Gujarat Infrastructure Development Board

Study of Saurashtra Coastal Corridor of Gujarat

Section 1 – Industry Analysis

Final Report – February 2006

PRICEWATERHOUSE COPERS @

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1 INDUSTRY ASSESSMENT

Introduction

- 1.1 PwC's Inception Report of December 2004 and the Interim Report of April 2005 contained preliminary analysis of select focus industries in Saurashtra, namely marine resource based industries, fisheries, agriculture, mineral based industries and tourism (refer Section 4.6 and Section 5.35 to 5.57 of PwC's Inception report of December 2004 and Section 3 of the Interim Report of April 2005).
- 1.2 This analysis forms the starting point for our analysis and we have presented herewith further investigation of these thrust sectors. Industry assessment contains an analysis of the distribution of medium and large industries in Saurashtra vis-à-vis Gujarat. We have also analyzed key investment trends including large projects being planned / undertaken in Saurashtra. Based on industrial statistics (including current output, share in total industrial output, etc) and other socio-economic factors, e.g. issues of employment, migration, benefits to local populace, etc, we have identified & analyzed the thrust sectors.
- 1.3 Exhibit 1 shows the current spread of large, medium and SSI units in the Saurashtra region (i.e. the standing inventory of fixed capital). Although the **overall contribution** of Saurashtra region to the state's industrial base is significant, the industrial base is highly concentrated. Jamnagar leads in terms of concentration of industry by a wide margin. This could prima facie be attributed to Reliance Industries' investment in Jamnagar district.

	Functionin	g Medium & L		No of		
District	Fixed Inv Produ		Production	ction		
Name	No.	(Rs. Lakhs)	(Rs. Lakhs)	Employment	(2003)	
Surendranagar	12	99,484	43,701	3,860	8,000	
Rajkot	60	45,871	97,650	12,390	30,564	
Jamnagar	24	2,145,678	3,586,933	11,440	12,475	
Junagadh	28	299,511	191,774	12,746	7,834	
Porbandar	10	72,372	59,463	5,103		
Amreli	6	169,320	86,629	1,432	4,644	
Bhavnagar	46	132,521	43,932	4,838	11,422	
TOTAL –	196	2 064 757	4 110 092	51 800	74 020	
Saurasinira	100	2,904,757	4,110,062	51,609	74,939	
GUJARAT	1,570	9,699,890	10,882,147	378,194	287,860	
Saurashtra % of GUJARAT	12%	31%	38%	14%	26%	

Exhibit 1: Industries in Saurashtra: Large, medium and small

Industries in Gujarat – Statistical Information, Industries Commissionerate – 2004

1.4 Projects worth Rs 36,418 crores have been completed in Gujarat since 2000. The Saurashtra region accounts for approximately 10% of these investments. Further, the district wise break up of investments in Saurashtra has been presented in Exhibit 2. This clearly shows that Saurashtra has low dispersion of investments with Jamnagar & Bhavnagar securing a majority of the regional investments.



Exhibit 2: District-wise breakup of investments in Saurashtra

Source: Projects Today

- 1.5 This observed scenario in Saurashtra **necessitates more dispersed development**. Achieving this in the short-term would be an admittedly difficult task. Therefore, to realize some benefits in the short term, we believe it would be **prudent to focus on a few nodes or 'hotspots' within Saurashtra (as highlighted above) for specific attention** while drawing up a long term structured plan for the region (the final outcome of PwC's assignment). These nodes or hotspots could be identified based on current indicators supported by views emerging from stakeholder consultations. These centers / hotspots have been highlighted subsequently in this report.
- 1.6 Our analysis also shows that the region accounts for 16% of private investment into Gujarat as against a share of 3% of total government's investment since 2000.¹ This prima facie seems to suggest a decline in public investments in the region. All these facts taken together seem to suggest that public investment would have to play a lead role in catalyzing further spin-off investments in the region.
- 1.7 The industrial characteristics of key centers in the region along with the principal companies present in the Coastal Corridor are highlighted as follows.

