Grade)	2.6 Lakh Tonnes (Industrial Grade)
Utilities Requirement		
Water	5 LGD	0.5 LGD
Power	15 MW	5 MW
Fuel	Coal – 30 TPD. Fuel Oil – 25 TPD	Coal – 200 TPD

3.1.1.13 Prospects of Liquid Bromine in Kutch

Bromine is an important marine chemical, which can be recovered from sea-water and its concentrates. Sea bittern having at least 2.2 gm / litre bromine is used for the manufacture of bromine by most of the commercial plant.

Table Bromine Occurrences

	Original content, g/L	After concentration, g/L.
Sea water	0.065	
Inland seas		
Kharaghoda, Indian Ocean	0.25	6
Sassyksee, Black Sea	0.28	1.5 to 4.5
Shebhka el Melah, Tunisia	2.5	6.8
Salt lakes		12 to 13
Dead Sea, Israel	4 to 6	
Ellon Sea, USSR	0.63 to 2.25	
Searles Lake, Calif (USA)	0.85	
Brine wells		
Michigan (USA)	2 to 3	
Arkansas, (USA)	4 to 5	
Yakutsk, Siberia, USSR	6 to 7 (CaCl2 solution)	

The Dead Sea is one of the richest sources, containing nearly 4 grams per litre of Bromine at the surface and up to 6 grams per litre at deeper levels.

The most important source of Bromine today is brine wells, which is the principal source in the United States. The richest brines are found in Arkansas and Michigan in USA, with bromine content ranging from 2 to 5 grams per litre.

Bromine has wide range of uses in chemical and other industries, like Dyes and Intermediates, Bulk Drug, Photography Chemicals, Insecticides, Fuming Agents, Gasolone Additives, Textile Auxiliaries, Fire Retardants, etc

Present Global demand for Bromine is estimated to be around 500,000 tonnes per annum. The annual growth rate in demand is estimated to be around 3% per year.

United States is the major world producer of Bromine, followed by Israel. Israel has been able to increase its production substantially from 23,000 tonnes in 1976 to around 2, 00,000 tonnes per annum at present, due to the availability of the richest source of Bromine i.e., Dead Sea Brine and its concentrates and the process innovations brought about by the technologists. Recovery of Bromine form seawater is mainly done in US, erstwhile USSR, Italy and Japan.

Phasing out of methyl bromide and ethylene bromide has forced bromine production to diversify into new markets. Still the largest end-use for bromine compounds, flame retardants account for 30% of world bromine consumption. About 45% of this is consumed in the US, with 31% in western Europe and 14% in Japan. Brominated flame retardants market is growing at 8% per year, with Asia leading the way.

The current domestic market size of liquid bromine is estimated at 14000 tonnes, while the current production of bromine is estimated at 9000 – 10,000 tonnes. About 3000-4000 Tonnes of bromine is being imported. The major consuming segments of bromine in the country are:

- Pesticides
- Dyes
- Pharmaceuticals
- Bromine Compounds (i.e. Specialty Chemicals and Fire Retardants)

The major manufacturers of bromine in India are:

- DCW Limited
- Tata Chemicals Ltd.
- Solaris Chem Tech (Formerly BILT Chemicals)
- Chemplast Sanmar Ltd.
- South India Bromine and Allied Chemicals (P) Ltd

Bromine Project: Prospects in Kutch

Generally, the facilities for manufacturing Bromine are located near the source of availability of natural brines or bitterns containing usable levels of Bromine. Keeping the availability of the source of bromine in view, the project for the manufacture of Bromine can be favourably considered in Kutch.

There is already a successful manufacturer (i.e. Solaris Chemtech) of Bromine existing in Kutch. This plant has enhanced its initial capacity of 2500 TPA to 10,000 TPA by diversifying into various Organic Bromine compounds.

Project Details

- Recommended capacity : 3000 TPA
- Estimated project cost: Rs. 12-15 Crores

3.1.2 Minerals and Mining Based Industries

Geographically Kutch is the largest district in the State. Geologically, it is hunting ground for earth scientists. District is bestowed with variety of fuel, metallic, non-metallic minerals in its geographical fold. Mineral-based industries& Minerals play vital role in the economy of the district, with 142 mining leases and 465 quarry leases giving employment to 15,000 to 20,000 people.

Important industrial ventures in the district, e.g. cement plant, power plant, lignite project, bauxite calcinations plant, Bentonite, processing plant are results of the abundance availability of Limestone, Lignite, Bauxite and Bentonite minerals.

Exploration programmes by different geological agencies like Geological Survey of India, Atomic Energy Commission, Central Ground Water Board, Oil & Natural Gas Commission, Remote Sensing Division of Indian Space Research Organisation, Commissioner of Geology & Mining, Government of Gujarat have highlighted hidden mineral treasures of Limestone, Lignite, Bauxite, Bentonite, China-clay, Fire-clay, Silica-sand, Gypsum Ochre, Calcite, Siderite etc.

Private and public sector enterprise “Gujarat Mineral Development Corporation” exploit the industrial minerals for captive as well as industrial applications. Details of the production, number of mining & Quarry leases, area covered, during 2003-04 for important minerals are given below.

Table 3.12: Production of Industrial Minerals

Sr	Name of Minerals	Production (MT) During 2003-04	No. of Mining Leases	Area covered in Hectares
1	Lignite	49,02,578	4	3354
2	Limestone	13,35,145	6	1675
3	Silica Sand	2,13,982	8	189
4	China Clay	1,20,456	40	343
5	Fire-clay	1,544	1	3
6	Bauxite	5,18,728	7	587
7	Bentonite	5,19,080	209 (QL)	498
8	White Clay	2,52,594	63	614

Source: Statistical Section, Commissioner of Geology & Mining, Gandhinagar

Metallic, non-metallic and fuel minerals prospected by geological organisations have established vast reserves of following minerals in the district:

- Cement Grade Limestone
- Metallurgical Grade Bauxite

- Drilling Fluid Grade Bentonite
- Ceramic Grade Kaolin
- Glass Grade Silica
- High Calorific Value Fossil Fuel Lignite

Lignite is mined at Panandhro project of "Gujarat Mineral Development Corporation" (GMDC). It produces per day 5000-6000 MT lignite, out of which half is fed to GEBs 220 MW Thermal Power station and rest is marketed to Roofing tiles, Bricks, Cement Plants and textile units.

Limestone produced is mostly consumed by the captive purpose by "Sanghi Cement". Silica Sand mined by 8 leaseholders covering 189-hectare area is marketed to Chemical, Glass and foundry sectors. China Clay exploited by 40 private leaseholders is mostly marketed to nearby Morbi, Than, Wankaner Sanitary and Wall & Floor tiles SSI units. About 60% of Bentonite produced is exported to South Eastern countries through Mundra, Mandvi and Kandla ports, and the rest is supplied to ONGC exportation projects, pelletisation plants and foundry sectors.

Bauxite produced is consumed by GMDC calcinations plant and part of low-grade bauxite is exported to cement plants in Kuwait, Iraq, Qatar. Bentonite acts as a sweetener during the cement grinding process.

3.1.2.1 Mineral Resources

3.1.2.1.1 Fuel Minerals

Lignite basins are prospected by the C.G.M., Govt. of Gujarat. Panandhro, Akrimota, Mata-no-math and Lefri are the separate basins assessed for the Lignite quality and quantity. Prospecting results have proved 285.60 million tonnes reserves in above basins. GEB has established a 220 MW thermal power station at Panandhro based on Lignite. Out of total reserves, 100 Million tonnes are located at Panandhro. The mining activity was started here in 1974 and substantial expansion was undertaken in 1988-89 and 1989-90. Current production from the mine is about 50 lakh tonnes per year.

Table 3.13: Analysis of Lignite

Sr	Particulars	Proximate & Ultimate Analysis
1	Moisture	25 – 30
2	Ash %	7 – 15
3	Volatile Matter	30 – 40
4	Fixed Carbon %	20 – 30
5	Calorific Value Kcal/kg	3500 – 4500
6	Sulphur % (Dry basis)	1.0 – 6.0

GMDC is implementing 250 MW Lignite based pit head thermal power project at Akrimota. Lignite will be mined from Akrimota separate basin.

Small coal deposit at Guneri has been prospected and 12 lakh tonnes reserve has been proved. Due to complicated rules and regulations in the Coal Act, the deposit is idle for the exploitation.

3.1.2.1.2 Bauxite

Bauxite pockets of the district have been prospected in detailed by C.G.M., Govt. of Gujarat. The department estimates 42 million tonnes of proven reserves. Kutch Bauxite is gibsitic and superior grade. Seven mining leases covering 587 hectares produce about 5 lakh tonnes bauxite (all grades).

All the Bauxite pockets are reserved for GMDC's proposed "Alumina Plant". GMDC at present operates 50,000 MT calcinations plant at Ghadhshisa village (exploiting Naredi and Ratadia Bauxite pockets). GMDC is scrutinizing all alternate proposals and possibilities for "Alumina Project". Until today, the proposal has not moved further much. Prospect appears bright for "Alumina House", "Proppant" and "Detergent Grade Zeolite". Detailed techno-feasibility studies for above value-added projects are advisable.

3.1.2.1.3 Industrial Clays

Kaolin

Deposits are exploited by 40 private mining leaseholders covering 343 hectare area. Few of them operate 7 to 10 MT capacity "Levigation plant" for refining the raw clay. Kaolin occurs as pocketary nature within the Felsphatic Sandstones as well as Leterific profiles. Pockets are manually worked at Mamuara, Manfera, Nadapa, Chamardi, Sukhgpur, Dagala, Lodai, Kandarai, Goniasar, and Paddhar etc villages by private leaseholders. Refined clay is supplied to Ceramic, Rubber, Paint and Filler sectors as per buyer's specifications. CGM, Government of Gujarat has partly prospected Sukhpur and Mamuara deposits. Physical-chemical characterization as well as prospecting of all the occurrences is advisable to fill the inventory gaps.

White clay

White Clay deposits are exploited by 63 mining leaseholders in 614 hectare area, producing 2, 52,594 MT clay. Geologically it is named as Lithomarge clay. Detailed prospecting has not been carried out for the white clay yet. It can work as good filler in Plastic, Rubber and Paint. White clay layer of variegated violet, pink, cream colour occur below bauxite. Clayey bauxite zone terminates into white clay. Clay pockets have not been assessed for its quality and quantity. Noted occurrences can be considered for the detailed prospecting.

Bentonite

Bentonite is extensively quarried by the private leaseholders. About 209 quarries are in operation producing around 5 Lakh tonnes clay annually covering 498 hectares area. Sodium-based high-swelling pockets at Wandh, Sheradi, Hamala, Saran, Lefri, Goniasar, Nana Ratadia, Tumadi, and Punadi are quarried in Mandvi and Mundra talukas. It is also quarried at Abdasa, Anjar, Bhachau, Rapar, Bhuj and Nakhatrana talukas' villages. Geological Survey of India, CGM and Govt. of Gujarat have partly prospected Mandvi and Mundra talukas deposits. Deposits in other talukas need detailed prospecting for total scenario of the deposit. Clay is foreign exchange earning commodity with wide scope of industrial applications as well as good source for value-added item production needed in the overseas market.

3.1.2.1.4 Limestone and Gypsum

Kutch has vast reserves of cement grade limestone, which can further sustain six major cement plants. Nummulitic limestone belt stretches from Ramania to Naliya having 7765 million tonnes reserves.

G.S.I. and C.G.M, Govt. of Gujarat has prospected Khavda Limestone deposits. In four blocks of Kaladungar, Goradungar, Khari-Juna Sadhara, Dedhia 745 million tones cement grade reserves has been estimated. Salinities variety of Gypsum occurs in Rapar and Lakhpat taluka. Total 20.72 lakh MT reserves have been estimated around the area of Aadesar, Palasava, Sanva, Umarsar and Karan villages. In addition to the above, marine gypsum is recovered from the saltpans for manufacture of Plaster-of-Paris.

3.1.2.1.5 Agate, Siderite, Barites and Brine Water

"Mardekbet" in Kutch is famous for Agate mining. Agate pebbles can be mined economically from Aadesar, Khegarpor, Bhuvaa, Chandrani, Antarjar, Dagara, Kera villages of Rapar, Anjar and Bhuj talukas. C.G.M, Govt. of Gujarat can take up the scheme for the Agate prospecting for quantity and quality assessment. Barites siderite and Brine water have been prospected, but due to negligible quantity not much attention is being paid to its exploitation.

3.1.2.1.6 Decorative and Dimension Stones

Bhuj sandstone is quarried by 22 quarry leaseholders for building stone. Attractive fabric and colour of sandstone can be considered for cut and sized tiles exploitation. Sedata, Ratia, Kodabi, Naranpar and Godpar villages of Bhuj taluka can be considered for cladding and flooring stone by establishing cutting and sizing unit. Andhau yellow limestone near Khavda and Dolerite Dyke near Dhinodhar are the promising decorative stones area, which need detailed mapping and engineering properties testing.

Table 3.14: Current status of District Mineral Resources is tabulated below.

Sr	Major Minerals	Reserves in Mill. Tons	Sr. No	Minor Minerals	Reserves in Mill. Tones
1	Lignite	285.60	1	Bentonite	202
2	Limestone	7765	2	Decorative Stone	--
3	Bauxite	42.5	3	Dimension Stone	--
4	China Clay	--			
5	Silica Sand	--			
6	Gypsum	0.2072			
7	Agate	--			
8	White Clay	--			
9	Barites	0.08			
10	Coal	0.12			

Source: C.G.M., Govt. of Gujarat, Gandhinagar

From the above status, it can be inferred that there exists inventory gaps for the exploration of certain important minerals e.g. China clay, White clay and Silica sand. In spite of vast & good quality reserves, large industrial houses hesitate to invest in mineral-based projects in Kutch for the following reasons:

- Perceived hindrances and obstacles from the environmental angle
- Distance from the consuming sectors.

3.1.2.2 Mineral Projects Potential

Kutch region has ample scope for small, medium and large scale value-added mineral item projects considering following favourable factors:

- Vast proven and good quality reserves
- 5 important ports
- 8 industrial estates
- 2 special Economic Zone (SEZ) at Kandla and Mundra
- Special Incentives in Kutch

Several small, medium and large scale value-added mineral item projects can be located at Anjar, Nagor, Mandvi GIDC estates. Identified viable projects, which can go to stream based on district mineral strength, are given below.

Table 3.15: Small Scale Value -added Mineral Item Projects

Sr	Raw Mineral	Project	Capacity/Annum	Unit	Investment in Rs. Lakh	No. of Projects Viable
1.	Bentonite	Activated Bentonite	15,000	Tons	80.00	10
		Organo Clay	1,000	Tons	60.00	5
		Catlitter	3,000	"	150.00	3
		Processed Bentonite	18,000	"	50.00	10
2.	Silica Sand	Coated Sand	30,000	Kg	50.00	5
		Precipitated Silica	3,000	Tons	70.00	10
3	Agate	Agate Display Articles	1,300	No.	40.00	2
4	Sand Stone	Dimension Stone Sizing	50,000	Sq. Mt.	70.00	10
5	Marine Gypsum	Marine Gypsum Washing	15,000	Tons	50.00	5

Source:

At present, 40% of bentonite production is marketed to drilling mud, pelletisation and foundry. Rest 60%, which is exported in raw and powder form need to be encouraged for the high value-added Bentonite-based items i.e. Activated Bentonite, Catlitter, Organo clay and Rheological additive. Technologies and plant machineries for all the projects are available indigenously.

Activated Bentonite can find applications in edible and non-edible oil decolourisation and purification. Calcium-based Bentonite has to be treated with acid and after digestion it is to be washed and filtered. Few units are operating in the Mehsana, Vadodara, Vapi and Ankleshwer.

Catlitter is a product mostly in demand in overseas market of USA and UK for pet dog and cat excreta deodorisation purpose.

Organo clay, which is a very high value-added product which is made by treating raw Bentonite with Amines in a closed circuit. Different grades are manufactured for Tyres, Cosmetic, Grease and Paint application.

Processed API (American Petroleum Institute) and OCMA (Oil Company Material Association) grades have good domestic and overseas market in oil exploration and foundry sectors.

Silica sand mined in Anjar Taluka is only sieved and washed. Value-added shell silica items can be produced by coating of organic compound in different percentage at a lower temperature. The product has a good application in fine casting of steel utensils.

Precipitated silica and Silica Gel are the other items for which technology is available with Central Salt & Marine Research Institute, Bhavnagar. It can find wide application in rubber, shoe-soles, printing ink, heavy duty tyres and tooth powder. Silica gel can find application in textile.

Bhuj sandstone can be quarried on an organised way with a selection of colour and fabric for cladding and unfinished flooring. Above identified small scale project with possible number can attract Rs. 40 crore investments, if conventional processors and new entrepreneurs are educated and motivated for the identified value-added items.

In addition to above, scope also exists for medium and large scale value-added projects, which appears viable looking to the demand, low production cost with location benefit of raw material, cheap land-cost and proximity to ports.

Table 3.16: Medium and Large Scale Value-added Projects

Sr	Raw Minerals	Project	Capacity/ Annum	Unit	Investment (Rs. Crore)	No. of Projects Viable
1	China-clay, Fire-clay and Bentonite	Slip House	1,000 TPD	Tons	50.00	2
2	Limestone, Pozzolona Clay and Fly-ash	Blended Cement	3,000	Tons	800.00	6
3	Lignite	Lignite-based Chemicals	100/Day	Kg.	0.80	2
4	Bauxite	Alumina House	1500	Tons	5.00	2
5	China Clay	Calcined China Clay	3000	Tons	50.00	1
6		Paper-coating Clay	3000	Tons	80.00	1
7	Lignite	Met Coke from Lignite	500000	Tons	400.00	1
8	Brine Water	Refractory Magnesia	15000	Tons	110	1

Morbi, Than and Wankaner ceramic clusters with 2000 SSI units produce sanitary ware, wall and floor tiles, crockery, insulators and refractory. All the units maintain individual slip section for desired raw mixed feed. They individually incur substantial investment for grinding, sieving, drying, blending, filtration and spray-drying activities. If raw mixed feed slips of desired specifications are provided to them substantial cost savings (i.e. Capital as well as operating) can be achieved. Processors have to carry out only subsequent casting, firing, etc. Most of the ceramic minerals are available in the district so the units can operate economically like cement plants based on clinkers. District is close to the ceramic cluster and new ceramic projects in the pipeline can also avail the scope.

Calcined china clay and paper coating clay value-added items projects can be considered with the available CSRI technology. One Calcined china clay unit is in operation at Mamuara with LPG fuel supply. Other two units can survive if proper techno-feasibility study with raw materials characterisation and LPG fuel supply is done by the expert agency.

Lignite-based chemicals, which are in good demand by oil exploration companies is a viable project. The proposed Met coke units based on imported coal can consider lignite as an alternate fuel using Davy Pittsburgh, USA technology.

Refractory magnesia, which is at present in good demand due to depleting resources of Salem Magnesite, can be a good project, as a Kutch sea-bittern is proved to be very rich in Magnesia percentage. CSMRI, Bhavnagar can be tied-up for the technology and pilot testing.

Considering vast cement grade limestone reserves and good additive sources of Laterite, Pozzolona clay, Silica sand and fly-ash, possibilities can be explored for few port-based cement plants at Mandvi, Jakhau, and Dayalpur.

Small private major and minor leaseholders do not have in-house testing laboratory, nor do they have knowledge of high-tech processing technology, equipments and qualified professionals. Ignorance of value-added items, domestic and international market, deprives them with opportunities for the expansion, diversification, export and establishments of value-added item projects. The district can able to attract investment in the mineral and mining sector for over Rs.5000 Crores.

3.1.2.2.1 Prospects for Value-added Mineral Products

Conventional processing of Bentonite, China clay and Silica Sand with a poor recovery and huge wastage of exploited minerals cut down the profit margins and increase the cost of production. There is a need to implement high-tech processing to manufacture of value-added products using proven technologies.

Table 3.17: Bentonite : Value-addition Possibilities

Sr	Bentonite Grade	Items	Market Price (Rs./ Kg)	Raw Price (Rs/Kg)	Technology Supplier
1	Non-swelling Calcium-based	Activated Bentonite	7	2.50	Local consultant
2	Hectareite-based Sodium Bentonite	Organo Clay	150-400 (Different Grades)	5-7	Bentec of USA
3	Calcium and Sodium -based	Catlitter (Traditional and Scoopable)	8-10	3-5	NMDC, Hyderabad
4	Hectareite-based Clay	"Rheological" additives Bentonite – 27, 34, 38, 128 and 500	10-15	6	-do-
5	-do-	Bentonite SD1, SD2, SD3, LT, EW	12-15	7	-do-

Organo clay unit and catlitter units are in operation in the district. Other three units are in production at Mehsana, Vapi and Ankleshwer.

For production of above items, indigenous technology suppliers within country are available. Some the units are making good profit and intend to expand the capacity due to increasing demand.

China clay processing is traditional and with poor recovery. There is hardly any processor engaged in value added products. Following identified value addition possibilities of China Clay have good export potential and domestic demand. Chin clay processing for rubber grade product is ideal with dry processing. Air-floated product can be marketed to Rubber industries. Other products need water and clean fuel. Calcined product can be manufactured with gas supply. Present levigation unit can consider extending the line for the paper coating and lamellar products.

Table II. Table 9.40: China Clay : Value-addition Possibilities

Sr	China Clay Grade	Items	Market Price Rs/ MT	Refined China Clay (Rs/MT)	Technology Supplier
1	Raw China Clay	Air-floated China Clay	2,000	700	Indian Bureau of Mines, Nagpur
2	Refined China Clay	Calcined China Clay	13,000	700	-do-
3	-do-	Lamellar China Clay	15,000	700	CSRI, Trivandrum
4	-do-	Paper-coating Clay	21,000	700-900	-do-

Silica sand exploited at present is only sieved into different fractions. No value-added products are manufactured. Down stream possibilities for processed washed silica items also exist in the district.

Table 3.18: Silica Sand: Value-addition Possibilities

Sr	Raw Mineral	Value-added Items	Price Rs/Kg	Price	Technology Supplier
1	Washed Silica	Precipitated Silica	8-10	Raw Silica: Rs.2.50/Kg	CSMRI, Bhavnagar
2	-do-	Silica Gel	13		-do-
3	Rounded Grained Silica	Shell Silica	4-5		Local Consultant
4	Precipitated Silica	Silica Fume	11	Washed Silica: Rs.3 to 4/Kg.	Dagussa, Germany
5	Raw Silica	Abrasive Silica	5		Local consultant
6	Washed Silica	Rejunivenation Silica	4		ONGC, Stimulation Division

For above items, few units are in operation in the state but not in the Kutch district. Silica sand value-added products are water intensive and needs chemical treatment.

Bauxite of Kutch district is reserved for GMDC's proposed "Alumina Project" since last 20 years. The proposal has not moved ahead due to technological reasons, insufficient reserves and high cost of energy. GMDC at present is considering producing "Alumina" powder in joint sector. It operates 50,000 TPA calcination plant at "Gadhshisa". During exploitation, 80% low grade (non-plant grade) bauxite is generated. All low grade bauxite within a 35% to 40% Al2O3 and up to 5% silica is lying idle at Naredi and Ratadia mine site. It is advisable to consider value-added Bauxite based items in the joint sector, after assessing its techno-commercial viability and pilot scale testing.

Table 3.19: Bauxite : Value-addition Possibilities

Sr	Raw Mineral	Items	Price Rs/Kg	Raw Low Grade Bauxite (Rs/MT)	Technology Supplier
1	Low-grade Bauxite up to 35 to 40% Al2O3	Zeolite-A (Detergent Grade)	23	200-250	CSMRI, Bhavnagar
2	Medium to High Grade Bauxite	Proppant (Well stimulation)	20-25	400-500 Al2O3 50%	Alkau, USA and JNARDC, Nagpur

Both the items are imported on a large scale and demand supply gap exists in domestic market.

Even in case of Lignite, scope for Lignite-based chemicals as well as Met coke from Lignite is the identified projects which need consideration in light of tough competition challenged by imported coal. Immediate need of the processors is technology tie up, common testing facility, modern processing equipments and good erectors. Techno- Market Studies & Pilot testing for Value-added items & pilot testing can be considered. Joint sector projects proposals for the identified bauxite-based value-added projects can be scrutinised and weighed in light of world market.

3.1.2.3 Problems and Constraints

- Coastal regulation zone notification 1991 and Environmental Impact Assessment Notification (1994) restrict exploitation of minerals within 500 meters from high-tide mark as well as minerals within sanctuary areas.
- Ceramic grade china clay, high swelling bentonite deposits, cement grade limestone are locked up within "Narayan Sarovar Chinkara Sanctuary and Wild Ass Sanctuary".
- No Broad-gauge linkage up to power projects and cement project sites.
- Shortage of qualified processors, erectors and technology suppliers.
- Distance from consuming markets of western sector.
- Shortage of water for china clay and silica sand processing units.
- Lack of analytical mineral testing laboratory within the district.
- Lack of judicious & balanced study reports for environment impact on mining activities for locked up mineral resources within sanctuaries.

3.1.2.4 Export Possibility of Processed Minerals

Kutch Bentonite has established its superior position in the international market. Crude, processed and activated bentonite are exported to Sri Lanka, Bangladesh, Kuwait, Oman, Indonesia and South Asian Countries. Activated bentonite is exported to Palm Oil producing countries (Malaysia and Indonesia). With the vast non-swelling calcium based Bentonite reserves in Mundra, Bhachau, Rapar, Abdasa and Anjar, scope to establish "activated Bentonite" item is promising. Export of the product can be encouraged with increasing demand in the overseas market. Calcined and coating clay export markets exist in the Japan, Korea, Sweden and USA. With the establishment of above product projects export can be boost up.

With the imposition of restriction of phosphate builders for detergent sector in European countries, demand for Zeolite-A has increased. Establishment of above product project by GMDC along with calcination plant of Bauxite appears viable. Scope for exports also exists for low grade Bauxite and its export.

Processed minerals as well as value-added mineral products export can be enhanced by the special incentive package of royalty and transport subsidy to the exporters. Decorative and dimension stones of Bhuj, Kotada, Andhau can be exported to South Asian countries. Unpolished cut and mottled fabric of violet and pink sand stones of Madhapur and Khodki has wide scope for cladding of high-rise complexes in US and Western Europe.

3.1.2.5 Proposed Actions for Development

- Initiate judicious & balanced study (by multi-disciplinary committee) for the assessment of environment impact of mining activities for locked up mineral resources wit hin sanctuaries.
- Identified inventory gaps for china clay, Bentonite, White clay, Silica Sand can be filled up by launching schemes for prospecting.
- Common Mineral Testing Laboratory can be erected by GMDC on a commercial scale on a no-profit-no-loss basis.

- To regularise the export of Bentonite, China clay, silica sand, low grade bauxite, a separate berthing facility at Kandla can be considered.
- Bentonite, China Clay clusters technology up gradation, personnel training, sponsored R&D projects can be taken up in co-operation of existing Association of individual minerals.
- "Mineral Wealth" District web site can be launched by the Government showcasing profiles of identified viable projects.
- Special package for transport subsidy on mineral value-added items of export can be considered.
- Royalty concession can be considered for processed minor minerals export
- A separate wing in the GMDC with mineral engineering experts be instituted to implement Value-added mineral product, enhance exports of processed minerals, sourcing and tie-up of high-tech mineral processing technology, sponsoring R&D trouble shooting projects and to attract suggested investments.
- Techno-commercial viability studies need to be carried out for specified Value-added propositions in minerals and mining sector.
- Export oriented Fly ash value-added projects (e.g. Tiles, Blocks, Cable-brick) can be considered based on Panandhro and Akrimota Power Project fly ash.

3.1.3 Handicraft Industry

3.1.3.1 Indian Scenario

India, exported US $1.9 bn worth of handicraft products in 2003 and is growing at a rate of 15 percent per annum since past 10 years. India has contributed to 10 percent of the world's handicraft exports in 2001-02. Major export destination countries are USA, UK, Germany France and Netherlands. North America, particularly the USA is the most lucrative market and 32 percent of Indian exports go to the USA. The USA's multiethnic and growing population unlike of Europe and Japan make the most lucrative market. India plans to double its exports to USA by 2010. According to GITCO contribution of Gujarat in total handicraft export of country is 10 percent.

Table 3.20: Top Ten Destinations of India's Export for Handicrafts (excluding carpets)

Rank	Country Name	2000 - 2001 (In Million US$)	2001 - 2002 (In Million US$)	2002 - 2003 (In Million US$)
1	U S A	294.8517	219.176	324.6047
2	U K	61.6174	56.1987	79.1673
3	Germany	37.554	30.4357	47.2585
4	France	31.013	29.4103	37.5341
5	Netherlands	29.243	25.8394	37.3164
6	Spain	21.8287	19.0162	30.4608
7	Italy	27.9376	19.89	24.0536
8	U A E	14.6376	12.205	20.9196
9	Canada	15.2344	12.8124	17.6554
10	Belgium-Luxembourg	9.0019	9.5755	14.5125

Source: DGCI &S

3.1.3.2 Handicraft Industry in Kutch

Kutch is famous for its handicrafts. The handicrafts mainly textile related crafts done by Kutchi women has given a unique identity to Kutch. Quality handicrafts produced in Kutch is not only symbol of their colourful way of life as well as it has been a source of livelihood for people. There is a wide range of Kutchi handicraft varying from textile-based handicrafts like hand embroidery, tie-dye (Bandhani), weaving, block printing to pottery with lime paste and mirror work decoration. Some of the villages and communities have specialized for generations in certain crafts and thereby create masterpieces. Few examples are Sodha embroidery of Loria village, patch work of Bhirandiyara, the Rabari embroidery of nana Nakhatrana, the leather work of Meghwal artisans, silver work on precious metal of Bhuj and Anjar, lacquer work on cloth of Chobari and Nirana villages. Kutch contributes significantly in Handicraft export from Gujarat. Handicraft industry in Kutch is unorganised and therefore it very difficult to estimate value of production. Gujarat State Handlooms and Handicrafts Development Corporation Ltd regularly purchases handicraft items through their office in Bhuj.

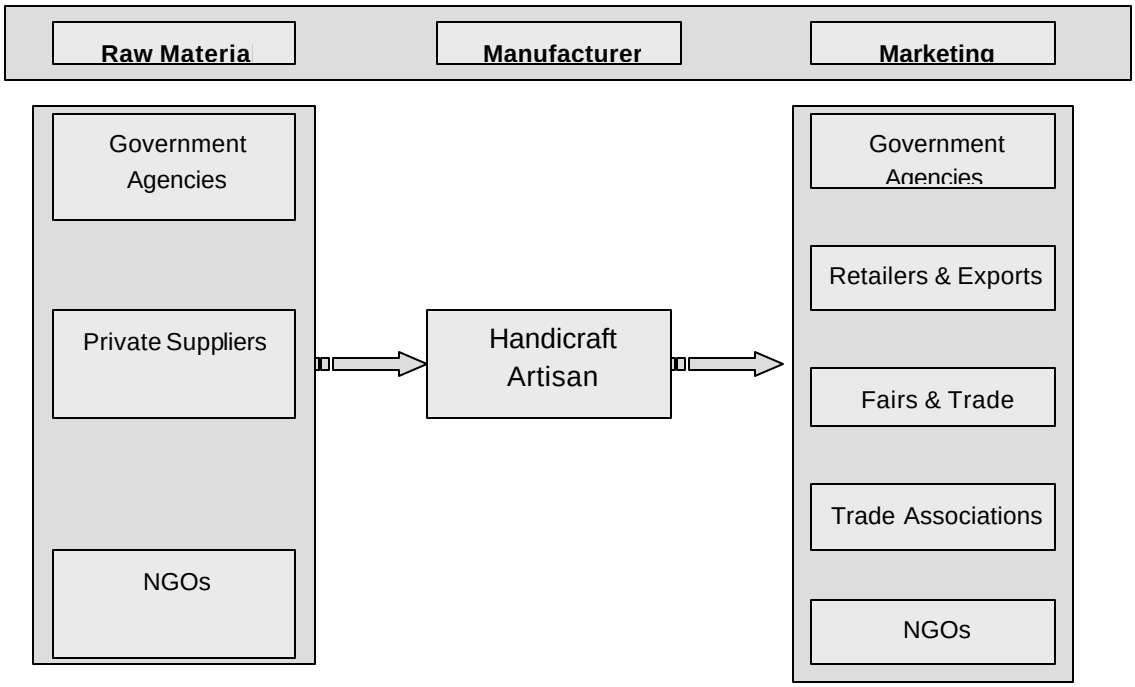
Table 3.21: Handicraft and Handlooms purchase by GHHDCL

Year	Handicrafts (In Lakhs)	Handlooms (In Lakhs)	Total (In Lakhs)
1993-94	168.93	1.67	170.6
1994-95	120.71	4.53	125.24
1995-96	92.5	3.97	96.47
1996-97	89.48	2.01	91.49
1997-98	NA	15.49	15.49
1998-99	52.6	46.46	99.06
1999-00	61.82	26.9	88.72
2000-01	108.48	20.18	128.66
2001-02	92.02	36.15	128.17
2002-03	51.23	34.05	85.28
2003-04	23.5	NA	23.5

Source: Gujarat State Handloom and Handicrafts Development Corporation, Bhuj

Gujarat Handloom and Handicrafts Development Corporation Ltd has district level centre in Bhuj to facilitate supply of raw materials and new designs to the artisans and weavers at their doorstep. According to figure provided by corporation in 2002-2003 Rs. 51.23 Lakhs of Handicrafts and Rs. 34.05 Lakhs of Handlooms had been purchase through Bhuj office. Purchase figures of corporation do not indicate any trend; in 1993-94 Rs 168.93 Lakhs of handicraft items has been purchase was highest in last ten years. Dependency on Government agencies decrease after entrance of NGOs and individual exporter who directly purchase items from the handicraft artisans.

3.1.3.3 Value Chain of Handicraft Industry



Handicraft artisan purchase raw material from market directly, Government agencies and NGOs also give raw material to handicraft artisans and take finished products to sale it in market. Non Government Organisations like Srujan, Kutch Mahila Vikas Sangathan, Kala Raskha, SEWA, Dastakar and VRTI are working with handicraft artisans by forming societies. Some international funding agencies like Oxfam Great Britain purchase handicraft items from Kutch and sale it in Britain through their stores. Marketing of handicraft done through many channels, Government agencies market these products through their emporiums established in various cities, some NGOs purchase these products sale it through their emporiums like Bhujodi and Kutch Craft Association has show rooms in Ahmedabad and Mumbai. Handicraft artisans also participate in trade fairs organise in various parts of country. Retailers also purchase directly from artisans and sale it in domestic market and export it in international market.

3.1.3.4 New Trends in Marketing

Handicraft items are also getting space in online trading. Self Employed Women Association (SEWA) organising women artisans by forming Kutch Craft Association and Banaskantha Craft Association booked orders through their websites and send products directly to purchasers. Bhujodi Association and India mart also booked orders through their websites.

3.1.3.5 Handicraft Artisans in Kutch

Handicraft industry in Kutch highly unorganised it is difficult to get exact number of artisans in Kutch. To estimate number handicraft artisans review of various studies, working papers, census report and discussion with NGOs has been done. According our estimate approximately 32000 artisans are engaged in handicraft industry in Kutch this figure will go up if we considered part time workers. Bhuj taluka in Kutch dominates in Handicraft industry more than 9500 artisans are in this taluka which is

around 30.7 percent of total artisans in Kutch. Approximately 21000 handicraft artisans are residing in Bhuj, Nakhatrana, Abdasa and Mandvi taluka which are around 70 percent of total handicraft artisan's population.

Table 3.22: Handicraft Artisans in Kutch

Sr. No	Taluka	Artisans	% Share
1	Lakhpat	1800	5.6
2	Rapar	1900	5.9
3	Bhachau	2000	6.3
4	Anjar	2500	7.8
5	Bhuj	9500	29.7
6	Nakhatrana	4000	12.5
7	Abdasa	4500	14.1
8	Mandvi	3800	11.9
9	Mundra	1000	3.1
10	Gandhidham	1000	3.1
	Total	30240	100

Source: Estimate

Gujarat Handloom and Handicrafts Development Corporation Ltd had distributed handicrafts and handlooms tool kits to 12652 earthquake affected artisans and weavers. New Non Government Organisations (NGOs) have also started working with handicraft artisans under livelihood generation programme after earthquake. According to data received from GSDMA approx. INR. 62.1 million have been raised by NGOs from various sources to support handcraft industry in Kutch.

3.1.3.6 Key Infrastructure Initiatives

Kutch Nav Nirman Abhiyan (KNNA) has established Common Resource Centre (CRC) with prime objective to facilitate a sustainable recovery for the artisans. Centre provides need based support to NGOs working in the craft sector, such as design/ technical marketing inputs and support systems etc. Centre facilitated the buyer-seller relationship by linking international and national buyers to various artisans. Centres also conduct research activities related to handicraft and block printing of Kutch. Centre has planned a holistic intervention with selected groups of artisans in Dhamadka and Bhujodi with the help of Confederation of Indian Industry (CII) to setup a crafts park in Bhuj to provide a single window platform to portray the crafts of Kutch.

FICCI-CARE has setup Business Resource Centre with long term objective of evolving into a community owned, professionally managed, commercially viable institution providing sustainable business development services to rural artisans. At present BRC is working with nearly 500 artisans in Anjar and Bhuj taluka. To bring improvement in the designs and in the products to meet the specific requirement of market Centre has tie-up with National Institute of Fashion Technology (NIFT) for developing 200 new product designs and ideas. Centre has organised workshops, exposure visits to link artisans with mainstream markets.

3.1.3.7 Problems of Handicraft Industry in Kutch

Handicraft industry in India is indirectly linked with tourism. Handicraft industry in other parts of country getting market through inflow of foreign and domestic tourist typical example is of Rajasthan where inflow of foreign tourist is very good. In Kutch inflow of foreign and domestic tourist is very less.

Handicraft industry in Kutch is basically compartmentalised in household industry due to this artisans are unaware about present market trends. Productivity is very low due to use of inferior technology which increase price of handicraft items.

3.1.3.8 Potentials of Handicraft Industry in Kutch

Handicraft industry's potential in Kutch is based on the following considerations:

- Recent growth of handicraft exports from India
- Available local skilled labourers
- Rich local tradition
- Special economic zones

3.1.3.9 Action Plan for Development of Handicraft Industry in Kutch

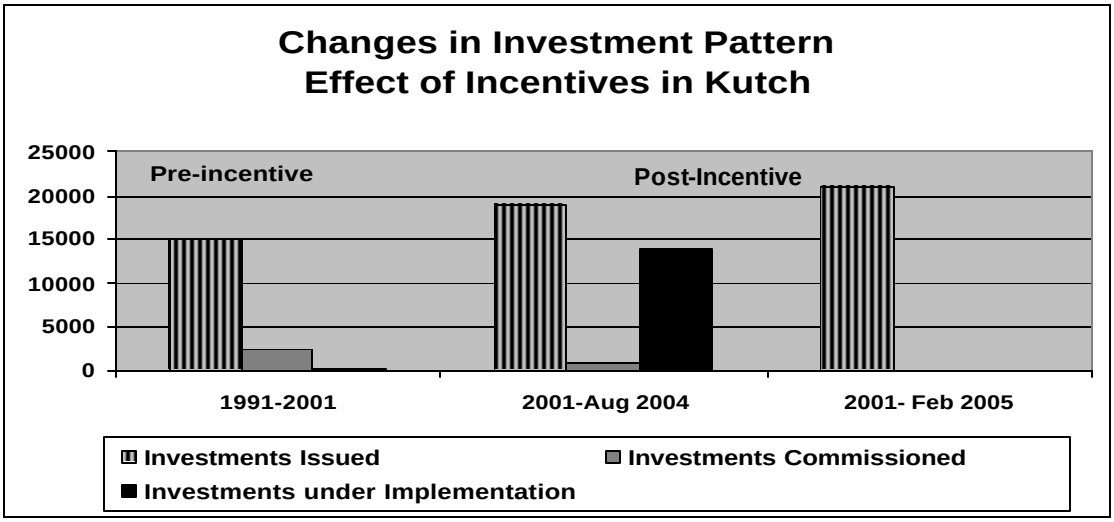
Handicraft industry in Kutch has great potential for development due to its uniqueness and presence of skilled artisans. Potential can be develop through capacity building of artisans, already some base work had been done by CII, Abhiyan, VRTI and Shrujan.

- Incentives provided in SEZ will assist in development of an integrated handicraft manufacturing design, training and trade centre.
- Integration of handicraft and textile and garment manufacturers and exporters in the region through development of an industry partnership, financing and marketing model
- CII's initiatives for develop ing the 'craft park' in Bhuj and their initiatives for marketing can be integrated with tourism promotion initiatives and apparel industries in the region,
- Research and Development Centre for Handicraft industry with the help of IITs, NID, NIFT, etc is an option for overall increase in productivity with better quality and design.
- Marketing management and branding etc can be created through involving IIM, Ahmedabad.
- Take part in international shows such as Dallas Super Market Show USA, Asian Gifts, Premium and Household Product Show, Hong Kong, Bangkok International Gifts and House Ware, Giftionery, Taipei, etc
- Strategic tie ups with companies such as Walmert, Sears, Zellers, etc
- Quality control with assistance from Handloom and Handicraft Export Council NID, NIFT
- Kutch University is also a good local option for carrying out research in handicraft sector.
- Disintegrated or partially integrated handicraft sector and development initiatives can be organised at the district level through a district level government or semi-government institute.

3.2 Linkage and Incentive Driven Industry - Potential in Kutch

Since, potential for local resource based industries (i.e. Minerals, Salt, Ceramic and Agro based industries) has been covered separately, this sections covers those industry segments which have potential either because of its linkages with existing and upcoming industries (in the wake of special concessions accorded to Kutch region) or linkages with port & SEZ (i.e. Export or Import dependent industries).

Analysis of the investment trends in the region clearly indicates the positive effects of incentive schemes.



Analysis of the recent investment trends has revealed that following is the product group pattern of industrial investments in Kutch:

Table 3.23: Incentive Induced Industries (based on analysis of list of industries commissioned / under implementation- Aug-04)

Type of Industries	No of Units	Type Products
Miscellaneous Manufacturing	15	Optical Disc, Concrete block
Chemical	14	Soap Glycerin & Oleo Chemical, Construction Chemicals, TBBA Liquid Bromine
Edible Oil	11	Soybean oil, refineries, hydrogenated oils
Met coke	11	Low ash metallurgical coke
Wood Products	10	Plywood, boards, saw mills
Food Products	9	Wheat Grading Pulse Polishing, Biscuit & confectionery
Metal Products	8	GI sheets, steel bars
MS pipes	8	pipes, coated/ uncoated
Basic Metal Industries	7	sponge iron, pig iron, Gold, Silver and Precious Metal Refinery,
Salt	6	Iodized Salt, raw salt
Electrical Machinery	4	Transformer Stabilizer, submersible pumps, AC

Machinery & Parts	4	Auto Parts, hand tools
Paper Products & Printing	4	craft paper, corrugated boxes, printing
Stone crushing	4	Stone crushing
Sewerages	3	mineral water
Hotel	3	Lodging and Boarding
Asbestos sheet	2	AC sheets
Ceramic	2	Granite tiles, glazed tiles
Hosiery and Garments	2	Dress material, towel
Rubber & Plastic Products	2	Pipes, packing bags
Wool, Silk & Synthetic fibre	2	Partially Oriented yarn, polyester film
Textile	1	Cotton ginning

It has been envisaged that the complete potential yet to be tapped. The industries, which have strong presence elsewhere in Gujarat have yet not considered Kutch as a destination, are:

- Dyes and Dyestuffs
- Chemicals and Petrochemicals
- Pharmaceuticals
- Textile Processing
- Garments
- Gems and Jewellery

The potentials can be trapped through effective actions.

3.2.1 Textile Sector: Potential in Kutch

The Textile Industry has been one of the oldest and most important sectors of the Indian Economy. It is the second largest employment provider in the country, next to Agriculture contributing to 3% of the GDP. India has also been a significant player in the Global Textile markets. It is the third largest producer of Cotton, the largest producer of Jute, the second largest producer of Silk and the 5th largest producer of synthetic fibre/yarn. India's exports of textiles and readymade garments grew by 10 % in 2001-2002 and now stand at over $14 billion. Exports of synthetic and rayon textiles rose by 23 %. There has also been a remarkable increase in export of polyester/viscose yarn by more than 35%, polyester yarn by 9% and polyester spun yarn by 28%. During this period, polyester filament fabrics increased registered an 18% growth and polyester-viscose fabrics increased by 10%.

3.2.1.1 Textile Industry-Gujarat

Gujarat is one of the leading industrial states in India and textile industry in particular had contributed in a big way to the industrialisation of the State. In fact, development of many industries likes, Dyestuff, Chemicals, Engineering/Foundry and Cotton farming is solely dependent on this sector. The State is well known for development of Hybrid Cotton, Ginning, power looms, composite mills, spinning units and independent processing Houses.

Textile Industry in general has suffered a setback, in specific, in organised sector, all over the country in the recent past. Gujarat was not an exception to this development. However, growth is prominently observed in decentralised sectors e.g. Power loom and Textile Processing, mainly in Surat and Ahmedabad. Overall economic growth of the State is very much dependent on this sector. 24% to 28%

of fixed investment, production value and employment of the SSI sector are from textiles alone. Further, 23% of GSDP comes out of textiles in the State, 16% of the cultivated land area of the state is for cotton and Gujarat is the largest cotton producer in the country. About 30% of woven fabric from organized sector and 25% of decentralized power loom sector of the country comes from this State alone. Large Fabric Process Houses are concentrated in Ahmedabad (250) and Surat (350) in the State. Surat is the largest Centre of Art Silk Fabric producing over 40% of the Art Silk fabric produced in the country. The State accounts for 12% share of the total textile exports of the country. A large number of Garment Units and Garment Processing Units are developed in urban areas of the State.

Realizing the need, State Government has, therefore, taken active step in developing Apparel Park, one at Surat and the other at Ahmedabad under active support of Union Ministry of Textile. Besides, Jetpur, a Centre of Sari Printing, has been already earmarked for setting up a Textile Park in near future.

In Gujarat, textile industry mainly manufactures cotton-based fabrics in Mill Sector. The major reason is being easy availability of the basic raw material in the State, i.e. Cotton. Similarly, many spinning units producing only 100% cotton yarns were established in the state. The State happened to be more conservative with cotton textile products mainly in organised sector. Surat art silk manufacturers are only exceptions, weaving, Synthetic Textiles in decentralised sector. Similarly, independent processing units' process synthetic blended and cotton fabrics. Clusters of processing units are located at Surat, Ahmedabad (Narol) and Jetpur. Though these units fall under decentralised sector, some of them operate on medium scale production capacity having good capability of processing wide range of fabrics.

Readymade garment manufacturers and hosiery knit wear units also exist in SSI category. In early 1990s, Gujarat saw a dramatic change in its textile industry scenario where quite a few textile mills started manufacturing denim. The Arvind Mills, Ashima Textiles, Soma Textiles, Modern Denim, Arvee Denim are the prominent group concentrating in Denim manufacturing.

3.2.1.2 Potential Projects in Kutch

Based on the situation analysis, it can be concluded that the Kutch region can attract textile projects which are either export oriented, highly labour oriented or less water intensive. Following export-oriented textile projects can be attracted to / near proposed Textile / Garment Zone of Mundra SEZ.

Table 3.24: Potential of Textile Based Projects in Kutch

Sr	Project	Favourable Factors	Size	Investment
1	Woven Labels	Besides domestic market, this sector is growing also in International Market Requirements would also be from the Garment export units of Kandla & Mundra SEZ Non-water Intensive	0.2 Million set per annum.	US $ 0.32 Million (Rs. 16 Million)
2	Denim Fabric	Rising indigenous demand as well as export demand SEZ & Port Linkage would be advantageous	10.0 MTA	US $ 20 Million (Rs 1000 Million)
3	RMG Units	Rising indigenous demand as well as export demand SEZ & Port Linkage would be advantageous	15 Lakh Shirts	US $ 0.2 Million (Rs. 10 Million)
4	Readymade Knitted	Both international as well as domestic market	200 Thousands of 'T'	US $ 2.4 Million

	Garments	has good potential although there are quite a number of players. Export potential is encouraging especially in the countries like USA, China, Hong Kong and other European countries. The estimated demand is around Rs 40 billion in the domestic market. Further in the international market, India's share is estimated at around 25% of the total export market of Rs 240 billion. SEZ & Port Linkage would be advantageous	shirts per annum.	(Rs. 120 Million)
5	Grey Cotton fabric	Very wide applications of uses wide developing indigenous market as well as export market with an annual growth of 25%. Local demand from Handicraft Industry SEZ & Port Linkage would be advantageous	0.8 Million meters per Annum	US $ 0.6 (Rs. 30 Million)
6	Cotton Yarn Spinning (Open ended)	Good availability of cotton (log staple variety) in Kutch and Saurashtra Local as well as export demand SEZ & Port Linkage would be advantageous	25000 spindles	US $ 2.0 Million (Rs.100 Million)

3.2.1.3 Initiatives required

- Special Textile / Garment Zone meeting specific infrastructure requirements of industries be planned in the SEZ.
- Also need to attract Large Textile and garment Export Houses to Mundra or Kandla SEZ
- Setting up of textile / Garment manufacturing training institutes in the region to develop local capabilities
- Cotton Weaving and Spinning yarn projects are power intensives and may some concessions be granted.

3.2.2 Gems and Jewellery: Potential in Kutch

The cutting and polishing of Diamonds and precious stones is one of the oldest traditions in India and the country has earned considerable goodwill, both, in the domestic and international markets for its skills and creativity.

Gems and Jewellery industry is the leading foreign exchange earner for the country. It is also one of the fastest growing Industries in the country. It is an artistic and creative industry and in the world no other country could match India in the cutting of gemstones and crafting of beautiful and fine jewellery. The importance and attraction of the Industry can be judged by the fact that over 1 million people are employed in the industry and it is still growing at the rate of approximately 15 % every year.

The biggest advantage that Indian Jewellery has is its low cost. The diamond jewellery, which is produced between $ 60 and $ 90, the overseas importer sells for $ 180. In other words, there is considerable value addition. The current consumption of gold in India is estimated at over 900 tonnes used mostly in 20 / 22 carat jewellery

India accounts for nearly 55% of the world's net exports of cut and polished diamonds in value terms, 90% in terms of pieces and 80% in terms of carats. It is therefore not surprising that there are chances that nine of ten diamonds in the world would have been cut and polished in India.

India today occupies top position in importing, processing and exporting diamonds. Of the total world exports of 27.25 million carats of cut and polished diamonds, more than 70 % exports are from India.

Exports of the commodity group 'Gems and Jewellery' are

- Diamonds
- Precious / Semiprecious stones or colored gemstones
- Gold Jewellery
- Pearls
- Non-gold Jewellery
- Synthetic stones Costume / fashion Jewellery.

India has only 1% of the total world market of $ 105 billion of jewellery. Margins are high compared to diamond as branding can demand high premiums. India has tremendous potential for jewellery exports. The leading jewellery exporters believe that what has been achieved in diamond exports can be attained in jewellery export too. India has many natural advantages to accomplish this. India has at present, perhaps the largest and the best artisan force for making jewellery in the world.

3.2.2.1 Gems and Jewellery Industry: Gujarat

Gujarat accounts for almost 80 % of the diamonds processed in India. Of this, 90 % are processed by about 10,000 diamond units located in and around Surat alone. Rest of the diamond units are located in Ahmedabad, Palanpur, Bhavnagar, Valsad and Navsari.

Surat became a diamond-processing centre as early as 17th century and is today the main diamond city in India. Exports of Gems and Jewellery from Surat alone were in the tune of Rs. 3330 Million in the year 2000-2001. Although Ahmedabad is an export point, bulks of them are traded at Mumbai. Besides, Gems and Jewellery Export Promotion Council & Indian Diamond Institute is also functioning at Surat.

The advantages of investing in diamond processing in Gujarat are:

- Low cost, economic and skilled labour
- Availability of large number of skilled labour
- Easy availability of institutional and Bank finance
- Relaxed government rules and regulations

Other competitive world centres like Hong Kong, Thailand, Taiwan, Korea, U.S.A., Italy, etc. are becoming costlier with decreasing availability of skilled labour.

3.2.2.2 Potential Projects in Kutch

Most of the projects in Gems and Jewellery sectors (i.e. Diamond Polishing, Manufacturing of hand made and machine made Jewellery) are largely exported oriented. Location of such units in SEZ,

would be advantageous. Besides, Diamond processing and Jewellery making is labour-intensive. Local skills for making traditional jewellery can be utilised. Following export-oriented textile projects can be attracted to / near proposed Gems and Jewellery Park of Mundra SEZ

Table 3.25: Potential of Gems and Jewellery Projects in Kutch

Sr	Project	Favourable Factors	Size	Investment
1	Studded Gold Jewellery	Excellent export market as well as fast growing domestic market for studded gold jewellery. This will also generate employment for local artisans in the state. SEZ may be excellent location for the project	360 Kilogram per year	US $ 0.4Million (Rs. 20 Million)
2	Machine Cast Gold Jewellery Unit	Established export market in Europe, Gulf countries, far-east Asian countries and also fast growing domestic market for standard design gold jewellery. This will also generate employment for local artisans in the state. SEZ may be excellent location for the project	1000 Kilogram per year	US $ 0.3 Million (Rs. 15 Million)
3	Diamond Polishing Unit	Established export market in Europe, Gulf countries, far-east Asian countries and also fast growing domestic market for standard design gold jewellery. This will also generate employment (approx.750) for local artisans in the state. SEZ may be excellent location for the project	Over 7500 pieces daily (0.01-0.50 carats mainly)	US$ 0.3 Million (Rs.15 Million)
4.	Diamond & Jewellery Park	Necessary space and infrastructure can be provided at / near Mundra SEZ		US$ 30 million Rs.1500 Million

3.2.2.3 Initiatives required

- Special Gems and Jewellery Zone meeting specific infrastructure requirements of industries be planned in the SEZ.
- Setting up of extension centre of Diamond Training Institute in the region to develop local capabilities
- Air linkage is very crucial for the exports of diamond and Jewellery. Immediate attention is required in this direction.

3.2.3 Chemical Sector-Potential in Kutch

The Chemical and Petrochemical Industry occupies an important place in the country's economy, as the Chemical industry has grown at a pace outperforming the overall growth of the industry. The Chemical Industry produces a wide spectrum of products, which include Pharmaceuticals, Dyes, Man-made Fibres, Plastics, Pesticides, Fertilizers, Cosmetics and Toiletries, Paint, Auxiliary Chemicals and wide range of Organic and Inorganic compounds for applications ranging from automobiles, textile industry, engineering industry, construction chemicals and food additives to veterinary and health care products.

The Chemical Industry constitutes about 14% of India's industrial production and 10% of the total exports from the country. A substantial proportion of these exports go to USA, Europe and other developed nations.