¹ Data of projects implemented since 2000 from Projects Today

- Bhavnagar: The key industries in the district include: ship breaking, steel re-rolling, ship-building, plastic manufacturing, diamond polishing and cutting, chemicals, engineering products, foundry, salt, agro-product based units, rubber, textile machinery and tobacco products. It has significant reserves of limestone and lignite that could be suitably exploited. Soda Ash industry can be promoted, as it needs more seawater and less sweet water. Major industrial units present are IPCL, Nirma and Excel
- Porbandar: It is rich in limestone, bauxite, chalk and fisheries resources. Further, it has religious places of significance close-by including Somanth and Dwarka. It is also Mahatma Gandhi's birthplace. Major industrial units include Saurashtra Cement, Saurashtra Chemicals, Orient (Emery powder)
- Junagadh: The important industries in the region include oil mills, limestone and chalk powder mining and salt manufacturing. Tourism also offers potential with key tourism sites in Junagadh are Sasan Gir, Girnar Forest, Ashok Shila Lake, Old Fort and Somnath. There is a significant potential for tourism related activities in the areas of forest tourism (Sasan Gir forest safari packages), coastal tourism and heritage tourism (existence of old forts, old building structures). Major industrial units present in Junagadh include Gujarat Ambuja, Cement Corporation of Gujarat, Gujarat Heavy Chemicals
- Amreli: It has the potential for supporting salt, fisheries and limestone based industries. The key industrial units present at Amreli are: Narmada cement at Jaffrabad (75 km from Amreli), Ultra Tech at Rajula (19 km from Amreli), Atco (weights at Savarkundla), Microlnks, GHCL factory at Sutrapada has salt pans in Amreli. Also, Indo Rama is planning to set up a cement plant in Amreli.
- Jamnagar: Major industrial units include Reliance, Essar, Brass cluster

Stakeholder Consultations

1.8 Exhibit 3 shows the major projects implemented since 2000 in the Saurashtra region:

Project	Company	Investment	District
		(Rs. Crs)	
Soda Ash Project	Nirma Ltd	1,037	Bhavnagar
Jamnagar Refinery Phase 1 expansion	Reliance Industries	1,200	Jamnagar
Cement clinker project	Gujarat Ambuja Cements	130	Junagadh
Diammonium phosphate project	Gujarat State Fertilisers & Chemicals Limited	180	Jamnagar
Water supply project	Gujarat Water Supply and Sewerage Board	271	Surat
Runway project	Airports Authority of India	10	Bhavnagar

Exhibit 3: Major projects implemented in Saurashtra since 2000

Source: Projects Today

1.9 Although limited investments have taken place in the past in Saurashtra region, current projects under implementation (as shown in Exhibit 4) highlight significant improvements in Saurashtra's share as a percentage of total investments in Gujarat. There is also an apparent shift in the concentration of investments. Earlier, Jamnagar attracted a large share of investments in the region. However, current trends seem to suggest that Amreli and Bhavnagar are attracting large share of investments in Jamnagar.

District Name	Projects under Implementation (Rs. Crores)
Surendranagar	230
Rajkot	500
Jamnagar	3,496
Junagadh	746
Porbandar	595
Amreli	5,650
Bhavnagar	3,193
TOTAL - Saurashtra	14,410
GUJARAT	52,839
Saurashtra % of GUJARAT	27%

Exhibit 4: Value of projects under implementation in Saurashtra

As on January 1, 2004, Industries in Gujarat – Statistical Information, Industries Commissionerate – 2004

1.10 Exhibit 5 shows MoUs signed in Vibrant Gujarat wherein investments are proposed to be made in Saurashtra. We held consultations with stakeholders to understand the issues in grounding these investments. The overwhelming feedback received from these consultations suggests that facilitation is the key to grounding these investments. As an example, we have highlighted some of the issues faced by Nirma for setting up a power project in Bhavnagar to illustrate the expectations of investors from the government on facilitation.