3.2.3.1 Chemical Sector- Gujarat

Chemical and Petrochemical Industry is the leading sector in terms of the projects filed as well as under implementation category as indicated by the analysis of the investment in chemical and allied sector vis-à-vis total industrial investment in all sector. The Chemical Industry in Gujarat comprises of about 500 large and medium scale industrial units, about 16,000 of small scale industrial units and other factory sector units.

Since August 1991 up to June 2004, chemical and allied sector accounts for an investment of Rs.1641 billion which is 47.8% of total investment of the state. Similarly 1497 projects of the chemical and allied sector involving an investment of Rs. 554 Billion have been commissioned/concluded, accounting for about 55.90% share in investment of the total projects commissioned. Also 398 projects envisaging an investment of Rs. 231 Billion are under implementation in Chemicals and Allied Industry. The Small Scale and Factory Sector industry in Chemical and allied field has also shown an impressive contribution in the sub-sectors of Dyestuff and Pharmaceuticals, Paints and Fine Chemicals producing large number of value added products.

The major reasons which could be attributed to such a spectacular growth of this sector in the state are a strong base of petrochemical industry, increasing availability of basic feed stock, relatively low overhead cost, availability of necessary infrastructure, trained and technical manpower and high degree of entrepreneurship. Gujarat Industrial Development Corporation (GIDC) has set up mega estates, particularly for chemicals at Ankleshwer, Panoli, Vapi, Vatva, Jhagadia, Vilayat and Dahej to facilitate further development and growth.

The lower per capita consumption of many important items at present and growing middle class with increasing purchase power constitutes an attractive market for various products The development of Chemical and Petrochemical Industry requires creation of basic and allied infrastructure facilities and in view of the availability of the same, the Indian/Gujarat Chemical Industry has opportunity to grow within as well as outside the country. Further the motivated entrepreneurs, pool of technical manpower and flexibility to changes in production set up which forms the competitive strength of the Chemical Industry in the State and therefore, will rise to all opportunities for development and growth in the investment.

The Chemical Industry needs to engage in strategic partnerships with foreign partners with a view to realize and capitalize the latent potential. The existing technology needs to be upgraded with the help of foreign partners. The Chemical Industry in India/Gujarat provides a large scope for collaboration in Technology tie-up, Process Development, Joint Research and Development, Solid and Liquid Waste Management and Market Access for various sub-sectors of the industry.

3.2.3.2 Chemical Sector- Potential in Kutch

Kutch as a location has following positives for proliferation of chemical sector:

- Availability of vast wasteland for development (existing South Gujarat corridor is on the verge of saturation. Kutch provides the scope for further expansion of this industry in the state)
- Availability of several ports (including two large ports) would facilitate import of feedstock and export of final products
- The region is less environmentally sensitive Environment Sensitivity of the region (Except for few pockets falling under forest and sanctuary, overall the region is environmentally less sensitive because of sparse

population, non-cultivable land. Because of sparse population and remoteness, there would be fewer issues of displacement and resettlement)

- Multim odal connectivity, which is being upgraded

However, the region has scarcity of power and water. Scarcity of power is still addressable through captive generation, but the problems of water infrastructure will need some time to address.

The scope for salt based and mineral based chemical industries have been covered separately under Local Resource based industries. The potential for large Mega Chemical Industrial Estate (which will be largely Petrochemical based industries) also have been covered separately. Apart from these, there is wide range of chemical projects (in organic, Inorganic, Agro-chemical, Dyes & Intermediate, Bulk Drugs & speciality chemicals sector), which are export oriented & less water intensive can come up in Kutch.

3.2.3.3 Initiatives required

- Special chemical estates to be developed in the vicinity of ports
- Implement few mega project (like LNG Terminal, Refinery or Mega Chemical Industrial Estate) to trigger fast development of chemical sector in the region.

3.2.4 Basic Metal / Metallurgical Sector

In the wake of special incentives accorded to Kutch region, there has been spurt of investment in the region especially in basic metal and metallurgical sector. Several sponge iron, pig iron, steel and their downstream projects (i.e. Pipes, Sheets, TMT Bars) are being implemented in the region.

Further scope in Kutch in this sector appears for following downstream / dependent projects:

Table 3.26: Potential of Metal and Metallurgical Sector in Kutch

Sr	Project	Favourable Factors	Size	Investment
1	Ferro Alloys Projects	Excellent export market as well as likely regional demand by upcoming Sponge Iron Units	60,000 TPA	US $ 6 Million (Rs. 300 Million)
2	Spun CI / DI Pipes	Good domestic demand for Spun CI / DI Pipes for Water / Sewerage Infrastructure projects Sizeable regional demand due to water supply schemes under implementation and increased reconstruction and project activities. Good prospects for the export of DI Pipes to GCC / Middle East	30,000 TPA	US $ 5 Million (Rs. 100 Million)
3	Met coke Project	Import of coking coal-main raw material would be convenient and economical as the production would be near Mundra and Kandla port. Users of Met coke, largely metal making companies have a strong concentration in the Western belt.	3 Lakh TPA	US$ 11 Million (Rs.550 Million)
4.	TMT Bars	Good prospects have been envisaged for domestic producers of Steel bars and rods, in	75,000 TPA	US$ 1.6 million Rs.80 Million

	view of Growth in the domestic infrastructure sector, Overall boom in the domestic construction sector and Increasing exp orts Sizeable regional demand due to increased construction activities (in Residential, Commercial, Industrial and Infrastructure sector) in the region.

3.3 Mega Projects

Mega projects are important for rapid development of a region. Two potential mega projects are considered for Kutch. These are:

- A mega chemical industrial estate and
- An LNG Terminal

3.3.1 Mega Chemical Industrial Estate

3.3.1.1 Project Concept

The Chemical and Petrochemicals industry occupies an important place in India's economy. It constitutes around 12% of India's industrial production. Exports from this constitute 12.5% of the country's export of manufactured goods. This sector provides employment to over 8.5 lakhs persons, which is 10% of the total employment in the organized sector.

The Indian Chemical and petrochemicals industry produces a wide range of products, of which is large number are internationally price competitive. Due to its price competitiveness, this sector has a tremendous potential for growth in the coming years and given facilitative environment, it could emerge as a major foreign exchange earner.

By its very nature, the chemical and petrochemical industry requires certain basic infrastructural facilities, including a good port, chemicals storage terminal, adequate berthing facilities, a common effluent treatment plant and most import, an effective green belt to segregate the industrial units from human settlements. Some chemicals are hazardous and pollute the environment and therefore have to be carefully managed at all times.

The Indian chemical industry lacks modern integrated infrastructural facilities. It is felt that the production and export earnings of this sector would receive a quantum jump if an industrial estate dedicated to the chemical industry is set up in line with those existing in Netherlands, Belgium, Germany, Spain, Singapore, Thailand, Saudi Arabia and China.

At present, chemical industrial units are spread all over the country. Although a large number of them are situated in Gujarat and Maharashtra, the country still does not possess an area where all facilities required for the growth of chemical industries are available. Each unit has to create these facilities on its own which leads to duplication of effort and investment which is a national loss. If related industries are set up in close proximity in an industrial estate, they could be vertically integrated resulting in a savings on the transfer cost of feed stocks and finished goods. This, coupled with lower investment on infrastructure as a result of sharing, would tremendously improve the cost competitiveness of the Indian products in the world market.

The need for having a specialized industrial estate dedicated to chemical industries is being felt the world over. Considering the future global economic scenario, some countries have already started action on these lines. Singapore, for instance has developed a mega industrial complex for chemical and petrochemical industry in 3000 hectare land at Jurong Island. It has comprehensive infrastructural facilities which have been able to attract companies like Esso, Du Pont, Mobil, Shell, Petrochemical Corporation of Singapore and Singapore Refining Company. It is home to twenty companies with a total investment of US$ 9 billion (Rs.33,000 crores) and projects with investments totalling US$ 4 billion (Rs.17,000 crores) in the Jurong Island to prime the growth of chemical industry in the new millennium.

Sophisticated, well established systems are available for executing such mega projects. It is conceived that an SPV could be brought into existence for the development of the concept and for the actual execution of the project. The financial commitment of the Govt. may be limited to expenditure related to identification of sites and payments to the initial consultant. Later, the Govt. of India and the concerned State Govt. could also become minority holders in the SPV.

The Department has proposed the identification of possible new sites as also of existing clusters of chemical industrial units which have some of these facilities and which have the potential of being developed into mega chemical industrial estates through up-gradation of the existing infrastructure along with creation of the other necessary facilities.

The Department of Chemicals & Petrochemical has set up an inter-ministerial committee comprising of representatives of the Ministries of Environment, Surface Transport, Power and Petroleum & Natural Gas to examine the issue. The Department has also obtained information from states about sites which can be developed into dedicated chemical industrial estates. Orissa, Gujarat, Kerala, West Bengal and Tamil Nadu have submitted their proposals. An expert committee is studying the various proposals reserved from state government to select the most appropriate site.

The advantages of such a comprehensive integrated chemical and petrochemicals estate will be.

- Synergy in function and co-sitting
- Efficient inflow of raw materials and outflow of finished products
- Cost competitiveness
- Assured supply of utilities
- FDI inflows (through participation of large MNCs)
- Environment friendly and less polluting

3.3.1.2 Global Chemical Estates – Success Stories

Chemical estates have been operating in many countries for quite some time. The concept of Mega Chemical Complex first implemented in USA and some of the European countries. China, Singapore and some Middle East countries have recently set-up such estates based on cluster approach. The list of such successful estates is given below:

Table 3.27: MCIE – Successful Models

Country	Estates
USA	Bayport – Houston

Netherlands	Port of Rotterdam
Belgium	Port of Antwerp
Germany	Bitterfeld, Leuna, Ruhr
France	Nord-Pas de Calais, Lacq, Marseilles
Spain	Tarragona
China	Shanghai, Nanjing
Saudi Arabia	Al Jubail
Singapore	Jurong Island

Except few all these chemical estates have their product-mix based on Refinery / Petrochemical Unit output or major building blocks as shown in the table below:

Table 3.28: Product Configuration of the major Chemical Estates

Products	POR	POA	Houston	Jurong Islands	Shanghai	Nanjing
Refinery	☑	☑	☑	☑	☑	Located close by
Ethylene	☑	☑	☑	☑	☑	☑
Propylene	☑	☑	☑	☑	☑	☑
Butadiene	☑	☑	☑	☑	☑	☑
Benzene	☑	☑	☑	☑	☑	☑
Toluene	☑	☑	☑	☑	☑	☑
Xylene	☑	☑	☑	☑	☑	☑

Source: DMM Analysis

Other common feature linking major chemical parks are the presence of large international chemical companies. Top three global players of the chemical industry are operating in 3 out of the six international estates studied. The next four large chemical companies are operating in two out of the six estates studied.

Table 3.29: International Chemical Companies operating in Global Estates

Sr.	Tenants	POR	Port of Antwerp	Bay Port Houston	Jurong Islands	Shanghai, China	Nanjing, China
1	BASF		☑		☑	☑	☑
2	Atofina	☑	☑	☑			
3	Esso	☑	☑		☑		
4	Air Liquide			☑		☑	
5	BP				☑	☑	
6	Dupont			☑	☑		
7	Huntsman	☑				☑	
8	Shell	☑			☑		
9	3 M		☑				
10	Akzo Nobel	☑					
11	Baker Petrolite			☑			
12	Bayer					☑	
13	Borialis		☑				
14	BRC		☑				
15	Cargill		☑				
16	Celanese				☑		
17	Chevron				☑		

18	Degussa		☑		
19	Eastman	☑			
20	GE	☑			
21	Haldor			☑	
22	Ineos		☑		
23	Kuwait Petroleum	☑			
24	Lonza			☑	
25	Lyondell	☑			
26	Mitsui				☑
27	Mobil				☑
28	Monsanto		☑		
29	Nerefco	☑			
30	Nynas		☑		
31	Petroplus		☑		
32	Sabic	☑			
33	Shinetsu	☑			
34	Singapore Refinery				☑
35	Solvay		☑		
36	Sumitomo				☑

Source: DMM Analysis

On reviewing the genesis and model of development of these Mega Chemical Industrial Estates, following conclusions can be drawn:

- The earlier estates (i.e. Bayport, POR, POA) have evolved as a naturally formed clusters around the refinery and petrochemical unit.
- While the recently developed estates (like Jurong, Al Jubail, Shanghai and Nanjing) are systematically planned estates based on Anchor Tenant Model, i.e. Identifying an 'core company' and designing the estate complementing this 'anchor' by establishing a network of units needed to supply materials, services and use by-products.

The following table briefly outlines the size of the estates, its genesis and operating and management structure.

Table 3.30: Global Chemical Estates – Configuration and Management

Estate	Area	Genesis	Management
Port of Rotterdam	3000 hectares	Refineries set up by Shell,Esso, Kuwait Petroleum Europoort and Nerefco followed by setting up of Petrochemical complexes	Rotterdam Municipal Port Management leases the land and manages the nautical safety, port superstructure managed by the private sector
Port of Antwerp	3000 hectares	Refineries set up by Atofina-elf and Esso Belgium and ethylene crackers based on refinery output	Antwerp Port Authority owns and manages the docks, berths and the sites used by the port operators. There are private sector service and logistics providers
Bayport Houston	3000 hectares	Bbasic infrastructure of the Port of Houston enabled the Refinery to be set up by Exxon Mobil, followed by the	Land leased by Port of Houston (POH) Authority. Public facilities owned & operated by POH authority and private operators provide the services

		setting up of two petrochemical complexes	
Jurong Islands	2800 hectares	Refineries set up by Esso, Singapore Refinery Company, Mobil Oil and Shell	JTC Corporation has planned and co-ordinated with different government agencies in land development and delivering the necessary infrastructure. Third party service providers provide the necessary support services.
Shanghai Chemical Industry Park	3000 hectares	Development of Chemical estates under the 10th-Five year plan of the Chinese Government. The refinery and ethylene cracker is planned in close vicinity to the complex.	SCIPDC, a public-private partnership consortium is responsible for the development and construction of SCIP. There are private service providers
Nanjing Chemical Industry Park	5000 hectares	Part of Chinese government's on-going plan to augment the country's capabilities in Chemicals sector. Feedstock to be accessed from the refinery and petrochemical complexes located nearby.	Local provincial estate of Jiangsu developing the estate

Some of the common threads linking these successful estates can be summarized as given below:

- Development based on Anchor Tenant Model
- Basic Petrochemical feedstock company or Large Integrated Chemical Company as an "Anchor Tenant"
- Access to significant public sector resources
- Proximity to port or Refinery
- Role of promotional agencies
- One-stop shop able to handle all aspects
- Business "tenants" actively involved
- Precise delineation of sites
- Clearly laid out grant structures
- Growth of estates mainly through growth / expansion by tenants

3.3.1.3 Mega Chemical Industrial Estate (MCIE) – Case for India

The global chemical industry is currently estimated at around USD 1900 Billion. In the global chemical production, USA has a share of 25%, Europe has a share of 34% and Asia has a share of 33%. The major global industry segments are petrochemicals with a share of 35-40%, pharmaceuticals with a share of 18-20% and performance chemicals with a share of 16%.

Historically, the chemical industry has been one of the better performers in the manufacturing sector. However, it has underperformed in recent years due to the lowering of GDP growth rates in developed countries. Between 1998 and 2003, the industry grew at an average growth rate of 2.7% p.a in Europe, 0.7% in USA and 1.3% in Japan. In the European market, the pharmaceutical segment has been the fastest growing with a growth rate of 6.8% p.a. followed by plastics and synthetic rubber with a growth rate of 1.6% p.a. during 1998-03. In the US market, the pharmaceutical segment has grown at

4.6 % p.a during 1992-2002 whereas basic chemicals recorded negative growth rates during the same period. In the Japanese market, Aromatic chemicals grew at 3.4% p.a during 1992-2002 while other petrochemicals, plastics and rubber showed positive growth rates during the same period. The industry is expected to recover and reach sales of US$ 2.4 trillion by 2010 primarily due to growth in the Asia-Pacific region (primarily China and India).

The chemical industry is characterized by increasing international trade, high susceptibility to variations in raw material prices, business cyclicality leading to over capacity and public concerns about environmental safety. The global chemical industry is driven by globalisation, consolidation, focus on cost reduction, increasing focus on R&D, core competence and increased use of information technology. The trends in the global chemical industry have important implications for the Indian chemical industry. The Indian chemical companies need to explore the opportunities in the global market with alliances and joint ventures with overseas players. The strategies for globalisation should be based on the strengths of low cost manufacturing base and skilled workforce. Indian industry needs to invest in the emerging growth areas. The industry needs to upgrade capacities to improve competitiveness.

The Indian Chemical Industry, though being the one of oldest manufacturing sector in India and producing more than 70000 chemical products, has been growing rapidly in the last decade. 10 % of the exports from India are in chemicals. The Indian chemical industry is valued around 30 Billion USD and contributes 8 % to the GDP of India. Indian chemical industry is only 2 % of the total world chemical market.

Petrochemicals are the largest sector contributing 22 % to the chemical industry of India. There is huge potential for the Petrochemical Industry in India considering the low per capita consumption of petrochemical products in India. Petrochemicals in India are growing at more than 15-16 percent per year. The domestic demand for Petrochemicals has grown at around 10% during the Sixth Plan, 13.2% during the Seventh Plan and 25% during the Eighth Plan. With future consumption of polymers expected to grow by 15 % and that of fibres and intermediates by 7-8 %. Petrochemical sector offers immense opportunity for growth and potential for investment by domestic as well as foreign players.

The Indian Pharmaceuticals sector has come a long way, being almost non-existing during 1970, to a prominent provider of health care products, meeting almost 95% of country's pharmaceutical needs. The domestic pharmaceutical output has increased at a compound growth rate (CAGR) of more than 13.7% per annum. In 2003, the domestic pharmaceutical market was valued at approximately US $ 7 billion. The global output of the Indian pharmaceutical industry ranks 4th in terms of volume and 13th in terms of value. India is one of the top five producers of bulk drugs in the world. Indian pharmaceutical market has good potential to grow due to its well developed industry with strong manufacturing base, well established network of laboratories and R&D infrastructure, highly trained pool of scientists and professionals, strong marketing and distribution network, very strong reserve of engineering skills, potential ground for clinical trials, fast growing health care industry, cost competitiveness, rich bio diversity and a growing biotechnology industry. The exports constitute almost 40% of the total production of pharmaceuticals in India and the past 5 years have seen pharmaceuticals exports growing by 30% per annum. Further during 1999-2005, drugs with annual sales of $30 billion would go off patent globally. The Indian pharmaceutical industry, with the extensive qualified manpower skills has relatively low cost structure, is ideally placed to tap the generics market. Indian companies are climbing the value chain by exporting to developed markets

and from bulk drugs to formulation exports. As a result, Indian companies are expected to produce six of the top 10 drugs that are scheduled to lose patent protection over the next five years.

Inorganic chemicals valued at USD 2.5 billion had an average growth rate 9% during the last decade as compared to the industry average of 6 percent. It covers basic products like Caustic soda, Chlorine, Sulphuric Acid, soda ash etc. This segment especially the caustic soda and soda ash sectors have faced difficulties in the past due to large capacity increase in caustic soda, which had let the supply over stripping the demand. Competitively priced imports have also negatively impacted this sector. This sector has a low growth potential in India.

The total Indian dyes and paints segment is around USD 1 billion and the segment is growing at 12 %. This segment has a good potential for development because of the low per capita consumption in India as compared to developed countries like USA (15 kg). The market is highly fragmented with 25 large and medium players controlling 50 percent market share and the rest 50 percent is with 2000 unorganised players.

This agro chemicals sector has a market size of USD 0.8 billion and is growing at 10% and covers mainly Pesticides, Fungicides, Weedicides. India is the 13th largest exporter of pesticides and disinfectants in the world, and in terms of volume, is the 12th largest producer of the same. Average Indian consumption is very low (1/20th of the world average). The Pesticides industry in the agro chemical sector has developed substantially with technical grade pesticides growing at the rate of 10% in the last few years and offers immense export possibilities in view of its international quality and competitive prices. Agro-chemicals hold the highest export potential for India.

As explained in the above sections, it can be concluded that the Indian Chemical Industry has good potential to be developed due to easy availability of raw materials, trained and skilled workforce, technically qualified managerial staff, low production costs and very low per capita consumption of chemicals.

The Indian chemical companies need to collaborate to improve competitiveness. A Mega Chemical Industrial Estate (MCIE) can provide opportunities for collaboration between industry players to reap the benefits of resource sharing to reduce costs, greater marketing power and an enabling environment.

3.3.1.4 MCIE Project Development – Challenges and Options

There are certain challenges in establishing such facilities. Some of these include:

- Complex inter-firm interdependencies can lead to higher risks to collaborating companies. Companies using each other's residual products face the risk of losing critical supply or market if a plant closes down. Moreover, the over emphasis on closing all material flow loops between companies can sometimes result in competitive disadvantages for some companies.
- The planning and implementation of such integrated estates bears the risk of higher development cost due to higher standards and thus concession periods may be extended compared to traditional estates to make them viable.
- The importance of public private partnerships to develop such estates is often over emphasized. Too much dependence on public agencies and little leadership from real estate developers and other private sector companies is often a concern

- There are existing integrated estates in Europe, US, SE Asia and Far East, which will pose a competition to the MCIE
- Getting the Anchor Industry/ Developer to initiate the project

At present, the responsibility for development of industrial infrastructure lies with the state governments. Even the centrally sponsored schemes are executed by state governments. In most states, the responsibility of developing industrial estates is with the respective State Industrial Development Corporations (SIDCs).

Commercialisation of industrial infrastructure requires a collaborative approach and participation from various stake holders like private sector, financial institutions, central, state and local governments. The setting up of the industrial infrastructure requires infrastructure like ports, rail, roads, water, power, telecommunications etc

Primarily, two basic approaches are recognized for the development of industrial estates:

- Natural or self organized system approach:

The approach says that facilitated organic growth of linkages between companies provides better results as companies keep ownership of the system and the system develops gradually with its own character.

- Engineering system approach:

The approach relies on detailed analysis of data as well as local / regional resources and energy flows. This approach assumes that once the efficiency maximizing interconnections have been identified, companies will operate accordingly.

Some of the alternate project development models for MCIE are given in the following table.

Table 3.31: Models and Approach for development of Mega Chemical Industrial Estate

Project Development Model	Approach	Developer
Green-field Estate	Building an estate on a fresh site with developmental and social objectives	Public entity especially SIDC's.
Anchor Tenant Model	Identifying an existing 'core company' and designing the estate complementing this 'anchor' by establishing a network of units needed to supply materials, services and use by-products	Public entity develops the estate after identifying the anchor company and provides incentives to 'Anchor' company
Stream Model	Analysing raw material , resource flows and infrastructure in a existing area and creating an estate by networking the users of complementary streams	Public entity along with private Developers
Redevelopment Model	Analyzing material and energy flows, possibilities of collaboration in an existing established industrial estate, enhancing environmental performance, cleaning up past pollution by detoxification and presenting possibilities of improvement and facilitating collaboration	Public entity Industrial estate management Companies

3.3.1.5 Development Cost

The major components of the capital cost for setting up of the mega chemical industrial estate include:

- Land and site development Cost including approach roads and Internal Roads, Fencing, Green Belt

- Electricity : Captive power plant, Sub Station cost, Transmission, Transmission Lines, Street lighting/General Lighting,
- Steam Network
- Water Supply : Internal Network, Storage Reservoirs/OHTS, Pumping Stations
- Effluent Treatment Plant , Effluent Disposal, Internal Network, Disposal Pipelines on land, Disposal Pipeline under sea
- Testing laboratories
- Fire Fighting

Further the development cost would vary depending on the development model in such an estate. The developer only develops the area and the basic infrastructure like land levelling, internal roads, lighting etc. and the remaining infrastructure like the pipeline network, CETP, power generation, tank terminals etc are developed by independent developers then the cost structure would be much different. Internationally most of the industrial estates have developed the basic infrastructure only and many common infrastructures like the pipeline network, tank terminal etc have been developed by independent developers. The basic cost details of some of the international estates are given in the following table:

Table 3.32: Development Costs of Chemical Estates

Estate	Area(Hectares)	Cost(Rs Million)	Cost Includes
Al-Jubail	10000	495000	Land Development, utilities, roads, Industrial port development
Port of Rotterdam – Expansion	1000	140000	Land reclamation and developm ent, building of sea-defense wall
DID Industrial Area, Qatar	1050	15000	Land development, internal roads, drainage, water and electrical supply system, adm building, landscaping, gas network

Source: DMM analysis

3.3.1.6 Location for MCIE – Critical Factor for Success

The Department of Chemicals and Petrochemicals has proposed to set-up the Mega Chemical Industrial Estate in public -private partnership by identification of new sites (i.e. Green field Project) and also assess the existing clusters of chemical industrial units (i.e. Redevelopment Model), which have some of these facilities and which have the potential of being developed into Mega Chemical Industrial Estate through up gradation of existing infrastructure along with creation of other necessary facilities.

The international chemical estates, as described in the earlier sections, all have the source of basic feedstock/ building blocks in the estate. The market analysis also suggests that globally there will be a demand-supply gap for major petrochemical building blocks because of the increase in per capita consumption of petrochemical products. Thus, the location parameters are based on the premises that the MCIE should be close to the sources of supply or accessible to the sources of supply of the major feedstock.

The location of the MCIE is a key factor determining its success. The location should be decided based on an analysis of the competitive advantage and inherent strengths of the region/location.

The socio-economic characteristics of the region need to be analysed coupled with the traditional skill or industries in the region. The work culture and history of labour problems determine the availability of skilled manpower for the industries to be located in the region.

Proximity to raw material sources and availability of utilities like water, power and stream are some of the important criterion for selection of location for MCIE. In order to transport raw material, finished goods and people, the area should be close to and well connected with important cities by rail, road, water and air. Social infrastructure required by employees working in the estate is education and health.

A large number of industrial clusters have grown organically in different parts of the country. These clusters are related to the existence of a large mother unit such as a refinery or a mother petrochemical unit. The location of the industrial estate should be guided by observing such clustering.

The location of industrial park should be in the vicinity of technical training and research institutes as these will aid the technological quality and potential of the industrial units.

The location selection criteria for the MCIE are detailed below.

Table 3.33: MCIE - Location Evaluation Criteria

Location Evaluation Criteria	Critical	High Priority	Medium Priority	Low Priority
Feed Stock/Raw Material Availability	☑			
Physical Infrastructure				
Port and conditions – Natural draft, Weather / Tidal Conditions, existing capacity of the ports, Scope for expansion etc	☑			
Fresh Water Availability			☑	
Power				☑
Gas/Fuel Pipelines		☑		
Rail Network/Nearness to main railway network			☑	
Road Network/Nearness to main National Highways			☑	
International Airport		☑		
Communication Infrastructure				☑
Environment Issues				
Ecological effects i.e. the impact of pollution on the ecosystems or life support systems (Plants, animals, micro organisms etc)		☑		
Other hazards i.e. accidental release of toxic materials or hazardous substances and its effects.		☑		
Occupational health i.e. the effect of workplace environment on the health of workers			☑	
Nearness to Ecological sensitive areas like Wild Life, Forest etc		☑		
History of Natural Calamities in the area		☑		

Availability of technically trained manpower		☑	
Social infrastructure			
Social infrastructure – Housing, Schools, hospitals, Colleges etc		☑	
General state work atmosphere in case of labour	☑		
Other Issues			
Presence of the Anchor industry	☑		
Land Availability	☑		
Natural calamity zones	☑		
Investment friendly atmosphere of the state	☑		
Existing infrastructure status of the state	☑		
Proximity to demand centres (in SE Asia, Middle-east, western part of China etc.)	☑		
State Government Incentives	☑		
Negotiation ability of the state government		☑	
Project priority for the MCIE by the state.	☑		
Central Government Incentives		☑	
State Government interest/willingness to participate financially in MCIE	☑		
Existing logistic network			☑
Preference for existing chemical industry to have manufacturing base in the proposed MCIE		☑	

3.3.1.7 Appropriateness of Kutch for MCIE

From the review of location aspects of MCIE, it can be concluded that

- Availability of vast wasteland for such development if the project is planned as green-field project
- Availability of existing estate, which can possibly be redeveloped
- Nearness to all weather port with suitable conditions – Natural draft, Weather / Tidal Conditions, existing capacity of the ports, Scope for expansion etc
- Nearness to Refinery, Petrochemical complex or source of feedstock
- Proximity to demand centres
- Environment Sensitivity of the region
- Availability of Power/ Gas / Water / Rail & Road Infrastructure
- Social Infrastructure

The relative standing of Kutch with respect to above criteria is done below:

Table 3.34: Kutch as a Potential Location for MCIE

Criteria	Evaluation
Land Availability	Vast wasteland available for green-field development all across the region
Availability of amenable existing estates	There are few such estates available. If the intention is to redevelop the existing estates into MCIE then Kandla and Mundra appears to be most amenable compared to other competing locations in South Gujarat, which are already saturated and does not have much room for expansion and remodelling them would be a complex task.
Nearness to amenable port	Ports of Kutch (especially Mundra and Kandla) are most appropriate in terms of

Criteria	Evaluation
	amenable conditions, i.e. Natural Draft, All weather conditions, suitable for Panamax Vessels, Crude carriers.
Nearness to Refinery / Petrochemical Complex / Feedstock Source	The nearest refinery is Jamnagar. However, this should not be construed as constraint as Refinery can be a part of MCIE. As such refining capacities needs of the country need enhancem ent / addition. The location for new refinery can be considered in Kutch along with the MCIE complex. Logistically, ports of Kutch are most appropriate location for importing Crude / Naphtha / LNG for the complex.
Proximity to demand centres	The prominent domestic consuming centres are South Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu. Considering these, Kutch is disadvantageously placed. But at the same time the location is most appropriate for the exports. As such the aim of MCIE is to increase India's' share in the International Chemical Trade.
Environment Sensitivity of the region	Except for few pockets falling under forest and sanctuary, overall the region is environmentally less sensitive because of sparse population, non-cultivable land. Because of sparse population and remoteness, there would be fewer issues of displacement and resettlement, if such a large project takes shape in this region.
Availability of Power/ Gas / Water / Rail & Road Infrastructure	The issues pertaining to Infrastructure are addressable and can be taken up in the course of development process.
Social Infrastructure	The issues pertaining to Social Infrastructure are addressable and can be taken up in the course of development process.

From the above, it emerges that the Kutch is uniquely positioned for sitting MCIE compared to other locations.

The ball-park investment in typical MCIE would be in the range of Rs.25,000 – 30,000 Crores depending upon the product-mix considered.

Attracting MCIE in Kutch would trigger significant investment (up to Rs. 400 – 500 Crores) in downstream chemical industries like:

- Dyes and Dyes Intermediates
- Plastic & Polymer Processing Units
- Agro Chemicals
- Films and Fibre Units
- Speciality Chemicals

3.3.1.8 Action Agenda

- Identified potential sit es near ports where MCIE can be set up
- Prepare a conceptual plan and feasibility report for MoCFs' consideration.
- Identify potential developers interested in the proposal.

3.3.2 LNG Terminal in Kutch

3.3.2.1 Project Rationale

After analyzing various options for the development of Kutch region, it can be concluded that the region has unique zone attributes (i.e. Vast wasteland for development, availability of port

infrastructure, strategic location for trading with Gulf and Middle East, Less environmental, displacement and rehabilitation issues, etc), which actually can attract mega projects, like:

- Refinery (as there will be a need to augment refining capacity in the country)
- Mega Chemical Industrial Estate (likes of Port of Rotterdam, Shanghai Chemical Complex)
- Another SEZ or Substantial Expansion of existing SEZ

Such large projects would obviously have massive power / energy requirement and hence necessary planning ought to be done in this regard.

It is quite obvious that such large and mega projects will have a captive source for meeting its energy needs. The options for the captive power plant could be any of the following:

- Imported Coal based power project
- Kutch Lignite based power project
- Natural Gas based power project (based on NG supplied by pipeline network in Gujarat)
- LNG based power project

Out of the above options, local lignite based option has been ruled out considering the limitations of further mining of lignite in the region. Natural Gas based power plant based on pipeline / grid supplied gas is a possible option but it is contingent up on extending gas pipeline to the Kutch region. Imported coal based power plant (like the type set up at Mundra SEZ) is also a possible option.

The option of LNG Terminal along with regassification unit and power plant based on LNG has been thought of for the following reasons:

- Renewed interest of setting up another LNG Terminal on the west coast (British Gas at Pipavav and Indian Oil on Kutch Coast)
- Availability of several sites amenable for constructing LNG terminal on Kutch coastline
- There would be demand for Natural Gas as fuel / feedstock for large / mega chemical complex (if it takes shape in the region), power project and desalination plants

Considering these factors, the concept of developing LNG Terminal has been considered here. The concept seems quite ambitious in the sense that it requires very large front end investments for creating necessary infrastructure for LNG import, i.e. LNG receiving terminal at ports, LNG regassification facility and associated gas transmission and distribution network and also calls for efforts on tie up of long term supply contracts. Though, this concept may be construed as ambitious concept, but such ambitious concept would only pave the way for achieving ambitious growth.

3.3.2.2 Proposed Size of the Project

- LNG Terminal: 2.5 MMSCD
- Power Project: 500 MW (Combined Cycle), which would consume about 30% of LNG

3.3.2.3 Proposed Location

- Near Mundra (Between Navinal Island and Bocha Creek)

3.3.2.4 Tentative Investment

- Approx Rs 1600-1700 Crores

3.3.2.5 LNG Sources

Very few countries of the World have reserves of Natural Gas. Annexure: 5.1, enlists Natural Gas Reserves. Many of these countries (like Qatar, Oman, Kuwait, Yemen, Turkmenistan, Indonesia & Malaysia) have substantially large reserves, but limited requirement / consumption & hence they have surplus Gas. There is a possibility for countries like India to meet their Natural Gas requirement by importing from these countries.

The available options for import of Natural Gas are:

- Laying of Trans-National Gas Pipelines.
- Transporting Natural Gas in liquefied form in cryogenic containers.

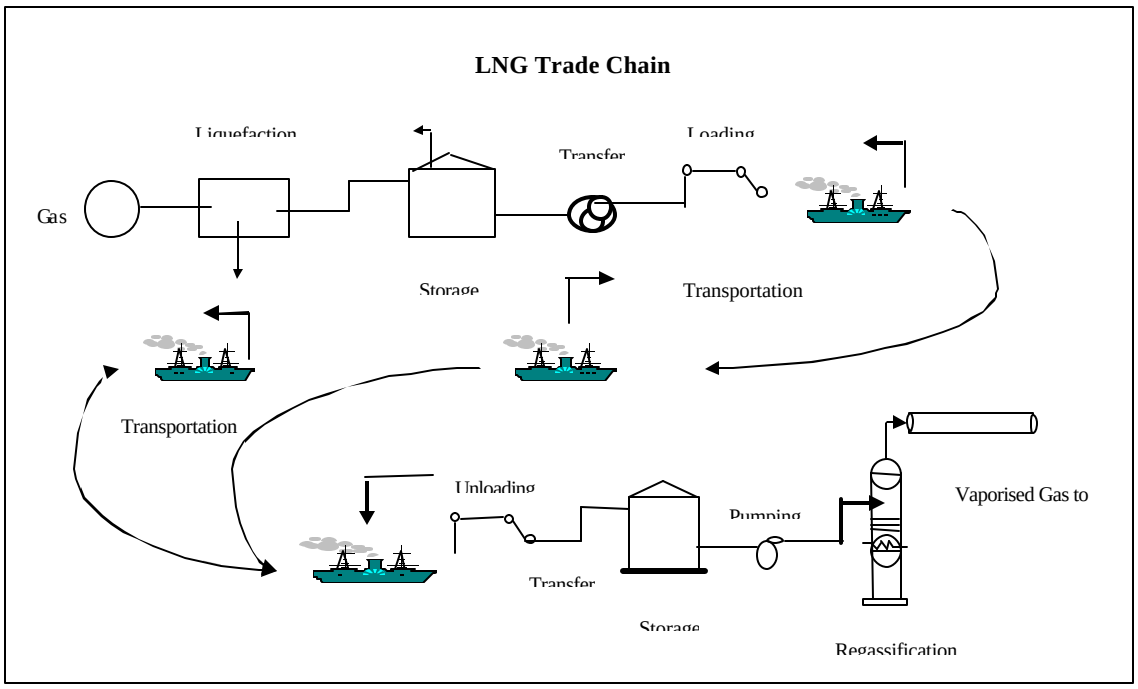
Following proposals for trans-national gas pipelines were mooted by the Indian Government:

- Indo - Oman Gas Pipeline
- Indo - Iran Gas Pipeline
- Turkmenistán - Pakistan - India UNOCOL Gas pipeline

All these proposals, however, were kept in abeyance / dropped because of the huge costs involved & strategic considerations. Natural Gas is inherently bulky and can not be economically transported by pipeline over long distances and across deep oceans.

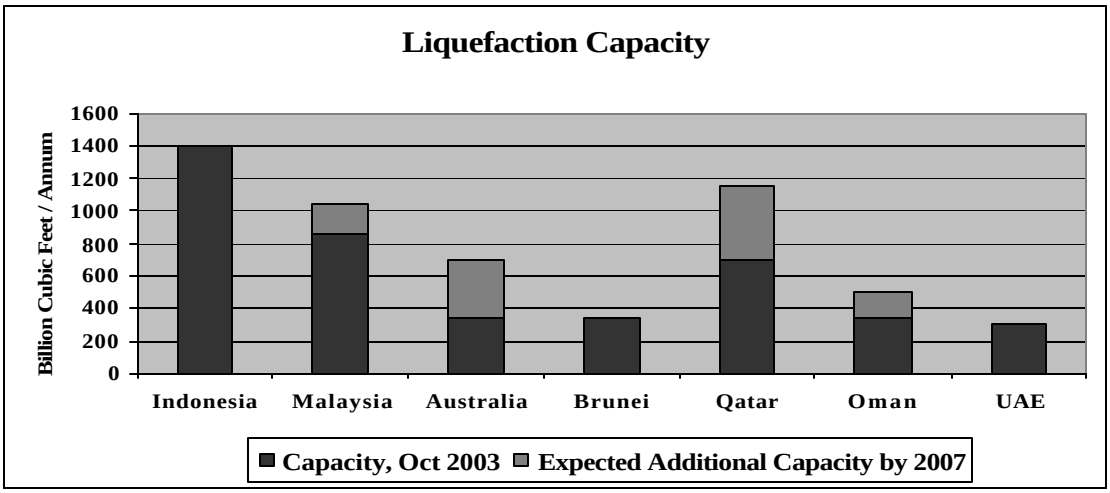
As against this, Natural Gas in Liquefied form (i.e. LNG) is much more compact (occupying only 1/600th of its gaseous volume) and hence, convenient & safe to handle, transport & store in large amounts. The Development of liquefaction technology coupled with the need to transport gas over long distances across oceans led to the growth of the LNG trade.

Natural Gas is liquefied by cooling to its liquefaction point of -160 0 C, whereby the volume is reduced by approximately 600 times. LNG is colourless, odourless and non-toxic fuel which can be easily and safely stored and transported at atmospheric pressure. It can be easily re-gassified by heating, when needed by end-users. Various steps involved in LNG Trade are shown schematically in the figure overleaf.



The potential LNG supply sources to India from South-East & West Coast are as follows:

South East Coast	West Coast
Indonesia	Qatar
Malaysia	Oman
Australia	Yemen
	Iran
	UAE



Malaysia and Indonesia so far have been major players in LNG trade. For the next stage of LNG market development in the region, the Middle-east will play an increasingly important role, with the expansion / implementation of LNG projects.

Some of the important sources of LNG in the region are:

- Abu Dhabi Gas Liquefaction Co (ADGAS)

- Qatargas
- Ras Laffan LNG (RASGAS)
- Oman LNG Project

Most of this LNG projects in the Gulf are aiming to serve Asian Markets and not European Markets, since, it is convenient to ship LNG to the Asian countries than European countries. Besides, the price of gas delivered into the Wet European grid is too low compared to Asian Market price.

3.3.2.6 Pre-requisites for LNG Imports

On a prima-facie look, LNG appears to be the best fuel for power generation in India. However, there are several inherent characteristics / complexities involved with LNG trade. Global trade of LNG has relatively few players with experience and capability to develop LNG projects. Any LNG project requires development of "LNG Chain", consisting of proven gas reserves, gas production facility, liquefaction plant, port facilities at both (i.e. suppliers & receivers) ends, shipping tankers, storage terminals, regassification facility and distribution network. To create such an infrastructure, very large front-end investment is required.

Substantial capital investments (along with large forex commitments) for LNG Terminal and Regassification Unit call for consortium of investors / developers, especially, in countries like India. In view of such a huge investment & reasonably longer gestation period, it is necessary to form a buyers consortium of assured markets & a long-term agreement with them - typically for 20 years or more with "take or pay" clause. It requires not only foreign investment, but long term commitment for payment in foreign currency. It is also necessary to devise an innovative formula for pricing LNG, which can maintain its competitiveness, at least over the period of contract.

3.3.2.7 Pricing of LNG

Pricing of LNG is a most complicated issue. Internationally, Natural Gas prices are market related, specific to the market in the buyer country, and it is unlikely that large quantities of gas / LNG are being traded on a cost plus basis. In Europe, Japan and Korea gas mainly replaces the petroleum products, and hence, the gas / LNG pricing is linked to the crude / petro-products prices. In India, the gas / LNG import has been mainly for the power sector & it would predominantly displace domestic and /or imported Coal (or in certain cases Naphtha). Therefore, the LNG Pricing in India, should be based on following two considerations:

- Power Sector's capacity to pay.
- Price of next best alternative (i.e. Coal or Naphtha).

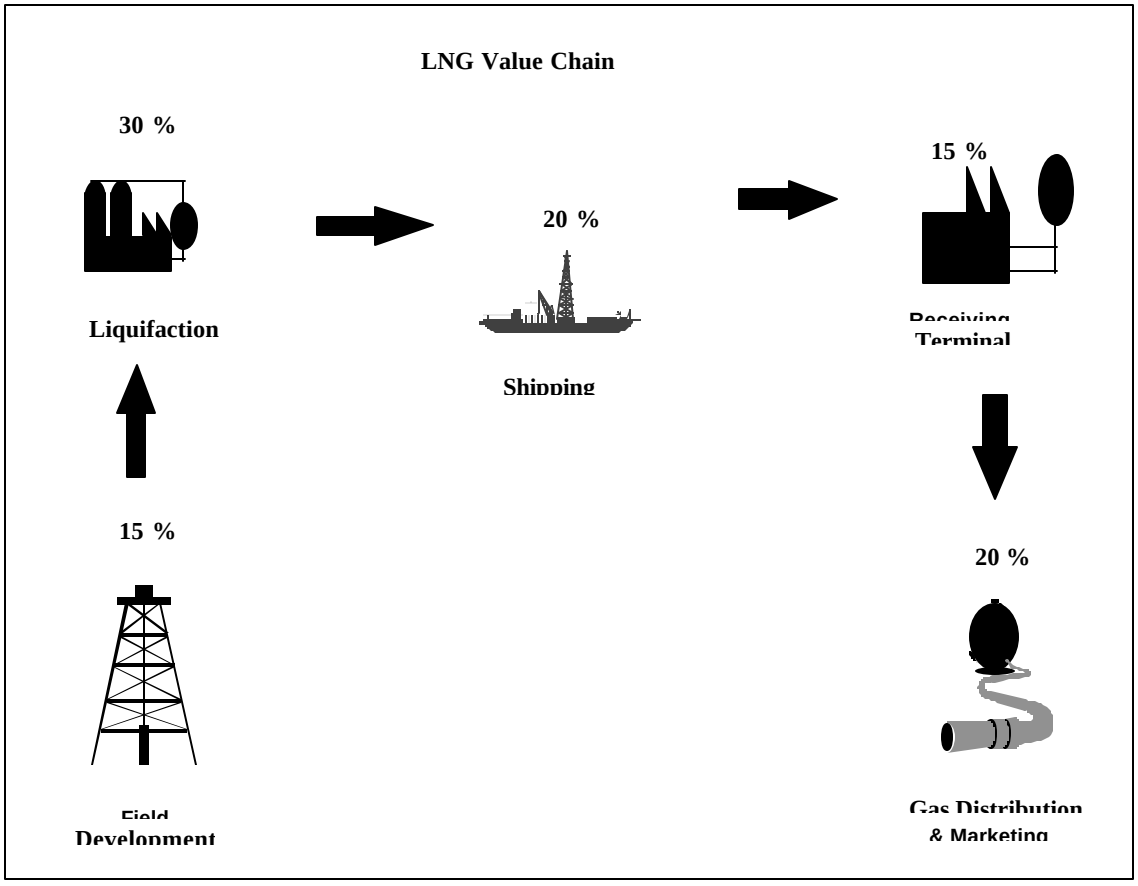
According to the agreement on 'principal terms' for Oman-India Gas Pipeline, the base price of gas delivered at Bhachau in Kutch, was fixed at $ 2.4 / MMBTU at crude oil price of $ 15 / BBL and $ 2.6 / MMBTU for crude oil price of $ 18 / BBL. Of course, LNG can not be imported in India at these price levels.

The cost of LNG includes following components:

- Gas Field Development
- Gas Treatment & Liquefaction
- LNG Transportation

- Storage Terminal
- Regassification Facility
- Gas Distribution (Through pipelines)

The total investment for the entire chain could be anywhere between US $ 5 - 10 Billion range depending upon the capacity. Relative value of each link of the LNG chain is given in following diagram.



The expected CIF price of LNG would be between US $ 3.0 - 3.5 / MMBTU, prior to regassification. The landed final cost to consumer has been worked out as given in the following table:

Table 3.35: Expected LNG Price at End-user's Level

CIF Price (Prior to Re-Gasification)			Expected Price at End-User's Level #	
US $ / MMBTU	US $ / MMKCal	US $ / Tonne	US $ / Tonne	Rs / Tonne
3.00	11.90	101.18	140.00	6300
3.25	12.90	109.62	149.28	6720
3.50	13.89	118.05	158.55	7135

Following assumptions have been considered to arrive at the expected LNG Price:

- Capacity : 5 Million TPA (LNG Terminal , Regassification & Distribution Network)
- Estimated Investment : US $ 350 Million

- Customs Duty : 10 % on CIF Price
- O & M Cost : 3 % of the investment
- Calorific Value : 8500 Kcal / Kg
- Amortisation : @ 22 %
- Expected ROI : 16 % (Pre-Tax)

The comparison of cost per kWhr power generation in combined cycle mode using different fuels is given in the table below. From this analysis, it is quite evident that LNG is most appropriate fuel next to Coal.

Table 3.36: Comparison of Cost per kwh Power Generation

Particulars	Domestic Coal	Imported Coal	Imported LNG	Domestic Fuel Oil	Imported Fuel Oil
Fixed Cost (Rs / KWHr)	1.05	1.05	1.01	1.00	1.00
O & M Cost (Rs / KWHr)	0.15	0.15	0.16	0.22	0.22
Specific Fuel Consumption [Gms (or M3) / KWhr]	0.68	0.42	0.23	0.19	0.19
Fuel Cost (Rs / Tonne or 1000 M3 for Gas)	2000-2500	3000 – 4000	7000	10000	10000
Fuel Cost (Rs / KWHr)	0.68- 1.36	1.26 - 1.68	1.60	1.90	1.90
Generation Cost (Rs / KWHr)	1.88 - 2.56	2.46 - 2.88	2.61	2.90	2.90

3.3.2.8 Action Agenda

- Identify prospective site for the LNG Terminal and associate power plant.
- The case for locating LNG Terminal in Kutch needs to be made stronger by combining it with large power plant and mega projects like MCIE.
- Work out detailed feasibility of the p roposal.
- Initiate dialogue with developers (i.e. British Gas, Indian Oil) who have expressed their desire to set up LNG terminal on the western coast.

3.3.2.9 LNG Terminal: Annexure

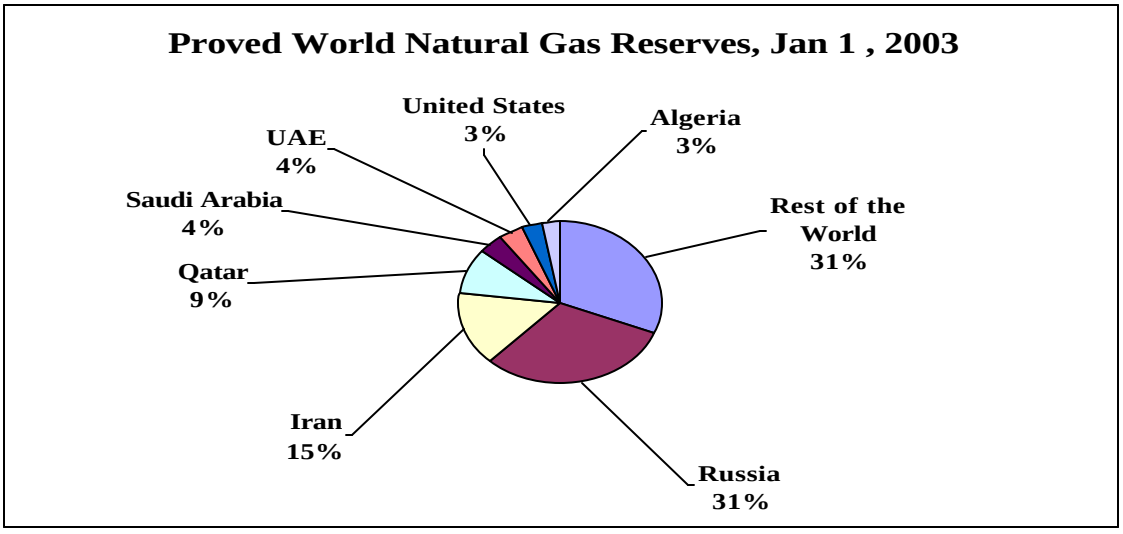
Table 3.37: Natural Gas Reserves by Country

Country	Proved Reserves End 1 / 1 /2003 (Tcf)	Percent of World Reserves
TOTAL WORLD	5501.4	100.0
Select Countries	5097.4	92.7
Russia	1680.0	30.5
Iran	812.3	14.8
Qatar	508.5	9.2
Saudi Arabia	224.7	4.1
United Arab Emirates	212.1	3.9
United States	183.5	3.3
Algeria	159.7	2.9
Venezuela	148.0	2.7
Nigeria	124.0	2.3

Iraq	109.8	2.0
Indonesia	92.5	1.7
Australia	90.0	1.6
Norway	77.3	1.4
Malaysia	75.0	1.4
Turkmenistan	71.0	1.3
Uzbekistan	66.2	1.2
Kazakhstan	65.0	1.2
Netherlands	62.0	1.1
Canada	60.1	1.1
Egypt	58.5	1.1
China	53.3	1.0
Libya	46.4	0.8
Oman	29.3	0.5
Bolivia	24.0	0.4
Trinidad/Tobago	23.5	0.4
Yemen	16.9	0.3
Brunei	13.8	0.3
Peru	8.7	0.2
Equatorial Guinea	1.3	0.0
Angola	0.0	0.0
Rest of World	404.1	7.3

Source: Oil & Gas Journal, December 23, 2003

Countries in Dark Shade are current LNG Exporters. Countries in Light Shade are potential LNG Exporters



3.4 Proposed Actions for Overall Industrial Development

General Action Plan for consolidating current pace of industrialization and attracting further investment in Industry sector

Sub-sector wise specific action plan and agenda have already been covered under each sub-sector discussed in previous sections. Following are actions recommended impacting industries across all sub-sectors, especially SSI and Medium scale industries:

Land allocation /allotment permissions to be accelerated / and streamlined.

Industries in general are of the view that land allocation to industries and seeking permission from various authorities is cumbersome and time consuming. A single window clearance is expected by the industry.

Upgrade roads and connectivity further and also extend the rail connectivity in the region.

As per the feedback, the industry widely believes that in spite of improved road / rail connectivity recently much is remaining to be done even along Bhuj, Kandla-Gandhidham, and Bhachau triangle. Specific up gradation and strengthening needs in promising corridors have been identified in road sector potential analysis.

Special attention / institutional arrangement may be put in place for allocating water allocation to industries, including to Industrial Estates

Extend Sales tax exemption / deferment for a longer period at a stretch to attract mega and large projects

Although recently, the State Government Incentive Scheme has been extended for another one year and there is provision for pipeline projects also. But, this is not adequate for planning large and mega projects, for which special considerations could be given.

Similarly excise exemption time limit be extended for a longer period at one go to facilitate planning of Large Trigger Projects—say for 5 years

In addition, grant electricity duty exemption/ concession for 5 years to select industries which are power cost sensitive including for captive power plants, may be with limits linked to investment, employment and local content in terms of man and materials.

The views have been expressed that certain well developed industries (and their entrepreneurs) in Gujarat would be attracted to expand their capacities in Kutch, if there is an incentives in terms of electricity duty exemption / concession. The units in SEZ in Kandla are already enjoying this benefit. .

Transport subsidy to select industries say salt and minerals which together account for employment of 50000 to 60000 workmen

Mineral mines and Salt producing centres are located in interior regions of Kutch, which are not well connected with arterial roads, ports, rail heads and consuming centres. The high cost of transportation needs to be taken care of till such time the connectivity improves.

Seek Income Tax exemption for (select) industries in Kutch

Similar to the exemption accorded industries in hilly regions e.g. Himachal Pradesh, Uttaranchal, which attracted Rs.3000 to 4000 crores investment only in Pharma sector within 2 years

Promote LNG terminal and LNG based power Plant

The concept of setting up LNG terminal at Mundra is being evaluated by the State Government. Such LNG Terminal would trigger large scale investment by Gas based industries utilizing locally available minerals. The associated power plant of LNG terminal can to a great extent address the power needs of the region at a affordable tariffs.

Encourage desalination plants put up by large / mega industries and estates

Promote 2-3 more specialized industrial parks and trading centres providing full infrastructure facilities besides 2 SEZs.

4. Tourism Potential in Kutch

In the north western tip of Gujarat lies Kutch- the biggest district in India in terms of sheer area. Sprawling over 45,000 sq. km, this district could easily be mistaken for a state for its sheer vastness. What makes Kutch so interesting is the great variety of land and water, plain and hill, desert and fertile land. All this has resulted in a variety of ecosystems close to each other.

The Rann of Kutch is the most distinctive geological formation in Kutch. The Rann of Kutch, essentially saline mudflats that occupy Kutch district and parts of Southern Pakistan, dissect Kutch into the Great Rann of Kutch, which lies to the North, and the Little Rann of Kutch to the east. The Great Rann of Kutch covers an area of about 18,000 sq. km and lies almost entirely in Kutch district, along the border of Pakistan. The Little Rann of Kutch on the other hand extends northeast from the Gulf of Kutch and occupies about 5,100 sq. km in Gujarat State.

Kutch propagates the most wonderful craft traditions in the country. Women folk set aside a few hours daily for embroidering the most vibrant, fine and varied collection of embroidery in the country.

4.1 Accessibility

Bhuj, the district headquarter has an Airport. Bhuj has two flights daily from Mumbai by Jet airways and three flights per week by Indian airlines.

Bhuj and Gandhidham are two major junctions on this route. Bhuj and Gandhidham are connected by broad gauge line from Mumbai and Ahmedabad. There are two trains connecting Gandhidham with rest of India and one train connecting Bhuj to Ahmedabad.

Kutch has well connecting roads all over the district. The district headquarters Bhuj is connected with all major cities of Gujarat by road. Other major cities like Gandhidham, Anjar, Bhachau, Rapar etc are also connected by road. The State transport buses and private luxury coaches connect Bhuj and Gandhidham with various centres of Gujarat. Other smaller centres are connected with district headquarter Bhuj.

4.2 Major Attractions

4.2.1 Aina Mahal: (Old Palace)

This is a beautiful museum, built in the 18th century as the palace of Maharao Lakhpatji. It has a Hall of Mirrors with white marble walls covered with mirrors and gilded ornaments; the floor is lined with tiles with a platform above it surrounded by a series of fountains. The room also has a chandelier of Venetian glass. It lies in the old part of the city, in a small, fortified courtyard and houses some very rare idols. However, the recent earthquake has destroyed most of this elegant palace.

4.2.2 Kutch Museum

The oldest museum in Gujarat, it was established in 1877, originally known as the Fergusson Museum, named after its founder, Sir James Fergusson, a governor of Mumbai under the British rule. The exhibits on display are gold and silver ornaments, Kshatrapa inscriptions, textiles, weapons, archaeological finds, stuffed animals and musical instruments. Besides these, it is equipped with a picture gallery and sections for anthropology and shipping. The recent earthquake has destroyed a part of this museum.

4.2.3 Prag Mahal (New Palace)

Constructed in 1979, the Prag Mahal is a magnificent building made of ornate Italian marble and sandstone. Its Corinthian pillars and Jali work depicting European flora and fauna are worth observing.

4.2.4 Cenotaph Complex

A popular site is the cenotaphs complex at Chattaradi. These are built of red stones. Of all the tombs here, the largest and the finest is the one of Rao Lakha built in 1770 AD. It is polygonal in shape with balconies and an intricately carved roof. Other impressive cenotaphs are the ones of Rao Rayadhan, Rao Desai and Rao Pragmal. The recent earthquake has destroyed most of the chattaradi.

4.2.5 Lakhpat

Lakhpat is situated 135 km. from Bhuj on the Kori creek. It is named after Rao lakha but it could also have been named so because of the many Lakhpatis, millionaires residing there in the hey day of Lakhpat's glory. The Lakhpat fort houses many Temples, Dargahs, and a Gurudwara from which, as popular belief goes, Gurunanak made his sojourn to Mecca.

4.2.6 Koteshwar and Narayan Sarovar

Famous for their lake temples sacred to Hindus, Koteshwar is at a short distance from Narayan Sarovar & 215 Kms. from Bhuj. It is an ancient place of pilgrimage. The existing temple is situated on a high plinth overlooking the sea. It is a breathtaking sunset point.

4.2.7 Bhadreshwar

It has a famous Jain temple dating back to the tenth century. It is located on the ruins of the ancient city of Bhadravati.

4.2.8 Anjar

Anjar is mainly known for the samadhi (tomb) of Jesal Toral, and the bungalow of James Mcmurdo, which is a veritable museum of Kutchi Art. Places worth visiting are the Ajaypal Temple, the Holy Shrine of Pinjora Pir. Anjar is also famous for its block printing work, nutcrackers, scissors and penknives

4.2.9 Mandvi

Mandvi, (about 75 km from Bhuj), founded in 1581 A.D. is an ancient seaport. It is well know n for its production of handicraft items particularly its relief, filigree and enamel work and its virtually unspoilt sea beaches. The Rukmavati bridge (the longest stone bridge built in 1883 A.D.) and the Vijay Vilas palace are the major tourist spots at this destination.

4.2.10 Wild Ass Sanctuary

Gujarat is as famous for its large wild ass herds as it is for its lions. To protect these rare animals, a sanctuary covering an area of over 4,953 sq. km was created to offer protection to more than 2,100 wild asses inhabiting this area.

4.2.11 Chinkara Sanctuary

A few kilometres away from the Narayan Sarovar is the Chinkara Sanctuary. It is about 210 km. from Bhuj. This sanctuary is the home of the Chinkara or the Indian Gazelle.

4.2.12 Marshes of Kutch

The marshes of Kutch are the only known breeding ground for flamingos in India. In a cycle of once in a decade, when conditions are favourable, flamingos descend in thousands to breed on islands in the Great Rann. After a good monsoon rainfall, one can hope to sight these majestic birds in Dhanda, in Banni. Flamingo city, near Kala Dungur, (48 hours camel journey through slush and marshes), is a breath taking sight to watch thousands of flamingo's with their young ones.

4.3 Fairs and Festivals

4.3.1 Dhrang Fair

The fair is held every year during February - March in Dhrang, 40 kms from Bhuj at the Samadhi (tomb) of Menkan Dada who served the community with great dedication.

4.3.2 Ravechi no melo

Ravechi fair is held on every Bhadrapad end i.e August-September in Rav village at Ravechi Mata's temple.

4.3.3 Kutch Mahotsav

The Tourism Corporation of Gujarat, Ltd. (TCGL), organised this unusual tour of Kutch, in response to the request of many who wished to visit an area quite different from urban India. This tour was called a Mahotsava, or great festival, because of the great variety of sights and scenes that are offered to visitors. The Mahotsava consists of a six-day tour of Kutch, in which all requirements of the visitors are taken care of. The Kutch Utsav comprises six heady days of travel, entertainment and cultural exposure: virgin sea beaches, inscrutable desert lands, breathtaking landscape, thriving wildlife, bird

sanctuaries featuring exalted species such as the flamingo, soul-stirring littoral tracts, historic monuments, forts and palaces, pilgrim centres.

4.3.4 Navratri Fair at Mata no Madh

Navratri fair is held twice a year at Mata no Madh (100 kms from Bhuj), during Chaitra (March-April) and Aso (Sept – Oct). The Aso Navratri fair is held for 9 days and attracts about 25000-30000 visitors daily.

4.3.5 Nakhatrana Fair

Three day fair at Nakhatrana in July is a major attraction marked with cultural highlights.

4.4 Climate

Summer : Max: 45 degree C Min: 25 degree C

Winter : Max: 26 degree C Min: 6 degree C

4.5 Tourist Inflow

Total Tourist	:	~ 1.6 to 1.7 lakh/year
Overnight Staying Tourists	:	~ 1.3 to 1.4 lakh per annum
Tourists visiting Aina Mahal	:	~ 1.25 lakh per annum
		~ 300-350/ day during February to September
		~ 400- 450/ per day during October to January
Tourists visiting Kutch Museum:		~ 80,000 to 90,000 per annum
		~ 250 per day during February to September
		~ 300 per day during October to January

Source: Aina Mahal, Kutch Museum, Tourist Information Bureau, and Hoteliers.

Due to earthquake, Kutch museum and Aina Mahal also suffered severe damage. The sites are not available for tourists after the earthquake.

Origin of Tourist

From Gujarat: ~ 50 % From Other States: ~ 50 %

Table 4.1: Seasonality of Tourist

Origin of Tourist	Visit Period	Mode of Transport
Gujarat	Sept to Jan	Bus/Train
Other states	Sept to Jan	Train

Level of interest by Foreign Tourists

About 10,000 foreign tourists visit every year.

Aina Mahal used to get about 60-70 foreign tourists per day from October to January and about 5 to 6 foreign tourists per day during rest of the year. Kutch Museum gets about 45-50 foreign tourists per day from October to January; and about 5 to 6 foreign tourists per day during rest of the year. These figures are before the earthquake. The tourist arrivals after the earthquake have decreased substantially.

Table 4.2: Spending Pattern of tourist (Rs)

Type	% of Tourist	Accommodation	Food	Travelling	Misc
Domestic	5%	1700-1800	150-200	400-500	200
	40%	700-800	75-150	100-200	100
	55%	300-400	50-75	30-50	50

Table 4.3: Nature of Tourist

	Business	Leisure/heritage	Pilgrimage
Nature of Tourist	25%	70 %	5%

Table 9.61Size of Groups

	Business tourist	Leisure/pilgrimage tourist	NRG family	Foreigners
Size of Groups	1 person	2-4 persons	4-5 persons	1-2 persons

Table 9.62: Average stay in number of days

	Business tourist	Leisure/pilgrimage tourist	NRG family	Foreigners
Average stay in number of days	1night	2 nights	--	2-3 nights

Business tourists are mainly commuting to Mundra and Mandvi. They are using Bhuj as a base, as no good accommodation is available in these locations.

Table 4.4: Seasonal flow details; As per Type of Tourist

Type of Tourist	Business tourist	Leisure/pilgrimage tourist	NRG family	Foreigners
Seasonal flow details	No specific season	Winter (Sept to February)	October to February	

Table 4.5: Profile of Tourist

Age group	Business tourist	Leisure/pilgrimage tourist	NRG family	Foreigners
% 3-24 years	5	5	5	5
% 25-34 years	45	15	15	5
% 34-44 years	35	35	35	10
% 45-54 years	10	20	20	40
% > 54 years	5	25	25	40
Sex				
% Male	100	60	60	70
% Female	0	40	40	30

4.6 Infrastructure details

4.6.1 Accommodation

Table 4.6: Major hotels in Kutch district

Hotel	Rooms	Class	Tariff Range (Rs.)
BHUJ			
Hotel Prince	60	B	800-3500/-
Hotel Anam	25	B	800-1200/-
Hotel Lakeview	25	C	380-900/-
GANDHIDHAM			
Hotel Arti	15	C	500-600/-
Hotel Chandan	37	C	1000-2000/-
Hotel Gurukrupa	20	C	300-600/-
Hotel Jaybharat	6	C	300-600/-
Hotel Kailash Inn	28	C	300-600/-
Hotel Natraj	40	C	300-600/-
Hotel National	15	C	300-600/-
Hotel Ojas	15	C	300-600/-
Hotel Satkar	40	C	300-600/-
Hotel Toral	17	C	300-600/-
Hotel Venus	36	C	300-600/-
Durha Guest House	8	D	300-600/-
Shrama Resorts	64	B	500-4000/-
MANDVI			
Toran Resort	10	C	100-800/-
Sahara Guesthouse	24	D	100-250-
DEVPUR			
Darbargarh Heritage Hotel	2	H	1800-2200

Category definition A = 4 & 5 star hotel, B = 2 & 3 star hotel, C = 1 star or deluxe hotel, D = guest house, E = Dharamsala, H = Heritage hotel

Table 4.7: Total Rooms Available

Category	No. Of Hotels	Total Rooms
A	0	0
B	3	98
C	18	397
D	13	218
E	9	159
H	1	4
Total	44	876

The above shown availability of rooms is after the devastating earthquake and do not include those rooms destroyed in earthquake.

4.6.2 Other entertainment facility

- No other entertainment facility is available.

- Communication
- Telephone, STD/ISD and post office facility is available all over Kutch.
- Civic Amenities

There is scope for improvement basically for roads, street lighting, signage boards, sanitation etc.

4.6.3 Mode of Transportation

The connectivity of district headquarter Bhuj to other parts of the state like Ahmedabad, Jamnagar, Rajkot, Baroda, Surat etc is very good. Other cities like Gandhidham, Kandla, Mandvi, Anjar etc are connected with Bhuj.

There is one train connecting Bhuj to Ahmedabad and two trains connecting Gandhidham to Ahmedabad-Mumbai. Frequency of trains has to improve.

Bhuj has an airport and operates daily flight to Mumbai. Bhuj has daily two flights from Mumbai by Jet airways and three flights per week by Indian airlines. Connectivity of Bhuj and other important destinations like Dholavira with rest of India has to be improved.

4.6.4 Availability of Other Utilities

Water

Kutch, being an arid area, has always faced water scarcity.

Power

The power Scenario at the destination is Good.

Eating Places (Restaurants, Bars, Food courts)

Multi cuisine food is easily available in major cities like Bhuj and Gandhidham. There are no way side amenities or eateries apart from the above cities.

Other Services details

Medical - Poor

Travel Agents – Few travel agents are running services between Rajkot & Bhuj.

Taxi Operator- Unmetered rickshaws and taxis are available.

Daily necessities - Good

Forex – Available

Religious – very old and historic temples are located all over Kutch, which gives Kutch a religious importance.

4.7 Environmental status, Policy and regulations

Kutch as a district is an important ecological zone in terms of various species like wild ass and reptiles found in Rann of Kutch. Vast marshlands are paradise for migratory birds, which land over here in winter. The environmental policy and regulations enforced by the Ministry of Environment and Forest (MoEF) and Gujarat Pollution Control Board (GPCB) apply to the district.

4.8 Other Undeveloped Sites

The following sites are undeveloped in Kutch

- Mandvi beach.
- Desert safari in small and greater Rann of Kutch.

4.9 Employment – opportunities and Avenues

Development of Mandvi beach and desert safaris and promotion of local handicrafts in this area will generate following opportunities for employment

- Hotels operators
- Cooks
- Taxi operators
- Tour operators
- Water sports operators
- Water sports coaches
- Tour Guides
- Specific desert/arid zone ecology guides
- Small retailers (shops and Food courts)
- Local community

4.10 Bottleneck/constraints

Major constraint will be taking permission from central government as the area falls at the border to neighbouring Pakistan. Also the desert safaris should be developed in such a way that local ecosystem is not disturbed. Extreme summer climatic conditions are one of the major hindrances in developing the area for tourism. After the earthquake, it has been observed that the hotel owners and taxi operators in Bhuj and Gandhidham have hiked their prices very high making it costlier than other cities of Gujarat.

4.11 General condition of the attractions

The Archaeological Survey of India regulates the day-to-day activities, maintenance of the monuments and museums in Bhuj and other areas of Kutch. The recent earthquake has affected some of the historical monuments which now need major repairs and refurbishment.

4.12 Strength and weakness analysis of the destination

4.12.1 Strengths

Strong cultural heritage, very rich and diverse ecosystem, bird watchers paradise, Calm and sandy beaches, well-developed port, flat deserts, unique combination of sea and desert.

4.12.2 Weakness

Lack of awareness, Lack of infrastructure, Lack of marketing, long distances within the circuit, extreme summer temperatures, extensive damage to the heritage sites due to the earthquake, which still has not been repaired/refurbished.

4.12.3 Infrastructure Status at Destinations

Table 4.8: Infrastructure Status

Characteristics	Status	Requirement
Accessibility		
External Roads	Good	--
Internal Roads	Poor	Resurfacing required
Internal Transport	Fair - Three Wheelers and Taxis available.	--
Bus Connection	Good (GSRTC and Private buses available from all over Gujarat)	
Rail	Fair - Two trains to Gandhidham and one train to Bhuj from Ahmedabad-Mumbai	Frequency of the train services has to increase.
Air Connectivity	Nearest Airport Bhuj - flights only from Mumbai	
Port	Nearest Kandla and Mandvi.	Ro-Ro facility can be developed for reaching Kandla/Mandvi. This will reduce the time taken to reach Kutch from places like Mumbai, Surat, Kutch, Jamnagar, and Rajkot and also reduce load on the existing infrastructure.
Communication		
Information Centres/Availability of Guides	Missing	Requirement of information centre at Airport and railway station. Availability of trained tour guides at information centres is must
Post Offices	Available	Available
Telecommunication	Available	Available
Entertainment		
Shopping Centres	Some good shopping facilities for ethnic embroidery work are available.	Shopping facility at the origin of Kutchi handicraft (Banni villages) should be established.
Emporiums/Gift Shops	Available at few places, Temporary during festivals	
Parks/Gardens	Not Available	
Theme Parks	Not Available	
Others		

Eating Places	
Restaurants/Eateries	Fair – Multi cuisine food is available
Utilities	
Water Availability	Scarce
Drinking water Facilities	Scarce
Sanitation Facilities	Fair
Other Services	
Medical	Fair.
Banking/Credit Facilities	Available.
Sign Boards	Missing
Street Lights	Available
Vehicle Parking	Available
Police and Security	Available
Spot Improvement	-
Intermediaries	
Travel Agents	Available
Taxi Operators	Available
Potters	Available
Advertising Agencies	Not Available.
Artists/Performers	Not Available
Facilities for Elderly/ Disabled/ Families with Young Children	Not Available

Accommodation	No.	Room	Condition
Upper Segment (Three Star plus)	3	98	Good
Mid Segment	18	397	Good
Guest Houses	13	218	Good
Dharamshalaa	9	159	Good
Lodge	Nil	Nil	Na
Health Farm	Nil	Nil	Na
Heritage Hotel	1	4	Good
Motel	Nil	Nil	Na
Resort	Nil	Nil	Na

4.13 Projects

4.13.1 Projects Under Implementation

- Gandhidham – Samakhiali (Package I&II) Highway project - National highways Authority of India.
- Kandla Port Road project - National Highways Authority of India.

4.13.2 Projects Announced

- Bhuj-Panandro SH Rd.-Govt. of Gujarat.
- Bhuj Airport upgradation project -Airport Authority of India.
- Mandvi air strip project -Govt. of Gujarat.
- Bhuj – Nagor – Lodai Rd project -Govt. of Gujarat.

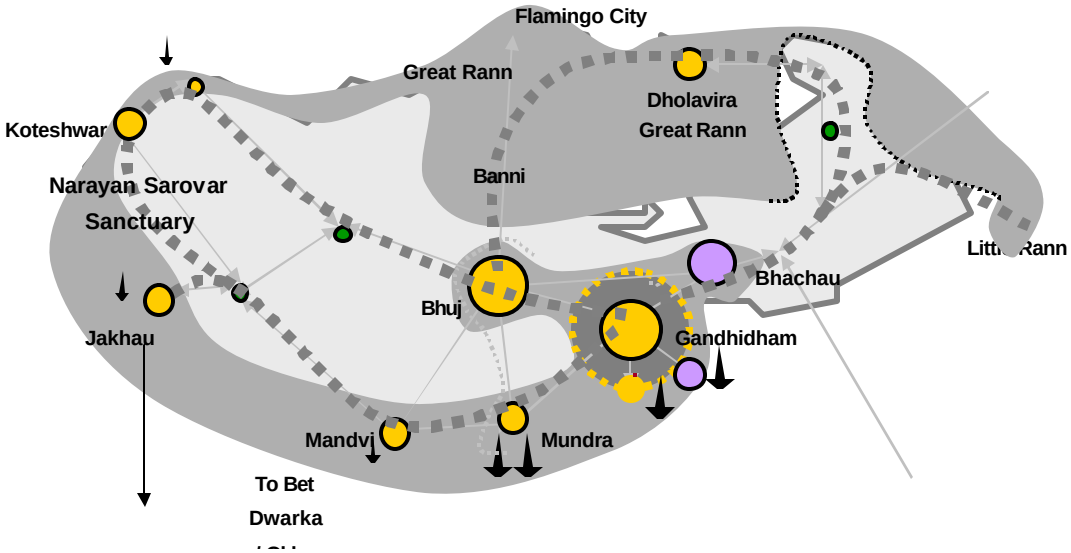
4.13.3 Potential Projects

- Circuits in Kutch connecting Little Rann Sanctuary, Dasada, Narayan Sarowar, Koteshwar, Mata-no-Madh, Bhadreshwar, Kera, Bhuj, Mandvi, Gandhidham, Wankaner, Konthkot, Village circuit of Kutch.
- One deluxe and budget hotel in Bhuj.
- Road connecting Banni villages area (Khavda) to Dholavira.
- Tourist information center at Gandhidham and Bhuj.
- Beach resort at Mandvi/Privatisation of TCGL property at Mandvi.
- Relaying of damaged road from Bhuj to Dholavira.
- Sound and light show at Dholavira.
- Restaurant at Dholavira.
- Accommodation at Dholavira.
- Wayside amenities at Mata no math.
- Permanent Handicraft shops/haat at Khavda in line with Delhi Haat.

4.14 Tourism Development Strategies for Kutch

This region has only three major destinations namely Bhuj, Gandhidham and Kutch. The total numbers of tourists visiting this region are around 1, 75,000 of which 88,000 are from within Gujarat, 86,000 from outside the state and approximately 15,000 foreigners. It accounts for 2% of the total tourist traffic in Gujarat. 74% of the tourists visiting this region are leisure tourists and the rest 26% are for Business. The share of foreign tourists is 36% of all the foreign tourists visiting this state; it's higher than the business hubs of the state. If the Government's plan to develop this region industrially materializes then there would be a considerable increase in the business tourist traffic. As of now the focus should be on leisure tourists and foreign tourists who come to this region for heritage and cultural purposes.

Tourism Potential Areas, Circuits and Nodes



4.14.1 Short Term Strategy

- Aggressive marketing of the Kutch festival through print media in national newspapers, magazines (business & travel) and Television commercials is required.
- Monuments need to be maintained well, especially the Satardi.
- Beach at Mandvi needs to be maintained well by the involvement of private parties.
- There is an urgent need for budget hotel and deluxe hotel at Bhuj and Gandhidham.
- Accommodation, food and water facilities need to be improved at Dholavira.

4.14.2 Medium Term Strategy

- Banking facilities need to be improved. (Acceptance of travellers cheques and credit cards is absent in this region hence there is need for immediate action in this regard.)
- Speech, light and sound show during the evenings at Dholavira, and fort of Kutch Mandvi could be organised. The show must be properly designed and developed.
- Aina Mahal, Kutch museum and Chattaradi need immediate restoration from the damage caused due to the earthquake.
- Desert safari in small and greater Rann of Kutch.

4.14.3 Long Term Strategy

- The projects suggested in the report should be implemented at the earliest possible time.
- Kutch should be developed as a separate brand for Gujarat Tourism. The Lagaan movie can be used to endorse this brand.
- The focus needs to be on the Kutchi lifestyle and culture that would attract the foreign tourists as well as the domestic tourists.

Table 4.9: Tourist Potential in Lakhs

Destination	Bhadreshwar	Bhuj city	Gandhidham	Khavda	Lakhpat	Mandvi	Narayan Sarovar/Koteshwar/Mata no Madh	Small rann of kuchchh	Region Total
2003	1.03	1.75	2.06	0.00	0.00	0.05	0.01	0.01	4.89
2004	1.06	1.80	2.12	0.00	0.00	0.05	0.01	0.01	5.05
2005	1.10	1.87	2.20	0.00	0.00	0.06	0.01	0.01	5.24
2006	1.15	1.95	2.29	0.00	0.00	0.06	0.01	0.01	5.46
2007	1.20	2.04	2.40	0.00	0.00	0.06	0.01	0.01	5.72
2008	1.27	2.15	2.53	0.00	0.00	0.06	0.01	0.01	6.02
2009	1.34	2.27	2.68	0.00	0.00	0.07	0.01	0.01	6.37
2010	1.42	2.42	2.84	0.00	0.00	0.07	0.01	0.01	6.77
2011	1.52	2.58	3.03	0.00	0.00	0.08	0.01	0.01	7.22
2012	1.63	2.77	3.25	0.00	0.00	0.08	0.01	0.01	7.75
2013	1.75	2.98	3.51	0.00	0.00	0.09	0.01	0.01	8.35
2014	1.90	3.23	3.80	0.00	0.00	0.09	0.01	0.01	9.04
2015	2.06	3.51	4.13	0.00	0.00	0.10	0.01	0.01	9.83
2016	2.26	3.83	4.51	0.00	0.00	0.11	0.01	0.01	10.73
2017	2.48	4.21	4.95	0.00	0.00	0.12	0.01	0.01	11.78
2018	2.73	4.64	5.46	0.00	0.00	0.14	0.01	0.01	12.99
2019	3.02	5.14	6.04	0.00	0.00	0.15	0.02	0.02	14.39
2020	3.36	5.72	6.72	0.00	0.00	0.17	0.02	0.02	16.00
2021	3.76	6.39	7.51	0.00	0.00	0.19	0.02	0.02	17.88
2022	4.22	7.17	8.43	0.00	0.00	0.21	0.02	0.02	20.07

Table 4.10: Projects recommended for Kutchh

Project name	Rs. Lakhs
Bhuj	
A class hotel	1900
B class hotel	2625
Budget hotel	500
Dormitory/Dharamshala	180
Handicraft haat	50
Renovation of Aina mahal	25
Renovation of Kuchchh museum	25
Tourist information centre/kiosk at Airport and railway station	1.2
Gandhidham	
Tourist information centre/kiosk at Airport and railway station	1.2
Renovation of Gandhidham airport	25000
Mandvi	
Beach resort/privatisatiion of TCGL property	200
Beach cafeteria	20
Ro Ro facility connecting Mandvi/Kandla with other coastal towns and cities of the state	185
Khavda	
Organised cultural haat for local handicrafts	50

Mata no madh/Narayan Sarovar/Koteshwar/Chinkara sancturay	
Way side amenties	75
Nature camp and desert safari	40
Bhadreshwar	
Basic infrastructure like garden, sitting arrangement, drinking water and toilets	25
Budget hotel	100
Dormitory/Dharamshala	180
Anjar	
Renovation of Jesal -Toral Samadhi	10
Basic infrastructure like garden, sitting arrangement at Jesal Toral Samadhi	5
Dholavira	
Road from Khavda to Dholavira	2000
Restaurant	25
Repairing/relaying of Bhuj – Dholavira road	25000
Light and sound show	5
A class hotel	50
B class hotel	160
Budget hotel	25
Dormitory/Dharamshala	25
Resort	100
	27390

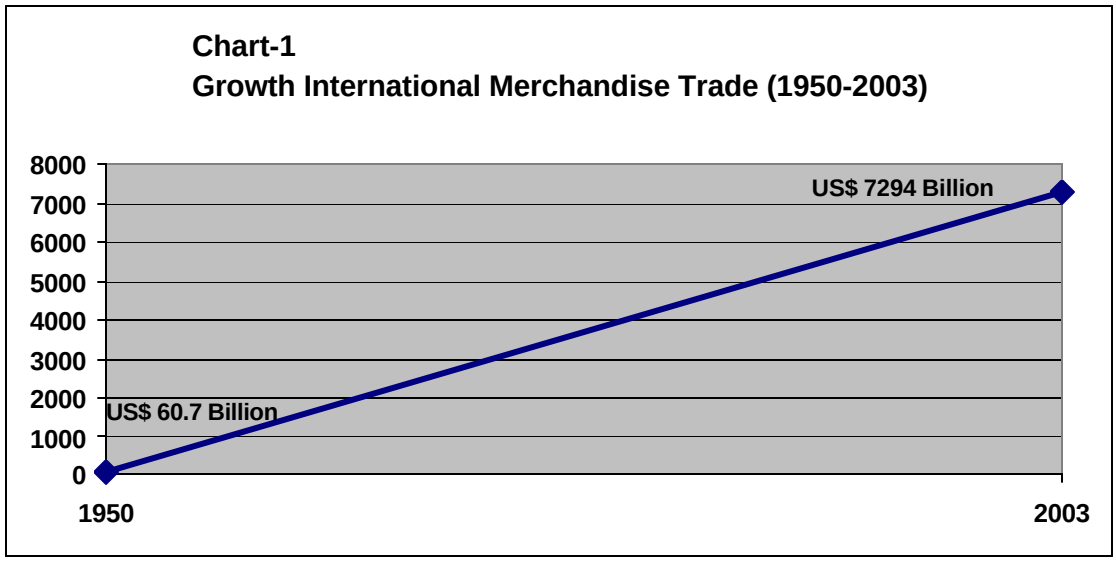
5. Trade and Logistic Hub

5.1 Preamble

With the world getting smaller, the globalization and liberalization of markets is significantly increasing demands for the movement of merchandise, goods and services, and for the wide range of activities in the logistics sector. Globalization is moving at an alarming pace and in the process opened up avenues for growth some countries and posed challenges to few unprepared ones. Intense competition is forcing many companies to close down and as a result unemployment is on rise.

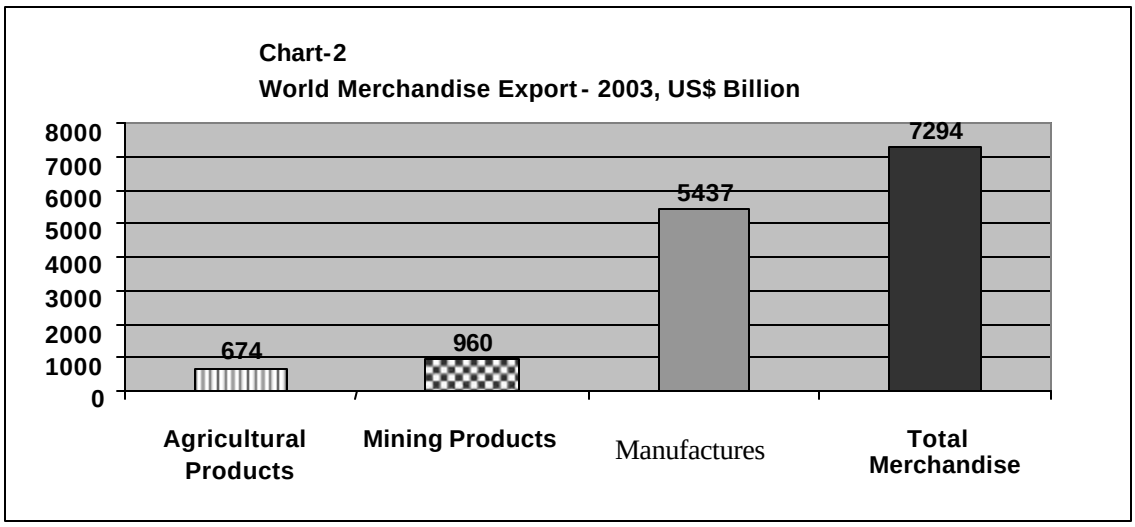
5.2 Global Merchandize Trade

International commerce initially dominated by trade in goods. Due to progressive lowering of tariffs and quotas, the 50 years following World War II has witnessed growing liberalization and momentous growth of international trade. World export of merchandize grew 90 times from US$ 60.7 Billion (in 1950) to US$ 7294 Billion (in 2003) at a CAGR of 10%.



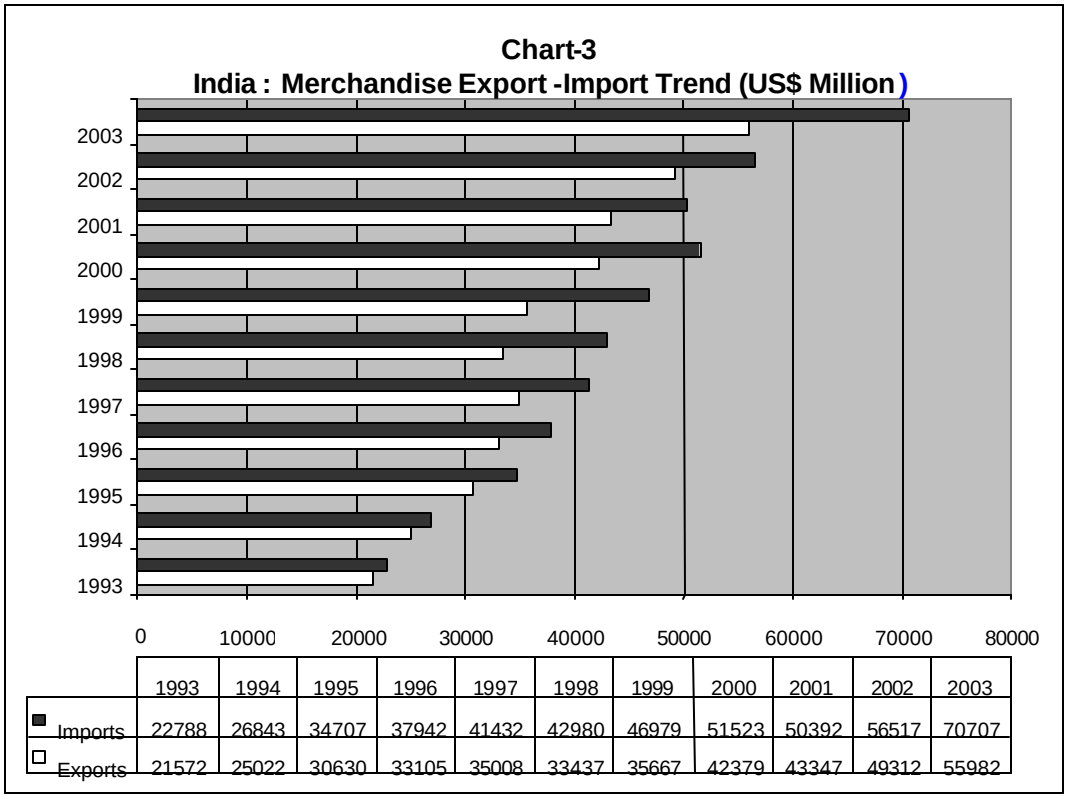
Merchandise trade now represents 21.1% of Gross World Product. Now trade in services e.g. transport, travel, banking, insurance, telecommunications, consultancy, inventions and designs has become much more important.

The composition of World Merchandise Export is given in the following charts-2.



5.2 Indian Merchandize Trade

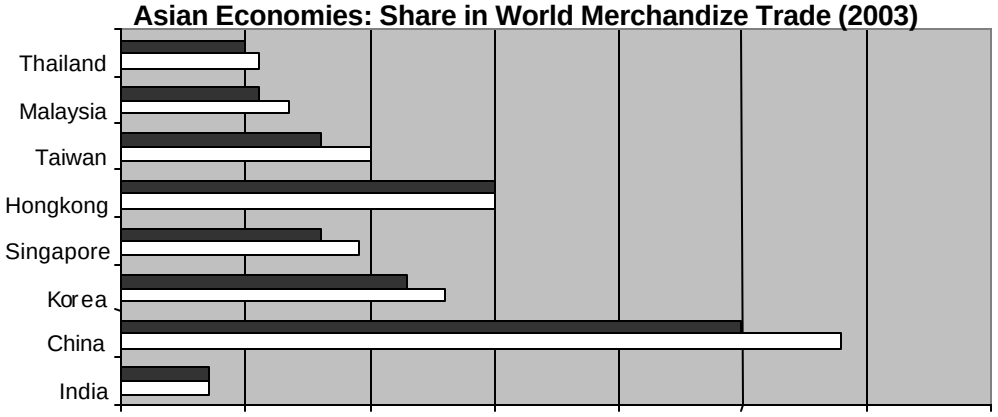
India's merchandise export and import has been about US$ 55 Billion and US$ 70 Billion respectively for the year 2003. Chart -3 gives the decadal growth of merchandise trade, which is 4.8% for exports and 7.7% for imports.



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports	22788	26843	34707	37942	41432	42980	46979	51523	50392	56517	70707
Exports	21572	25022	30630	33105	35008	33437	35667	42379	43347	49312	55982

The share of India in the World Merchandise and Commercial Services Export is quite miniscule (about 0.7%) and is ranked below most other South East Economies (See Chart 4 below).

Chart-4
Asian Economies: Share in World Merchandize Trade (2003)



	India	China	Korea	Singapore	Hongkong	Taiwan	Malaysia	Thailand
Imports	0.7%	5.0%	2.3%	1.6%	3.0%	1.6%	1.1%	1.0%
Exports	0.7%	5.8%	2.6%	1.9%	3.0%	2.0%	1.4%	1.1%

The commodity-wise merchandise trade (export and import) is given in Annexure-1 & 2. The analysis of commodity-wise trade reveals that different commodity groups and individual commodities have shown varied levels of performance. The trade-performance reveals the following:

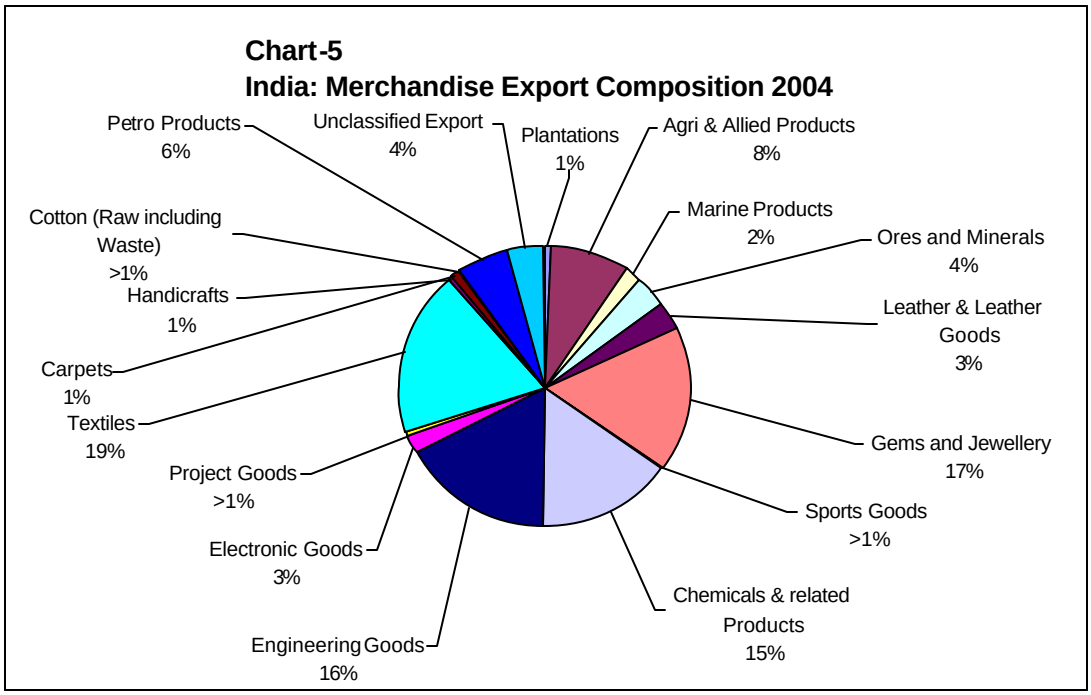
5.2.1 Exports

- **Moderate to high growth (10% and above)** have been witnessed in Engineering goods, Gems and Jewellery, Sports goods, Chemical & related products, Petroleum products, Ores and Minerals, Coffee, Agriculture and allied products which includes Wheat, Oil meals, Tobacco, Processed foods including fresh fruits & vegetables, Meat & preparations, Poultry & dairy products. Natural silk textiles, Man-made textiles made-ups etc & Jute manufactures, Project Goods and Electronic Goods have also registered a moderate growth.
- **Low growth (upto 10%)** has been observed in case of Tea, Leather & Mfrs, Readymade Garments and Carpets.
- **A decline in export growth** has been witnessed in exports of Rice, Pulses, Spices, Cashew, Marine Products, Handicrafts and Cotton, yarn, fabrics, made-ups, etc.

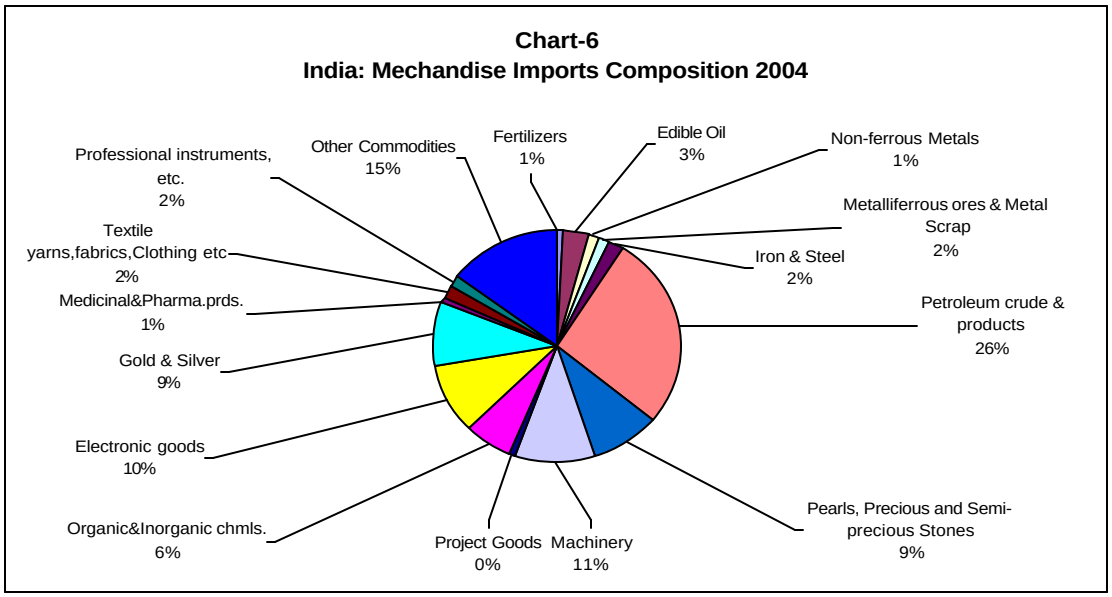
5.2.2 Imports

- **Moderate to high growth (10% and above)** has been witnessed in the case of Fertilizers excluding crude fertilizers, Edible oil, Pulp & waste paper, Newsprint, Paper board & mfrs., Metalliferous ores and metal scrap, Non-ferrous metals, Iron and steel, Petroleum crude and products, Pearls precious & semi-precious stones, Machinery, Cashew nuts, Artificial Resins, Organic & inorganic chemicals, Coal Coke and briquettes, Gold and Silver, and Electronic goods.
- **Low growth (up to 10%)** has been observed in, Man made filament spun yarn, Silk raw, Medicinal & Pharma. Products and Professional Instruments.
- **A decline in imports** has been observed in Cereal and Preparations.

The composition (i.e. Break up) of merchandise exports and imports have been depicted in Chart-5 &6 respectively.



80% of the total exports in comprised manufactured goods such as gems and Jewellery, ready-made garments, cotton yarn and textiles, leather goods, engineering products, chemicals and allied products, electronic products, transport equipment, marine products, agriculture and allied products, computer software.



Of the total imports, capital goods and fuel accounted for one third share. Other major imports are chemicals, pearls, precious and semi-precious stones, newsprint, fertilisers, iron and steel, non-ferrous metals and professional instruments.

India's exports have never before had a better run before with merchandise trade zooming to $63.5 billion in 2003-04 from $43.8 billion in 2001-02 and $52.7 billion in 2002-03. Even as the Medium-Term Export Policy (2002-07) had forecast an average annual growth rate of 12 per cent in dollar terms, exports have grown at 20 per cent-plus the last two years with the current year set to do a repeat considering the buoyant trends so far. Though competing in an increasingly integrating global economy, domestic industry and trade have not lost their nerve, as widely feared. Both small and medium enterprises (SMEs) and big export and trading houses have shown their staying powers to capture a share of the global market.

The new Foreign Trade Policy 2004-09 unveiled by UPA Government hopes to double the country's share of global trade from 0.7 per cent now to 1.5 per cent in the not-too-distant future. Players in the trading sector have a crucial role to play to attain this objective.

There are certain obstacles, which needs to be surmounted to achieve the ambitious target spelt out by the Government. Some of these are:

- The appreciation of the rupee against the dollar erodes the competitiveness of our exports, particularly when the value of competitor China's currency value remains unchanged.
- Exporters face innumerable infrastructure bottlenecks. Inland movement of goods remains a major obstacle, as exporters are helpless in the face of high cost of transport and inter- and intra-State barriers.
- The handling capacity of ports is 450 million tonnes now, and in another five years it would hopefully reach 620 million tonnes. But to effect exports of $175 billion, the handling capacity must be 950 million tonnes.
- Lack of adequate infrastructure for handling container traffic (see Annexure 3 for details)
- Low pure trading (Re-export) activities in India (See Annexure 4)
- Logistics and trading hubs is the key to China's tremendous export success, but remains India's weakest link.

Under this scenario, it is apparent that at national level, few vibrant Trading & Logistic Hubs are desirable for the success & growth of country's merchandise export growth.

The best example of export success based on developing trading and logistic hubs is UAE. These trade hubs (i.e. Jebel Ali, Abu Dhabi and Ras Al Khaimah) have changed the face of the country and helped it to diversify into non-oil based economic activities (See Annexure 5).

5.3 Essentials of Global Trading and Logistics Hubs

The common thread linking all internationally acclaimed and successful "Trading & Logistics Hubs" like Singapore, Jebel Ali, Tanjung Pelepas, Shanghai, are:

- Strategic Location
- Presence of World-class seaport and airport
- Multi Modal Transport Linkages
- Presence of large export oriented manufacturing industries
- Presence of major warehousing, distribution and logistics companies
- Efficient Telecommunication and Advanced Information Technology Infrastructure
- Competitive environment

Committed Government support for developing international logistics as the key industry cluster

5.4 Rationale / Prospects of Developing Global Trading & Logistics Hub in the Kutch

The proposition of developing trade and logistic hub in Kutch basically emerging from following favourable factors:

- Kutch has a long coastline with number of minor, developing and major ports with most amenable port conditions
- Ports of Kutch are already handing 10% of total port traffic and this likely to increase to 20% by next five years.
- It is located midway between the Western and Eastern markets and hence has a potential to act as transit point for international transshipment cargo and throws of potential for re-exports to some of the imported items for vast hinterland to countries in Gulf and middle-east.
- Adequate facilities available for handling container traffic (at Kandla and Mundra P&O Terminal)
- Vast hinterland of North West India, which can be served best by Kutch ports.
- Nearness to Middle East / Northern Africa
- Critical multi-model connectivity already existing and also being upgraded.

Under this scenario, it makes sense to develop a **Trade and Logistics Hubs** near Kandla and Mundra Port.

However, turning the region into a Global Trade and Logistics Hub is not a straight-forward dream. It is a mammoth task calling for extra-special measures. Having seen the development of Singapore, Shanghai and Dubai as Global Trading Hubs, it can be inferred that these hubs have gradually evolved and attained the current status after years of careful planning & continuous investments in support infrastructure (i.e. especially in development of ports, multimodal connectivity, etc). Similar efforts on planning and investment front need to be taken for developing Kutch region as global trade and logistics hub.

5.4.1 Development Approach

There are basically two approaches for developing Global Trading Hubs, these are:

- Natural or self organized system approach
- Engineering System Approach

The first approach, i.e. Natural or Self-organized system approach believes in facilitated organic growth of linkages (i.e. port, multi-modal connectivity and support infrastructure) gradually resulting into system with its own character. Such an approach can work for a region which is already on the major shipping trade route and has all necessary essentials, i.e. natural harbors, large hinterland thriving with manufacturing industries).

The second approach, i.e. engineering system approach relies on planned development of crucial linkages in a phased manner after analyzing synergistic impact potential of various linkages. This approach is basically a pro-active approach forcing development in the desired direction. Such an approach though calls for huge investment but can bring result in a quicker time compared to previous approach.

For developing Kutch into Global Trading and Logistic Hub, adoption of ***Engineering System Approach*** appears appropriate for the following reasons:

- The ports of Kutch are so far not on the major shipping trade routes obviating possibility of its development in a natural course
- The international trade dynamics is fast changing and it is in favor of Asia and South East Asia at the moment. The existing trade and logistics hubs are witnessing investments from all over the world. Most of these hubs which are facing capacity shortage to handle the growing traffic / volume are making huge investments for the improvement, expansion, and development of transport and logistics infrastructure. In view of this scenario, early and systematic initiatives for the development of trading and logistic hub in the Kutch are desired.

Following this approach would mean concerted efforts and large scale initial investments, which in turn needs:

- Appropriate strategies for ensuring synergistic development
- Appropriate framework for planning and implementation
- Involvement of multiplicity of agencies
- Appropriate funding mechanisms

5.4.2 Strategies for Synergistic Development

The success of Trading and Logistics Hub is critically dependent on the type of facilities and support infrastructure available and growth of industrialization in the immediate hinterland. Hence, it is essential to have a following two-pronged strategy:

- Creating world-class support infrastructure necessary for Trade and Logistics Hub
- Promote industrialization in the immediate hinterland

The first thing in the process of planning is to select an appropriate port location for the hub. The options available are either work on a Greenfield model or Redevelopment model. The option of developing a Greenfield port for the proposed hub does not appear to be pragmatic considering:

- The extent of time and investment involved in the development
- The region has already two most amenable ports of Kandla and Mundra (i.e. in terms of amenable port conditions for berthing of panamax vessels) having adequate scope for further development / improvements as per the need of proposed hub.

5.4.3 Developing Support Infrastructure for Trade Hub

Port Facilities

To support operations of global trading hub, the current facilities at Mundra and Kandla port needs to be enhanced substantially. The possible enhancement areas could be:

- Addition of 5-6 berths of adequate lengths to offer suitable linear wharf , allowing berthing of super post panamax vessels

- Expansion of container terminal facilities, i.e. making it adequate enough to increase throughput to 5 million TEU

- Matching facilities at container terminal (i.e. quayside cranes having 22-box outreach capable of catering to next generation super post panamax vessels, yard cranes utilizing Differential Global Positioning System (DGPS) ensuring productivity, safety and security.

- Create facilities to make port a one-stop-shipping-centre, i.e. creation of facilities to assure full range of services, including container handling dry-docking, ship repair, bunkering, pilotage services, tug services, arbitration, insurance, and comprehensive financial services, and even, training and education in port operation and management, logistics and distribution management, and other transport studies.

Enhancement of port facilities would involve lot of preparatory work, like:

- Studies establishing techno-commercial viabilities of various facilities envisaged

- Risk assessment from various angles, i.e. market, environment and safety

- Assessment of funding requirements

- Project Financing, Implementation and management structure

Port up-gradation / improvement projects are complex and extremely capital intensive. Suitable public-private partnership models would have to be evolved for different facilities after assessing risk-return profiles. This process involves several complex issues pertaining to policy, legal, regulatory aspects as well as issues of operational and management autonomy. For resolving these issues need an appropriate set up such as ***"Special Project Facilitation Group"***

Multi-Modal Connectivity and Support Infrastructure

The success of Singapore as ***"Global Transshipment Hub"*** can be attributed to its world-class seaport, airport and inland road transportation network. World's major commercial airlines and shipping lines, converge into Singapore carrying enormous amount of in-bound freight. This freight is then re-organized and consolidated and transshipped to bustling airports and ports in the region, making Singapore the major transshipment centre in the Asia-Pacific region.

Developing a world-class Airport in Kutch does not appear to be an immediate possibility (i.e. in the Phase-1 development). However, plans must be drawn to develop air-strip on immediate priority and full-fledged airport at a later stage, when the proposed Hub achieves reasonable targets as envisaged. Road and Rail linkage connecting ports and major destinations / CFSs in the hinterland is very crucial and needs to be accorded immediate priority. ***The need and necessary steps / action plan for improving multi-modal connectivity and support infrastructure in the region have not been elaborated here as they have already been contemplated and discussed in the sections dealing with potential development in infrastructure sectors in this report.***

Efficient Telecommunication and Advanced IT Infrastructure

Successful international logistics management relies on efficient telecommunications. It is essential to have an advanced telecommunication infrastructure offering International Direct Dialling (IDD) with links to major trade destinations, Integrated Service Digital Network (ISDN), data communications, video conferencing, sky-phones and services. Information Technology (IT) in logistics management is essential, and calls for electronic data interchange (EDI) network for streamlining processing

procedures for import and export and transshipment documents within minutes. It should be also linked to the EDIs of major ports around the world such as Singapore, Dubai, Shanghai, Rotterdam, Hamburg, London, Antwerp and New York. Complementing this, international logistics companies can have link their EDIs with the Indian Customs Department to enable pre-clearing of imports.

Facilities for Warehousing and Distribution

All the major Global Trading Hubs have well laid space and facilities for Warehousing, Distribution and Value added processing. Extensive investments have been made in developing warehousing and distribution infrastructure. The common features of successful trading hubs (i.e. Singapore, Dubai, Shanghai) with respect to Warehousing and Distribution activities are:

- Highly sophisticated and automated warehousing and distribution facilities catering to wide range of storage and distribution needs
- Well designed warehousing space and facilities considering the needs of export cargo generated in the hinterland and import cargo for inland distribution
- Development of new distribution trends such as, Just-in-Time (JIT) concept, and door-to-door delivery
- Presence of large distribution companies (like Keppel, Schenker, BMW, PTP, Kenwood) doing distribution after value added processing
- Presence of almost all leading international logistics operators specialized in integrated logistics, providing quality service to clients in the region (i.e. Federal Express, DHL, UPS, AEI, TNT Express Worldwide, Burlington, Airborne, Nippon Express, and Mitsui-Soko)
- Increasing number of MNCs (such as Sony Corporation, General Motors, Eastman Kodak, Dupont, Caterpillar, Hewlett Packard, AT&T, Ciba Geigy, Fuji Xerox, and General Electric) establishing their central distribution centres (CDCs) to serve their regional and global operations. Locating a CDC in efficient hubs help derive benefits of fast delivery times, Reduced transportation costs , Lower inventory costs Lower staffing costs)
- Excellent Rail & Road connectivity between Warehousing facilities and industrial areas / ports,
- Extended support and incentives by the Government **(See Annexure -6)**

Learning from the above successful models, it is imperative that warehousing, distribution and logistics are critical elements of the trading hubs. Hence, adequate attention ought to be accorded while planning for facilities related to warehousing, distribution and logistics.

Consultants have tried to assess the cargo traffic in the hinterland of Kutch ports (See **Annexure -7**). Considering traffic growth projected for Kutch region ports, potential for distribution to vast hinterland of North West India and re-exports, there lies a potential for 2-3 such large systematically planned "Trade and Logistic Hubs", which can facilitate in providing efficient and cost effective services.

Considering the exports and imports of hinterland, facilities for trading and distribution of following items / commodities can be considered in these proposed hubs:

- Clothing
- Agricultural Commodities
- Edible Oils
- Oilseeds
- Pulses
- Textile Yarn, Fabrics
- Automobiles
- Chemical
- Pharmaceuticals
- Polymers and Plastic Products
- POL Products
- Electronic Items
- Marine Products
- Electronic Items
- Engineering Goods
- Machineries & Instruments
- Coals
- Fertilizers

In order to facilitate and proliferate trading and distribution of above products, adequate facilities / space need be created in the proposed Trading and Distribution hubs. Various facilities to be created are:

- Container Freight Station(CFS) / Inland Container Depots (ICDs)
- Cold Storages
- Silos from Grains
- Open Stockyards
- Covered Storages / Godowns
- Chemical / POL Products storage terminals
- Testing and Certification Labs

Apart from above, following appropriate common physical and social infrastructure facilities need to be created to support the activities of trading hubs:

- Captive Power Plant or facilities for uninterrupted power supply
- Water Distribution and Waste water and Sewage management
- Office Complex
- State-of-the-art Communication and IT Infrastructure
- Residential Facilities
- Recreation centres
- Education Facilities
- Medical Facilities
- Transportation
- Security

The proposed hub should also attract large distribution companies and MNCs to set up their Centralized Distribution Centres in the hub zone and carry out value added processing before distribution.

Following value added activities for inbound commodities can be taken up and for which necessary facilities to be created in the hub:

- Pure Trading (Re-Exports)
- Stock and Trade
- Package Labeling
- Packaging – Bulk to Bags
- Sorting, Grading and Repacking
- Manufactured exports from Hub units
- Internal Re-labeling / Branding
- Minor Processing of traded commodities

Attracting large distribution companies, manufacturing and assembling units and global logistics companies in the hub is a crucial but a most challenging task. A well planned marketing strategy coupled with appropriate incentive framework needs to be carved out for attracting global players. Some important steps desired in this direction are:

- ***Either plan the Trading Hub in already declared Special Economic Zone and Declare the proposed trading zones as Special Economic Zones***
- ***Provide lucrative schemes and incentives to service sector (i.e. transport, logistics, warehousing and distribution activities) to make the Kutch region a focal point of trade. The schemes and incentives may be devised in line with those offered in Singapore. Some of these schemes and incentives offered in Singapore are outlined in Annexure-6.***
- ***Attracting global players in distribution and logistics is vital to the success of trading hub. An appropriate promotional agency may be appointed for this purpose.***

Promoting Industrialization in the immediate hinterland

All successful Global Trade Hubs have been found to be neighboring thriving industrial and manufacturing zones, e.g. Mega Chemical Industrial Estate at Jurong Island near Singapore, Jebel Ali and Hamriyah Zones near Dubai, Large Chemical and Petrochemical complexes / Industries near Sanghai, Rottredam and Antwerp.

The proliferation of industrial activities in the hinterland helps in accelerating growth for the trade hubs in the following ways:

- Increased industrialization / manufacturing activities in the hinterland increases volume growth of both outbound and inbound cargo.
- Some of the large industries would also participate in building some of the infrastructure facilities which are also critical for their activities, e.g. Large Chemical / Petrochemical complex or park may participate in up-gradation / modernization / enhancement of port and port facilities and development of multi-modal transport linkages.
- Development of large industries / complexes would also be instrumental in proliferation of ancillary and support industries further providing opportunities for warehousing, distribution and logistic and other service activities.

For promoting / triggering large scale industrialization in the immediate hinterland of proposed trading hub, consultants suggest following two-pronged strategies:

1) **Attract Mega Projects which are based on the unique zone attributes in terms of immediate / extended hinterland resources, strategic geographic location, and availability of natural resources in the region and presence of a functional and efficient port.**

   The economic activities, which need to be probed / explored, further in this regard, are:

   - Mineral Based Industries based on Bauxite, Lignite, Limestone, Bentonite, Kaolin, etc
   - Salt and Salt based industries
   - Edible Oils
   - Refinery
   - Mega Chemical Complex
   - LNG Terminal

2) **Cluster those economic activities which have a global interaction either in terms of import or export / re-export and are attracted because of SEZs and efficient ports**

   The economic activities, which need to be probed / explored, further in this regard, are:

   - Textiles
   - Light Chemical Processing
   - Food Processing
   - Electronics and mechanical engineering
   - Pharmaceuticals & health care
   - Light metallurgy industry
   - Gems & Jewellery

- Tank farm terminals

The priorities and specific action plan for development of above projects in the Kutch have already been discussed in detail and hence, it has not been elaborated here.

Developing a Global Trading Hub is a complex task needing networking amongst number of agencies of various public and private sector groups and organizations throughout the region working together toward the mutual goal of increasing trade and development in the proposed region.

A special project facilitation group or Trade Hub Development Council with autonomous powers needs to be instituted to give fillip to the proposal / idea by directing efforts towards desired course of development. Such a group or council must have appropriate representations from concerned central and state governmental departments like Central Authority of Ports in India under Ministry of Surface and Water Transport, Ministry of Commerce & Industries, Ministry of Finance, MOEF, Gujarat Maritime Board, GPCB, Industries Commissioners' office, GIDB etc along with Urban and Industry Area Planners, Specific Industry experts, project structuring experts, Environmental specialists and Legal and Contract Specialists.

The role and function of the proposed group and council would be:

- ***Preparing a Vision and Roadmap of development for the proposed trading and distribution hub in the region***
- ***Broad planning of facilities and area planning***
- ***Prioritization of Project Proposals after understanding interdependent linkages and overall developmental impacts***
- ***Initial configuring and structuring of projects based on understanding risk-return assessment***
- ***Preparation of preliminary feasibility reports on prioritized and selected project components***
- ***Appointing appropriate marketing agencies to attract the global players in the area of warehousing, distribution, logistics, centralized distribution activities to the proposed hub***
- ***Facilitating interactions between Investor Community and relevant Govt. Departments with a view to eliminate / alleviate bottlenecks and impediments***

Suggest authorities on policy and regulatory issues

5.4.4 India's Merchandise Trade: Annexure 1

Table 5.1: India Merchandise Export (2003-04): Composition (in US$ Million)

Sr	Commodities	April-March		Growth	Weight
		2002-03	2003-04	(%)	(%)
I	**Plantations**	**546.76**	**582.53**	**6.54**	**0.92**
	1 Tea	341.37	347.01	1.65	0.55
	2 Coffee	205.39	235.52	14.67	0.37
II	**Agri & Allied Products**	**4721.32**	**5326.12**	**12.81**	**8.39**
	1 Cereal	1587.38	1492.53	-5.98	2.35
	a) Rice	1204.92	899.45	-25.35	1.42
	b} Wheat	363.64	511.27	40.6	0.81
	c) Others	18.82	81.81	334.77	0.13
	2 Pulses	71.29	70.2	-1.53	0.11
	3 Tobacco	211.36	237.39	12.31	0.37

	4	Spices	342.08	332	-2.94	0.52
	5	Nuts & Seeds	555.98	650.14	16.94	1.02
		a) Cashew incl. CNSL	425.97	370	-13.14	0.58
		b) Sesame & Niger seed	93.17	161.74	73.61	0.25
		c) Groundnut	36.84	118.41	221.39	0.19
	6	Oil Meals	307.33	711.98	131.66	1.12
	7	Guar gum Meal	100.56	109.62	9.01	0.17
	8	Castor Oil	126.01	138.31	9.77	0.22
	9	Shellac	18.57	35.5	91.2	0.06
	10	Sugar & Mollasses	374.94	265.62	-29.16	0.42
	11	Processed Foods	605.22	771.16	27.42	1.22
		a)Fresh Fruits & Vegetables	225.25	370.03	64.28	0.58
		b)Fruits/Vegetable seeds	20.24	11.38	-43.77	0.02
		c)Processed Items	359.73	389.75	8.34	0.61
	12	Meat & Preparations	284.57	348.73	22.54	0.55
	13	Poultry & Dairy Product	74.08	88.65	19.67	0.14
	14	Floriculture products	37.35	48.05	28.64	0.08
	15	Spirit & Beverages	24.6	26.25	6.71	0.04
III	**Marine Products**		**1431.55**	**1320.49**	**-7.76**	**2.08**
IV	**Ores & Minerals**		**1996.05**	**2340.68**	**17.27**	**3.69**
	1	Iron ore	867.94	1117.19	28.72	1.76
	2	Mica	8.44	16.68	97.67	0.03
	3	Processed Minerals	550.23	615.38	11.84	0.97
	4	Other ores & Minerals	516.06	533.48	3.38	0.84
	5	Coal	53.37	57.95	8.58	0.09
V	**Leather & Leather Goods**		**1848.32**	**2025.33**	**9.58**	**3.19**
	1	Footwear	642.02	741.46	15.49	1.17
	2	Leather & mfrs.	1206.3	1283.88	6.43	2.02
VI	**Gems and Jewellery**		**9029.94**	**10509.79**	**16.39**	**16.56**
VII	**Sports Goods**		**72.61**	**93.36**	**28.58**	**0.15**
VIII	**Chemicals and Allied Products**		**7858.33**	**9791.47**	**24.6**	**15.43**
	1	Basic chemicals, Pharma & Cosmetics	4658.42	5612.88	20.49	8.85
	2	Plastics & Linoleum	1221.67	1739.14	42.36	2.74
	3	Rubber, glass & other products	1601.27	2046.64	27.81	3.23
	4	Residual chemicals & allied Products	376.97	392.81	4.2	0.62
IX	**Engineering Goods**		**7688.97**	**10413.91**	**35.44**	**16.41**
	1	Machinery	3463.13	4801.43	38.64	7.57
		a) Machine tools	120.8	137.4	13.74	0.22
		b) Machinery & Instruments	2008.44	2771.54	37.99	4.37
		c) Transport equipments	1333.9	1892.48	41.88	2.98
	2	Iron & Steel	1856.03	2463.93	32.75	3.88
		a) Iron & Steel bar rod etc	234.55	323.47	37.91	0.51
		b) Primary & semi- finished iron & steel	1621.48	2140.46	32.01	3.37
	3	Other Engineering Items	2369.81	3148.55	32.86	4.96
		a) Ferro Alloys	51.82	85.21	64.42	0.13

		b) Aluminium other than prods.	152.96	154.42	0.96	0.24
		c) Non-ferrous metals	288.06	456.41	58.44	0.72
		d) Manufacture of metals	1847.62	2408	30.33	3.79
		e) Residual Engineering Items	29.33	44.51	51.73	0.07
X	**Electronic Goods**		**1294.56**	**1739.32**	**34.36**	**2.74**
	1	Electronics	1252.73	1686.41	34.62	2.66
	2	Computer Software	41.83	52.9	26.48	0.08
XI	**Project Goods**		**49.45**	**59.86**	**21.05**	**0.09**
XII	**Textiles**		**11081.14**	**11970**	**8.02**	**18.86**
	1	Readymade garments	5689.91	6088.42	7	9.59
	2	Cotton, yarn, fabrics, made ups	3351.05	3324.36	-0.8	5.24
	3	Manmade textiles & made ups	1417.49	1817.57	28.22	2.86
	4	Natural silk textiles	310.85	369.66	18.92	0.58
	5	Wool & woolen manufactures	50.92	59.12	16.1	0.09
	6	Coir & coir manufactures.	73.36	78.44	6.93	0.12
	7	Jute mfrs.	187.57	232.43	23.91	0.37
XIII	**Handicrafts**		**785.33**	**442.31**	**-43.68**	**0.7**
XIV	**Carpets**		**532.59**	**569.5**	**6.93**	**0.9**
	1	Hand-made excl. Silk	401.02	543.03	35.41	0.86
	2	Mill-made excl. Silk	111.71	0	-100	0
	3	Silk Carpets	19.86	26.47	33.26	0.04
XV	**Cotton raw and waste**		**10.39**	**176.59**	**1599.74**	**0.28**
XVI	**Petro Products**		**2576.54**	**3518.52**	**36.56**	**5.54**
XVII	**Unclassified Exports**		**1195.31**	**2574.71**	**115.4**	**4.06**
	GRAND TOTAL		**52719.43**	**63454.56**	**20.36**	**100**

5.4.5 India's Merchandise Trade: Annexure 2

Table 5.2: India Merchandise Import (2003-04): Composition (in US$ Million)

Sr	COMMODITIES		April-March		Growth	Weight
			2002-2003	2003-2004	(%)	(%)
I	**BULK IMPORTS**		**23941**	**29175.98**	**21.86**	**37.87**
	1	Cereals &preparations	25	19.18	-21.73	0.02
		Rice	0	0.04	-83.92	0
		Wheat	0	0.05		0
		Other cereals	0	0.42	205.81	0
		Preparations	24	18.66	-22.66	0.02
	2	Fertilizers	626	718.88	14.88	0.93
		Crude	185	133.84	-27.58	0.17
		Sulphur & Un-roasted pyrites	83	86.23	3.47	0.11
		Manufactured	358	498.82	39.48	0.65
	3	Edible Oil	1814	2540.6	40.04	3.3
	4	Sugar	7	9.32	37.4	0.01
	5	Pulp & waste paper	343	408.38	18.93	0.53
	6	Paper board & mfrs.	422	602.63	42.69	0.78
	7	Newsprint	234	334.24	42.56	0.43

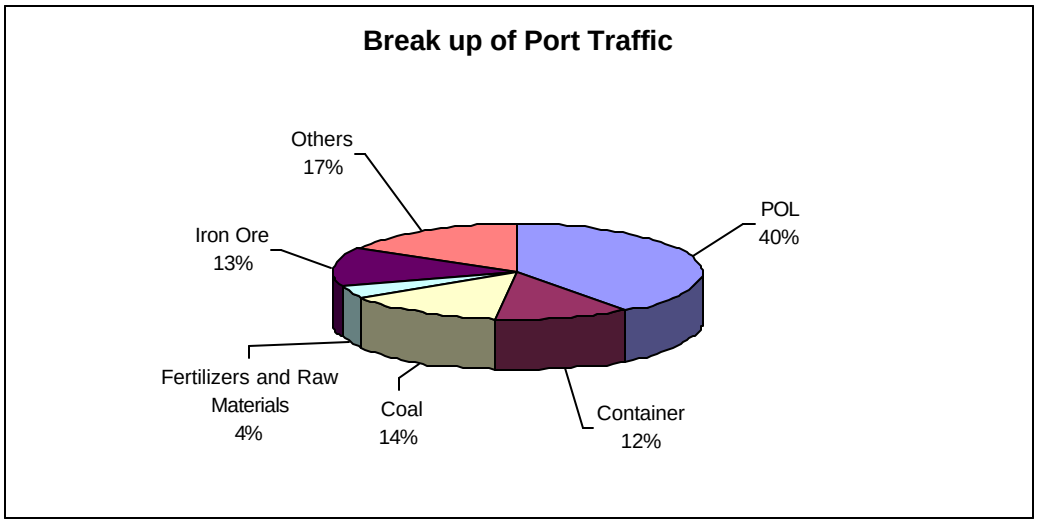
	8	Crude rubber	182	279.99	53.46	0.36
	9	Non-ferrous Metals	667	942.51	41.41	1.22
	10	Metalliferrous ores & Metal Scrap	1038	1250.55	20.5	1.62
	11	Iron & Steel	944	1500.09	58.96	1.95
	12	Petroleum crude & products	17640	20569.6	16.61	26.7
II.	**PEARLS,PRECIOUS & SEMI-PRECIOUS STONES**		**6062.76**	**7128.31**	**17.58**	**9.25**
III.	**MACHINERY**		**6374.05**	**8188.52**	**28.47**	**10.63**
	1	Machine Tools	246.94	459.51	86.08	0.6
	2	Machinery other than electrical	3565.62	4722.64	32.45	6.13
	3	Electrical machinery	664.1	863.85	30.08	1.12
	4	Transport Equipment	1897.4	2142.51	12.92	2.78
IV.	**PROJECT GOODS**		**542.68**	**379.72**	**-30.03**	**0.49**
V.	**OTHERS**		**24491.32**	**32160.24**	**31.31**	**41.75**
	1	Cashew Nuts	255.45	298.53	16.87	0.39
	2	Fruits & Nuts	132.61	177.47	33.83	0.23
	3	Wool raw	165.68	189.46	14.35	0.25
	4	Silk raw	133.72	136.29	1.92	0.18
	5	Synthetic fibres	75.25	58.43	-22.34	0.08
	6	Pulses	565.57	489.9	-13.38	0.64
	7	Raw Hides & Skins	55.72	49.78	-10.65	0.06
	8	Leather	142.17	171.13	20.38	0.22
	9	Coal,coke & briquettes	1239.64	1409.92	13.74	1.83
	10	Non-metallic mineral manufactures	234.67	326.46	39.11	0.42
	11	Other crude minerals	103.15	128.27	24.35	0.17
	12	Organic & Inorganic chemicals	3025.16	4022.3	32.96	5.22
	13	Dyeing, Tanning material	276.81	348.31	25.83	0.45
	14	Medicinal & Pharma. Products	592.04	643.21	8.64	0.83
	15	Artficial Resins, etc.	781.83	1080.01	38.14	1.4
	16	Chemical products	451.98	630.81	39.57	0.82
	17	Other Textile yarn, fabrics,etc	340.43	424.23	24.61	0.55
	18	Manufactures of metals	488.29	687.23	40.74	0.89
	19	Professional instruments, etc.	1133.19	1226.42	8.23	1.59
	20	Electronic goods	5599.41	7495.52	33.86	9.73
	21	Wood and wood products	402.1	711.29	76.89	0.92
	22	Gold & Silver	4288.25	6817.37	58.98	8.85
	23	Tea	25.89	14.04	-45.77	0.02
	24	Wollen Yarn and Fabrics	20.86	36.55	75.17	0.05
	25	Cotton yarn and fabrics	87.8	141.89	61.61	0.18
	26	Man made filament spun yarn	397.23	414.6	4.37	0.54
	27	Made up textile articles	39.52	81.22	105.51	0.11
	28	Ready made garments (woven)	23.96	37.57	56.84	0.05
	29	Silk yarn and fabrics	60.55	113.41	87.29	0.15

30	Milk & Cream	1.973	19.47	886.95	0.03
31	Spices	121.18	126.64	4.51	0.16
32	Oil seeds	2.37	3.02	0	0
33	Jute raw	27.85	10.8	-61.22	0.01
34	Woollen & Cotton rags	17.34	29.22	68.58	0.04
35	Veg. & animal fats	2.4	2.76	14.97	0
36	Cotton raw and waste	255.73	341.67	33.61	0.44
37	Essential oils & Cosmetics preparations	100.51	90.99	-9.47	0.12
38	Cement	0.86	2.02	134.03	0
39	Computer Software	493.8	380.66	-22.91	0.49
40	Other Commodities	2328.37	2791.34	19.88	3.62
TOTAL IMPORTS		**61412.14**	**77032.77**	**25.44**	**100**

5.4.6 Container Traffic: Infrastructure Hurdles: Annexure – 3

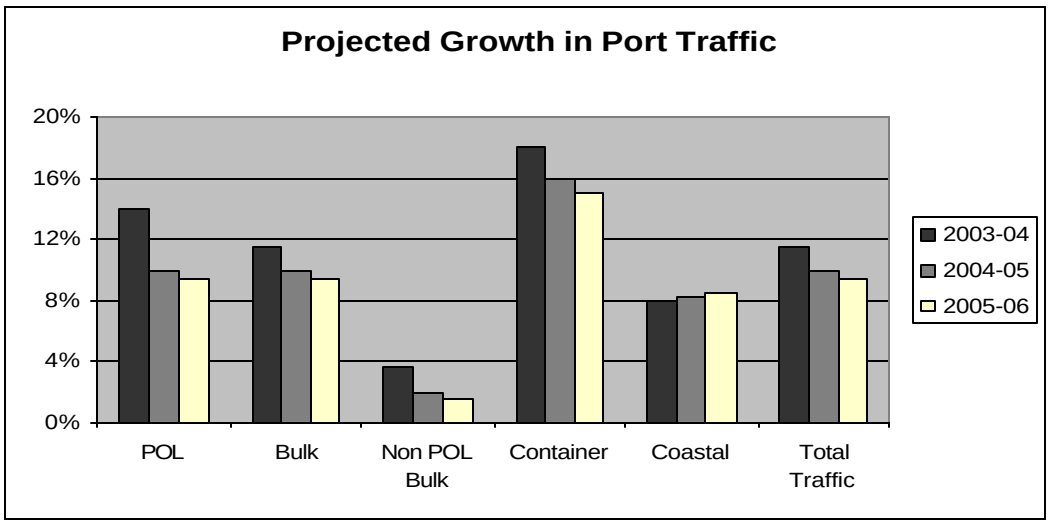
In an arena of multimodal transportation, containerisation of cargo helps in reducing time to delivery and sustaining handling charges. By eliminating manual re-packing when differing modes of transportation are used, containerisation cuts down on freight and labour costs. Apart from offering significant advantages like timeliness of delivery, reduced damages and pilferage, transport through containerized cargo especially by rail is cost effective means of transportation particularly for medium and long hauls.

Globally, the level of cargo containerisation is around 70% as against 30-35% in India. However, the growth in containerisation has been rapid in recent years, with container traffic growing at a CAGR of 15%, compared to just 7% for non-container traffic. This is reflected by the fresh capacity additions in terms of container handling at Indian ports. Of the total traffic handled at Indian ports, container traffic accounts for around 10% of total traffic. Domestic growth in containerisation could be attributable to progressive liberalization in external trade policy, changing product mix of Exim business and growing acceptance of containerized packing as a standard.



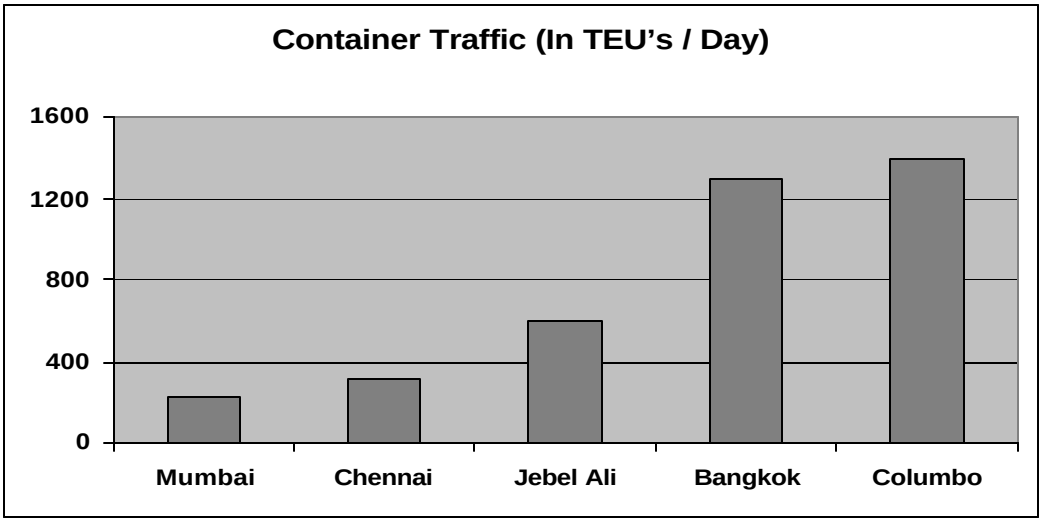
The total container traffic handled in Indian ports has grown by more than 50% in last five years. The country currently has 1 m TEU's (Twenty foot equivalent units/ 1 standard size container) each of export and import container traffic. The growth of container port traffic is expected to have a relatively

better growth rate in the coming years, especially in ports of JNPT (Jawaharlal Nehru Port Trust), Mumbai and Chennai. These ports, which handle about 80% of the business currently, are expected to see most of the container traffic in future. Other important container handling ports are Haldia and Tuticorin.



The perspective plan for Indian Port - Vision 2020, a study ordered by the Union Ministry of Surface Transport and carried out by Rail India Technical and Economic Services (RITES), has projected total marine container traffic of 220 m tonnes by 2020 (28 m tonnes in FY00). Container capacity will see a growth of 100% in next 3-4 years. One of the major areas identified by the report for restructuring of ports has been construction and operation of container terminals.

A major hurdle for the growth of container traffic has been lack of adequate infrastructure. In India productivity in terms of ship turn-round time, waiting time and average ship berthday output has slowly improved over the last decade, but the performance continues to be modest when compared with generally accepted international standard and performance of other Asian ports.



High percentage of non-working time at berth per vessel is one major factor in low performance of Indian Ports. This has discouraged most shipping lines from introducing direct container services.

Only one Indian player, viz SCI has a role in container shipping. However, most of the leading global container companies like Maserk-Sealand, NOL-APL and P&O-Nedlloyd offer services to Indian shippers. Again even the container handling costs in India are on an average 70-80% higher than those in Japan and United States despite low labour costs.

It is clear from the table above that India loses out to container traffic to neighboring countries primarily due to lack of infrastructure.

To conclude the industry holds huge potential provided the government gives a fillip to infrastructure on a fast track basis.

5.4.7 Re-Exports Potential: UAE Case Study: Annexure - 4

The UAE is maintaining its regional trade hub status for the long time on the back of a continued upsurge in re-exports currently growing at over 20 per cent, faster than imports. Re-exports from the UAE are mainly to the other Gulf states but strong demand from Iraq will fuel re-exports in the years ahead.

Imports into the UAE have been rising steadily in recent years, but a major cause of the rise in gross imports is not import demand but demand for re-exports that are growing at a much faster rate than imports.

Re-export growth has been particularly dramatic since 2000, averaging at 22 per cent per annum in the four years since 1999. Since 1995, re-exports have grown at a very robust rate of more than 15 per cent per annum, much higher than the growth in imports. Almost a third of imports are currently destined for re-exports as compared with a mere 21 per cent in 1995.

The oil exporting countries of the Gulf form the largest destination group for the UAE and these countries have seen considerable economic expansion because of firm oil prices for several years.

Iran is the leading single buyer from the UAE, while India and Pakistan have manifested rapid rates of growth in the new millennium as well as the CIS countries which have bucked the global slowdown and have undergone economic expansion after years of stagnation. Significantly for the UAE, re-exports to Iraq are rising rapidly as its economy opens up. Iraq now ranks fifth among re-export destinations from the UAE with re-exports rising six-fold in two years. In 2002, re-exports to Iraq were worth US % 0.5 billion compared with US $ 0.3 billion in 2001 and a mere US $ 100 million in 2000. Demand from Iraq is likely to fuel re-export growth in the immediate years. In the long run, too, because of the continuous increase in international trade, the UAE will tremendously benefit from its established position as a hub for regional trade.

Statistics showed that the top 10 countries account for 60 per cent of the UAE's re-exports. Iran tops the table, accounting for more than one-fifth.

Demand from India is rising due to a resurgent economy. Besides, four of five GCC countries figure among the top 10 destinations (Qatar being the exception) and countries such as Afghanistan, Azerbaijan, Turkmenistan, Armenia and Uzbekistan have recently become key destination markets from the UAE.

Dubai is by far the leading re-exporting emirate, accounting for almost three-fourths of the total, followed by Sharjah and Ras Al Khaimah, which has emerged as a strong re-exporter in recent years.

Table 5.3: UAE Re-Export Trade

(In US $ billion)

Year	Imports	Re-Exports	Re-Export Annual Growth
2000	27.2	7.1	13.50%
2001	30.5	8.5	20.30%
2002	33.4	11.2	30.90%
2003	40.2	13.9	24.10%
Growth 02-03	20.60%	24.10%	

Table 5.4: UAE – Re-Export Destinations (In US $ billion)

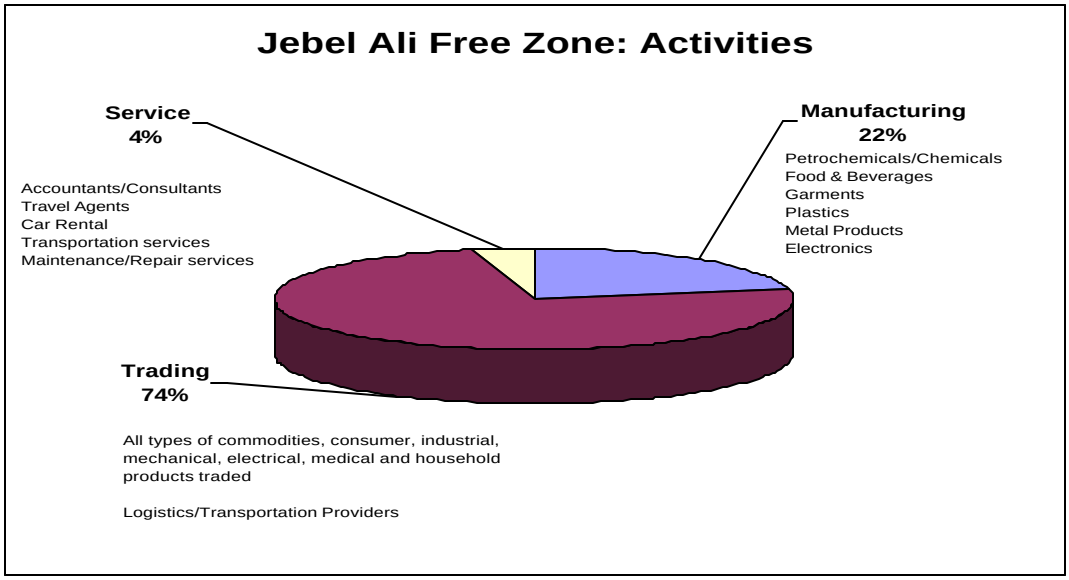
Country	Re-export	Share (%)
Iran	2.36	21.09
India	0.94	8.37
Oman	0.81	7.22
Saudi Arabia	0.60	5.35
Iraq	0.49	4.35
Pakistan	0.34	3.04
Kuwait	0.33	2.92
Libya	0.30	2.68
Russia	0.29	2.63
Bahrain	0.26	2.36
Top 10 total	6.71	60.01
Rest of the world	4.47	39.99
Total	**11.19**	**100**

Source: Ministry of Planning

5.4.8 Jebel Ali: Case Study: Annexure - 5

Jebel Ali Free Zone (JAFZ) was created in 1985. JAFZ was initially seen as the ideal base for multinationals to warehouse and distribute products to the Gulf .JAFZ was a visionary project by the Dubai Government aimed at boosting economic diversification and improving the throughput of associated ports and airports.

Over the years the range of industry has grown from distribution to include the whole spectrum of manufacturing, trading and services (see chart below).



JAFZ was formed with the full support of the Dubai Government (like Land was provided, Infrastructure and superstructure was subsidised until FZ was self-funding, etc). Initial Government support greatly assisted JAFZA in achieving commercial credibility. Such support and commitment enabled them to avoid speculators looking for short-term ROI and allowed us to focus on our long-term strategic goals. JAFZ was the first FZ in the UAE and was conceived as a general free zone open to many types of service, manufacturing and distribution activity.

JAFZ's success has encouraged our neighbours to also create Free Zones as a vehicle for attracting investment. JebelAli's success in attracting Multinationals from various sectors has been a catalyst for the development of new industry-specific free zones, such as:

- Internet City
- Media City
- DUCAMZ
- Airport FZ
- Textile City
- Heavy Equipment Zone
- Techno Park
- Flower Free Zone
- Dubai Metals and Commodities Centre
- Aid City

Today JAFZ continues to be a general FZ. JAFZ companies contribute approx 200,000 TEU of Jebel Ali port's throughput.

5.4.9 Singapore : Schemes and Incentives for Trade & Logistics Hub Development- Annexure - 6

Scheme / Incentives	Details / Eligibility
(A) General Schemes /Incentives	
Pioneer Status	New manufacturing and service investments introducing high-tech skills can enjoy complete exemption from the 24.5 per cent corporate tax on profits for five to ten years.
Development & Expansion Incentive	This incentive replaces the post-pioneer incentive. Firms that engage in new projects, expand or upgrade operations in Singapore which result in significant economic spin-offs are eligible for a concessionary tax rate of 13 per cent for up to ten years with provision for extension.
Investment Allowance Incentive	Companies engaged in qualifying activities (for example, manufacturing, engineering services, research and development activities, construction or projects to reduce consumption of water) are eligible for exemption of taxable income equal to a specified proportion (up to 50%) of new fixed investment. The exempted firms must make the specified investments within five years.
Approved Foreign Loan Scheme	A company that takes a minimum loan of S$200,000 (about US$110,000) from a foreign lender to purchase productive equipment will be wholly or partially exempt from withholding tax on the interest payable to the lender.
Approved Royalties Incentive	Full or partial exemption of withholding tax on royalties is given to eligible companies.
Overseas Investment Incentive	Companies eligible for this incentive must be involved in investments in overseas projects. The companies must be 50 per cent owned by Singapore citizens or permanent residents, and must be incorporated and resident in Singapore for tax purposes. These companies can offset losses incurred from the sale of shares or liquidation of up to 100 per cent of equity invested overseas, against their other taxable income.
Technopreneur Investment Incentive	Companies eligible for this incentive are start-ups in the initial stage of developing or exploiting new technology. Investors in the eligible start-up company can offset losses incurred through the sale of shares or through the liquidation of the start-up company, against their own taxable income.
Operational Headquarters (OHQ) Incentive	Entities providing management and other approved headquarters-related services to subsidiary, associated, or related companies in other countries are taxed at the concessionary corporate rate of 10 per cent (global HQs are eligible for full tax exemption). The incentive is given for up to ten years with provision for extension.
Accelerated Depreciation Allowances	In lieu of the normal initial depreciation allowance of 20 per cent and annual allowance of between 5-20 per cent on capital expenditure, companies can claim an annual depreciation allowance of 33-1/3 pere cent over three years for all plants and machinery. They may also claim 100 per cent in one year for prescribed automation equipment, robots and certain environmental-related equipment (e.g., energy-saving equipment). Industrial buildings may be depreciated over 25 years.

Scheme / Incentives	Details / Eligibility
Overseas Enterprise Incentive	Exemption of corporate tax on qualifying income earned from approved overseas investments and pr ojects is granted for up to ten years. Companies must be at least 50 per cent owned by Singapore citizens or Singapore permanent residents, and incorporated and resident in Singapore for tax purposes.
Business Headquarters (BHQ) Status	may be awarded to eligible companies in manufacturing and service activities which qualify for an incentive under the Economic Expansion Incentives Act and which provide business and professional expertise, business and management direction and key support services to companies in the region. Period varies depending on the incentive granted.
Double Deduction for Research and Development (R&D) Expenses	applicable to manufacturing and service activities engaged in R&D. The project must be carried out in Singapore. Double ded uction is allowed for qualifying R&D expenses against taxable income.
Double Deduction for Overseas Investment Development Expenditure	Eligible manufacturing and business activities can enjoy double deduction for qualifying expenditure incurred in approved feasibility studies and maintenance of overseas project offices against taxable income.
Writing Down Allowance for Approved Intellectual Property	Singapore-based companies that acquire approved intellectual property (IP) can offset the total cost of the IP against taxable income over a five-year period.
Research Incentive Scheme for Companies	Under this scheme, grants may be offered to support the development of in-house R&D capabilities among Singapore-based companies.
Innovation Development Schem e	Under this scheme, grants may be offered to companies to engage in, and develop capabilities in the innovation of products, processes and applications.
Initiatives in New Technology	Under this scheme, grants may be offered to companies to support manpower training costs in the application of new technologies, industrial R&D and professional knowhow.
(B) Schemes /Incentives for International Trading *(by Trade Development Board)*	
Approved International Trader Scheme (AIT)/Approved Oil Trader Scheme (AO T)	The aim is to attract major international companies to use Singapore as competitive trading hub. Companies with the AIT/AOT status enjoy a concessionary tax rate of 10 per cent on international trading activities in approved commodities /products.
Approved Cyber Trader Scheme (ACT)	Companies conducting international business through the use of internet can qualify for the ACT incentive. Companies under the ACT incentive is expected to: ▪ conduct its principal E-Commerce activities in Singapore as well as handle a range of business activities and support functions, e.g., - Server farms/Database management; - Web site content hosting, design and development; - General and administrative management; - Business development and investment planning; - Financial control and treasury functions; - Logistics management and/or centralized distribution function - R & D of internet applications and technology;

Scheme / Incentives	Details / Eligibility
	▪ meet other commitments or criteria specified by the approving authority. Companies' business plans are evaluated on a case-by-case basis.
Approved International Shipping Enterprise Scheme (AIS)	The AIS scheme aims to provide shipping companies with an incentive to operate from Singapore. Approved companies can enjoy tax exemption for ten years on income from qualifying shipping operations
(B) Schemes /Incentives administered by Monetary Authority of Singapore	
Tax Incentive Scheme for Asian Currency Unit (ACU) Income	This encourages banks and merchant banks to undertake offshore banking activities with non-residents and provides a concessionary tax rate of 10 per cent on income earned from such activities.
Tax Incentive Scheme for Offshore Insurance Business	A concessionary tax rate of 10 per cent can be granted to insurance companies on income derived from writing offshore insurance business.
Initiatives in New Technology Scheme (INTECH)	To encourage the development of manpower resources in the insurance industry, this incentive provides a financial grant to registered insurers, reinsurers and approved captive managers in Singapore to help defray the cost of manpower training.
Tax Exemption Scheme for Offshore Marine Hull & Liability Insurance Business	This Scheme aims to encourage all general direct insurance and reinsurance companies in Singapore to tap the insurance potential of the shipping communities in the Asia-Pacific region. It provides tax exemptions for income derived from underwriting profits of offshore marine hull and liability business, as well as non-Singapore dividends, realised capital gains and interest, including Asian Currency Unit (ACU) deposits, derived from investing premium income from offshore marine hull & liability insurance business and shareholders' funds used to support the offshore marine hull & liability insurance business.
Abolition of Withholding Taxes on Financial Guaranty Insurance Contracts	To promote financial guaranty business, claim payments made under financial guaranty insurance policies by approved financial guaranty insurers to non-residents will be exempt from withholding tax.
Tax Incentive Scheme for Transactions in Foreign Securities	To encourage regional securities trading activities, financial institutions can be granted: ▪ Concessionary tax rate of 10 per cent on income derived from non-residents' from provision of brokerage, custodian services, trading in foreign securities, arranging and underwriting foreign securities. ▪ Tax exemption on income from transactions in foreign securities listed on the Singapore Exchange. ▪ Exemption of contract note stamp duty on transactions in foreign securities on behalf of non-residents. ▪ Tax exemption on income from arranging and underwriting Initial Public Offerings of foreign securities

Scheme / Incentives	Details / Eligibility
	on the Singapore Exchange.
Double Tax Deduction Scheme for Financial Research and Development	Designed to encourage financial institutions in Singapore to develop new and innovative financial products, this incentive allows double tax deduction for expenses such as costs of R&D personnel, legal expenses, training costs and consultancy fees
Tax Incentive Scheme for Operational Headquarters	This allows financial institutions with substantial international operations a concessionary tax rate of 10 per cent on income derived from providing qualifying headquarters services to overseas related companies and on income derived from treasury activities.
Tax Incentive Scheme for Finance and Treasury Centres	Designed to encourage multinational corporations to use Singapore as a base for conducting treasury management activities, this incentive provides a concessionary tax rate of 10 per cent on income derived from provision of finance and treasury services to related companies. Interest payments on foreign loans obtained from overseas banks or related companies may also be exempted from withholding tax

5.4.10 Cargo Potential Areas in Kutch Hinterland - Annexure - 7

Based on the geography and profile of the Kutch hinterland, the major cargo potential areas are Delhi and surrounding area, Punjab, Haryana, Uttar Pradesh, Gujarat and parts of Madhya Pradesh.

The Kutch hinterland has a wide range in the commodity mix for both exports and imports. The major exports from this region comprise agro products (including food grains like rice, fruits, etc.), textiles (including apparel), auto parts, handicrafts and marble/marble products while machinery, chemicals, auto components, heavy metal scrap and newsprint are the major imports. Mundra SEZ and other increasing industrial activities would provide additional volumes in coming years.

The summary of the analysis of major cargo in each of the cargo areas of the Kutch hinterland (in year 2002-03) is provided as Exhibit 2. It should be noted that cargo generated in a particular area refers to the aggregation of cargo in that area and does not necessarily mean its final origin or destination in that region.

Table 5.5: Summary of Cargo Potential in the Kutch Hinterland

Cargo Area	Traffic Share (loaded) for 2002-03 in '000 TEU			Share of Cargo Area	Major Commodities (Export/Import)
	Exports (%)	Imports (%)	Total (%)		
Delhi and surrounding	309 (53%)	274 (47%)	583 (100%)	55%	Food grains (E), Auto parts (I/E), Textiles (E), Metal products (I/E), Chemicals (I/E), Metal scrap (I), Machinery equipment (I/E), Paper (I), Rubber/Plastic products (I/E), Handicrafts (E)
Punjab and North	59 (41%)	84 (59%)	143 (100%)	13%	Agro products (E), Cycle parts (E), Metal scrap (I), Textiles (E), Machinery (I/E), Tyres and tubes (E), Newsprint (I), Sports goods (E)
Haryana	34	2	36	3%	Textiles (E), Rice (E)

Cargo Area	Traffic Share (loaded) for 2002-03 in '000 TEU			Share of Cargo Area	Major Commodities (Export/Import)
	Exports (%)	Imports (%)	Total (%)		
	(94%)	(6%)	(100%)		
West Uttar Pradesh	42 (88%)	6 (12%)	48 (100%)	5%	Artware (E), Leather goods (E), Textile (E), Metal products (I/E)
East Uttar Pradesh	15 (75%)	5 (25%)	20 (100%)	2%	Leather (E), Carpets (E)
North Rajasthan	31 (91%)	3 (9%)	34 (100%)	3%	Handicrafts (E), Textiles (E), Marble (E), Machinery (I), Auto parts (E)
South Rajasthan	50 (86%)	8 (14%)	58 (100%)	5%	Handicrafts (E), Guar Gum (E), Marble/Granite stone (E)
Gujarat (Ahmedabad-Mundra Area)	107 (75%)	36 (25%)	143 (100%)	13%	Cotton denim (E), Cotton yarn (E), Agro commodities (E), Machinery (I/E), Chemicals (I/E), Newsprint (I)
Grand Total	**647 (61%)**	**418 (39%)**	**1065 (100%)**	**100%**	

Source: AFF Estimates

Choice of Inland Transport Mode and Implications for a CFS

The choice of mode of inland transport and its associated costs plays an important part in determining whether the cargo is studded/de-stuffed at the port or in the hinterland (either factory stuffing/de-stuffing or CFS stuffing/de-stuffing). There are two choices of mode for cargo movement between the Kutch hinterland and the ports of Western India viz. road and rail. Further, movement byroad itself could be in two forms break-bulk (with portside stuffing/de-stuffing) or containerized (with inland stuffing/de-stuffing and customs cleared at port CFS). Currently, rail movement is through CONCOR's (Container Corporation of India) network.

Major ICD and CFS in the Kutch Hinterland

Exhibit below shows the cargo area-wise major ICDs and CFSs in the hinterland of the Kutch port with a comparison of area and loaded traffic handled.

Table 5.6: Major CFS/ICD Network in the Kutch Hinterland

Cargo Belt	Owner/ Operator	Total Area Sq. M.	Covered Space Sq. M.	Open Space Sq. M.	Est. Loaded TEUs Handled 2001-02	Est. Loaded TEUs Handled 2002-03	Est. Traffic Mix (2002-03)	Area Utilisation Sq. M/Ldd TEU	
							Ex : Im	2001-02	2002-03
Delhi Metropolitan Area									
Tughlakabad	CONCOR	330000	16000	314000	240000	288203	50:50	1	1
Patparganj	CWC	31000	16000	15000	25000	30778	70:30	1	0.5
Faridabad	ACTL	53820	6125	47695	10000	16220	65:35	5	3
Gurgaon	CWCL	n.a.	n.a.	n.a.	4000	10000	67:33	-	-
Punjab and Upper North									

Cargo Belt	Owner/ Operator	Total Area Sq. M.	Covered Space Sq. M.	Open Space Sq. M.	Est. Loaded TEUs Handled 2001-02	Est. Loaded TEUs Handled 2002-03	Est. Traffic Mix (2002-03)	Area Utilisation Sq. M/Ldd TEU	
							Ex : Im	2001-02	2002-03
Dhandarikalan	CONCOR	18000	0	18000	12000	64349	49:51	2	0.3
Dhandarikalan	PSWC	93069	6968	86101	36000	26240	46:54	2	3
Jalandar	PSWC	36418	3600	32818	3000	4710	50:50	11	7
Amritsar	PSWC	20232	4200	16032	4000	10712	50:50	4	1
Bhatinda	PSWC	68799	1765	67034	0	160	50:50	-	419
Ludhiana	OCS	9597	2170	7427	7000	7057	46:54	1	1
Haryana									
Panipat	CONCOR	24300	1200	23100	3	3557	100:0	7799	6
Rewari	HSWC	129504	9504	120000	0	324	100:0	-	370
West Uttar Pradesh									
Moradabad	CONCOR	70000	4900	65100	14000	17770	79:21	5	4
Agra	CONCOR	16200	1560	14640	4000	3610	99:1	4	4
Gwalior	CONCOR	18000	3300	14700	1000	2104	18:82	15	7
Sharanpur	CWC		683	2413	0	712	100:0	-	3
East Uttar Pradesh									
Juhi (Kanpur)	CONCOR	88000	2000	86000	6000	7759	61:39	14	11
Kanpur	CWC	5442	2587	2855	3000	1163	96:4	1	2
Varanasi	CWC	1851	418	1433	1000	320	94:6	1	4
North Rajasthan									
Jaipur	RSIC	30000	8800	21200	4000	6000	85:15	5	4
Jaipur	CONCOR	37445	600	36845	4000	10120	91:9	9	4
Bhiwadi	RSIC	28325	7000	21325	0	252	48:52	-	85
South Rajasthan									
Jodhpur	RSIC	24000	6000	18000	7000	16288	100:0	3	1
Jodhpur	CONCOR	40000	1000	39000	4000	7195	92:8	10	5
Jodhpur	Hasti Petro				1000	1500	85:15	Neg.	Neg.
Udaipur	CWC	3000	2000	1000	0	266	1:99	Neg.	4
Kota	CWC	n.a.	n.a.	n.a.	0	56	100:0	-	-
Ahmedabad-Kutch Belt									
Ahmedabad	CONCOR	60000	3600	56400	46000	43549	81:19	1	1
Vadodara	CONCOR	22000	0	22000	5000	7669	67:33	4	3
Kandla	CWC	10327	3919	6408	1000	1605	89:11	6	4
Adalaj	CWC	20452	9842	10610	2000	1607	41:59	5	7

Source: Published Data AFF Estimates

Although there are various operators of these ICDs and CFSs, the most important amongst them operating in the Kutch port hinterland is CONCOR, the sole agency today responsible for the movement of containers by railways. CONCOR has also been awarded a status of Mini Ratna by Government of India. It also operates both ICDs and CFSs. Other important players (in the CFS business) are Central Warehousing Corporation (CWC), Punjab State Warehousing Corporation, Rajasthan Small Industries Corporation (RSIC), Associated Container Terminals Ltd. (ACTL) and Continental Warehousing Corporation Ltd. (CWCL).

6. Potential Investments in Kutch

6.1 Investment Potential

In the wake of incentives accorded to Kutch region for industrial investment, several investment proposals have been received from various sectors. About 3.5% of investment projects have already been commissioned, while 43% is under implementation.

Table 6.1: Investment Proposals in Kutch

Status	Investment (Rs. Crores)
Investment Proposals	17955
Commissioned	602
Under Implementation	7295

Considering, the status of above announced projects and the opportunities identified in textiles, gems and Jewellery, Chemical (excluding Mega Chemical projects, Salt, Mineral and Agro based industries) and Metallurgical sector, the further investment potential of Rs.10000 - 12000 Crores can be expected in these sectors. The corresponding employment generation possibility would be about 75,000 to 80,000.

The sectoral analysis leading to internalisation of potential has been summarised as Vision for Development of Kutch inclusive of industrial potential and possible requirement of infrastructure. An investment scenario emerges out through potential of various development initiatives in Kutch (refer Annex: A Vision for Development of Kutch).

Potential investments in the region is also attempted to estimate through internalising the recent trends of investments in industries. After the earthquake of 2001, the Government of India and the State Government of Gujarat have provided incentives with relaxations in excise duty and sales tax to promote rapid industrialisation in Kutch. Incentives given by the governments have facilitated a boom in the number of attracted industries and investments in the region, which was unprecedented. Data from the Industrial Extension Bureau (iNDEXTb) reveals that Kutch received an investment of INR 78.94 billion (commissioned and under implementation projects) only during August 2001 and June 2004. Looking at the trends of LOI, LOP and IEM issued from August 1991 to August 2004 it shows annual increase of 5 percent and investment has been forecasted. The forecasted figure has been adjusted with the present rate of implementation and finally it has been estimated that Kutch will receive investment of INR 320 billion by 2011 and will create employment opportunities for approximately 1.5 lakh people. From analysis of industries, by 2015 industrial investments is estimated at INR 430 billion and an employment of 1.7 lakh. Both the estimates are almost equivalent. This is sufficient to have major impact on socio-economic conditions and life of people in Kutch.

6.1.1 Sector-wise Investment Potential in Kutch

Sector-wise investment potential has been identified according to the sectoral analysis carried out in the previous chapters and also considering their relationships with sectors such as real estate and logistics.

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)		
(An Investment Potential in Industry, Trade & Infrastructure Sector)		
Sr	Areas	Rs. Crores
A	Industry	
	Agro & Allied Industries	150
	Mining and Mineral based Industries (SSI & Medium Scale Sector)	1250
	Alumina Project	1200
	Cement Projects	4800
	Export Oriented (Apparel, Jewellery, Light Chemicals, etc)	5000
	Mega Chemical Industrial Estate (including Refinery)	15000
	Salt/ chlor alkali	450
	Down stream and ancillary	1000
	Other projects-incentives, Linkages, agglomeration (incl. Projects under implementation)	14000
	Sub-total(A)	42850
B	Energy	
	Power plants(Thermal)-2000 MW -including LNG based	8000
	Wind Power mills 500MW	2000
	Sub-total(B)	10000
C	Infrastructure	
	Corridor Roads (400 km)	1800
	Rural roads	150
	Railways	1000
	Airports up gradation	500
	Water Infrastructure	3000
	Ports	3000
	LNG Terminal	1600
	Sub-total(C)	11050
D	SEZ & Industrial Estates	2000
E	Real Estate Development	3000
F	Logistics	
	Trade & Logistic Hubs(i.e. Tankages, Office Complexes, other facilities)	1200
G	Tertiary / services @15 %	10515
	TOTAL	80615

6.1.2 Sector-wise Employment Potential in Kutch

Establishing investments and employment relationships, the employment potential of Kutch is identified in the following pattern:

A VISION FOR DEVELOPMENT OF KUTCH (UP TO YEAR 2015)

(Employment Potential in Industry, Trade & Infrastructure Sector)

Sr	Areas	Investment (Rs. Crore)	Employment / Rs. Crore Investment	Employment Potential
A	Industry			
	Agro & Allied Industries	150	5.0	750
	Mining and Mineral based Industries (SSI & Medium Scale Sector)	1250	0.8	1000
	Alumina Project	1200	0.5	600
	Cement Projects	4800	0.8	3840
	Export Oriented (Apparel, Jewellery, Light Chemicals, etc)	5000	2.0	10000
	Mega Chemical Industrial Estate (including Refinery)	15000	0.3	4500
	Salt/ chlor alkali	450	1.5	675
	Down stream and ancillary	1000	4.0	4000
	Other projects-incentives, Linkages & agglomeration (incl. projects under implementation)	14000	4.0	56000
	Sub-Total (A)			81365
B	Energy			
	Power plants(Thermal)-2000 MW -including LNG based	8000	0.3	2400
	Wind Power mills 500MW	2000	0.3	500
	Sub-Total (B)			2900
C	Infrastructure			
	Corridor Roads (400 km)	1800	0.2	360
	Rural roads	150	0.2	30
	Railways	1000	0.2	200
	Airports up gradation	500		0
	Water Infrastructure	3000	0.5	1500
	Ports	3000	0.5	1500
	LNG Terminal	1600	0.3	480
	Sub-Total (C)			4070
D	SEZ & Industrial Estates	2000	2.0	4000
E	Real Estate	3000	0.5	1500
F	Logistics			
	Trade & Logistic Hubs(i.e. Tankages, Office Complexes, other facilities)	1200	3.0	3600
G	Tertiary/ services @15 %	10515	7.0	73605
	TOTAL	80615		171040

6.2 Assessment of Socio-economic Impact

To understand impact of development of export hub and rapid industrialisation in Kutch on prevailing socio-economic structure a broad analysis to anticipate its impact on culture, economy, and quality of life is carried out.

6.2.1 Impact on Social Structure

Development of Export hub and industrialisation will increase employment opportunity in the region, which is potential to lead to influx of skilled and unskilled labours from other parts of the state and country. It is envisaged that Bhuj, Gandhidham, Mundra and Bhachau will experience major influx of population with cultural diversification and multi-culturalism. Bhuj, Bhachau and Mundra will have major impact. Gandhidham already has the trend due to migrated population and diverse industrial and service base. International cases such as in Shenzhen have shown unprecedented migration due to special economic zones and related economic growth. Almost fivefold increase in population has been experienced by Shenzhen SEZ (from 20,000 in 1979 to 10 million in 2002). Socio-economic impact of such a situation is of unimaginable scale. But increasing income levels and systematic planning are capable of mitigating the negative aspects of such impacts.

6.2.2 Impacts of Mega-projects

It has been found that Kutch is suitable for mega-industrial and infrastructure projects and initiatives such as SEZs. Initially these mega-projects may not create substantial local employment, but these projects are capable of generating ancillary and down stream small and medium industries and numerous services, which will maximise local employment opportunities. Such projects will also contribute to development in the region through:

- by providing domestic water supply to surrounding villages, towns and communities,
- setting up of townships, schools, hospitals and sport and recreational facilities,
- supporting development of urban and regional infrastructure,
- supporting various training programmes and local resource based community development programmes, etc.

6.2.3 Impact on Urban Economy

Sudden influx of population is potential to create demand and supply gap in housing and real estate. This may initially lead to sharp increase in real estate prices to increase investments in real estate business. Already real estate prices in Bhuj and Gandhidham are comparatively higher. New housing schemes will develop and expansion of cities will take place. Construction industry will experience positive growth trend. Commercial activities in cities will increase, new shopping malls will come up and entertainment and recreational spots will be developed. It will change face of cities and revive economy of cities by generating supporting activities. Possible stress on infrastructure can not be negated.

6.2.4 Impact on Regional Economy

Agriculture productivity in some part of Kutch is very low as compare to other parts of State. Export hub and industrialisation will create employment opportunities and there are possibilities of occupational shifts and intra-regional migration to cities. It is estimated that the composition of 255 thousand agricultural workers and labourers and 350 thousand non-agricultural workers in 2001, may experience change. Approximately 50,000 marginal labourers in agriculture and allied activities may shift towards various secondary and tertiary activities. It is estimated that out of additional 150 thousand employments generated in Kutch by the next decade, approximately half in the secondary sector and around 60 to 70 percent in the tertiary sector will be local. On the other hand, primary activities inclusive of farming, animal husbandry, fishing, and household manufacturing may see a boost due to optimisation of labour force, increasing demand, mechanisation and commercialisation.

6.2.5 Impact on Quality of Life

Export hub and industrialisation will definitely have positive impact on the quality of life of the people, provided that infrastructure demand is constantly made. Employment created by the industries and in service sector will improve economic status of people through increase in income and ultimately leading to higher purchasing power. Export hub will have multiplier effect on local people by opening new avenues for commercial activities and tertiarisation.

6.2.6 Impact on Environment

Industries and construction activities in region may have adverse impact on environment and ecology of region, which can be checked and minimised through adoption of environmental management plans and procedures. Particularly, region's depleted water resources, wild and marine life, rich traditional culture, grass lands and other environmentally sensitive aspects are important aspects to consider in such plans. Gujarat Institute of Desert Ecology, Kutch University, NGOs, etc can be brought together through a regional level institutional arrangement and continuous monitoring programme of the environmental concerns and environmental revitalisation initiatives can be taken up in co-ordination with industries, businesses and services in the region. An initial precaution and integrated strategic move will facilitate sustainable economic development.