Exhibit 5:	Vibrant Gu	iarat 2003 –	MoUs with	investments in	Saurashtra
	Thorant Gu		11005 1111	investments in	ouurusiittu

Project	Investment (Rs. Cr)
Co-generation of power (10 MW) – Gujarat NRE Coke	50
Wind power project (350 MW) – Enercon	1,750
Cement plant (1 million tonne) in Bhavnagar – Nirma	300
Power project in Bhavnagar – Nirma Chemical Works	2,200

Source: Government of Gujarat website

Identification of key focus sectors

- 1.11 The key sectors analyzed by PwC are the ones mentioned in the Inception Report of December 2004 and the Interim Report of April 2005, namely marine resource based industries, fisheries, agriculture, mineral based industries and tourism. We have confirmed this further through secondary analysis and stakeholder discussions as explained further in this section.
- 1.12 As a starting point, we have analyzed the Annual Survey of Industries for Gujarat state data for the year 2000-01 (the latest report that is available) to arrive at a preliminary list of thrust sectors. The current industrial base and characteristics in the Saurashtra region as per this survey is shown in Exhibit 6.

District	Factories	Fixed Capital	Employee	Gross Output	Net Value Added (NVA)
Surendranagar	1.50%	0.85%	1.12%	0.39%	-0.32%
Rajkot	4.79%	0.57%	3.26%	1.07%	0.87%
Jamnagar	2.39%	10.80%	3.88%	7.33%	3.17%
Junagadh	3.28%	1.25%	3.55%	1.23%	1.83%
Porbandar	0.75%	1.14%	2.13%	0.59%	0.59%
Amreli	0.75%	3.89%	1.21%	1.34%	1.52%
Bhavnagar	5.95%	2.01%	2.28%	1.71%	0.37%
SAURASHTRA	19.41%	20.51%	17.43%	13.66%	8.03%
GUJARAT	100.00%	100.00%	100.00%	100.00%	100.00%
Value for Gujarat	1,462	57,282	404,950	89,889	11,996
Units	No.	Rs crore	No.	Rs crore	Rs crore

Exhibit 6: Saurashtra Industry characteristics

Annual Survey of Industries, 2000-01, Gujarat

1.13 On further analysis of the industrial base of Saurashtra region, it is evident that chemicals, food products & beverages and other non-metallic mineral products are the key industries contributing to majority of the industrial output of the region as shown in Exhibit 7.

Industry	Gujarat	Coastal as a % of Gujarat	Saurashtra as a% of Gujarat	Saurashtra Industry as a % of Saurashtra – ALL Ind
Chemicals	40,696	16%	16%	55%
Textiles	7,833	1%	1%	1%

Industry	Gujarat	Coastal as a % of Gujarat	Saurashtra as a% of Gujarat	Saurashtra Industry as a % of Saurashtra – ALL Ind
Food Products & Beverages	8,468	9%	9%	6%
Coke, Refined Petroleum Prod	11,258	1%	1%	1%
Other Non-Metallic Mineral Products	2,939	53%	55%	13%
Medical, Pre. Opt Watches & Clocks	182	0%	85%	1%
Fabricated Metal Prod & Equip	550	0%	27%	1%
Machinery & Equipment	2,436	1%	12%	2%
Basic Metals	6,237	4%	4%	2%
Paper & Paper Products	1,171	0%	2%	0%
Agri & related service activities	510	0%	2%	0%
Wood & Prod of wood & cork	57	0%	9%	0%
Rubber & Plastic Products	1,369	2%	2%	0%
Furniture: Manufacturing	849	1%	1%	0%
Other Transport Equipment	1,007	80%	80%	7%
ALL INDUSTRIES	89,889	12%	14%	100%

Annual Survey of Industries, 2000-01, Gujarat

- 1.14 We have focused on **plastics within the chemicals segment** considering the presence of large number of plastic units and the employment in the sector. Likewise, we have focused on **cement in the "other non-metallic mineral products part" category**. Therefore, we have analyzed the mineral base including **key minerals** like limestone, lignite and bentonite.
- 1.15 Also, as shown in Exhibit 7, "other transport equipment" is a major contributor for Saurashtra coastal industries. This includes the ship breaking industry that has a large presence at Alang in Bhavnagar. Also, "fabricated metal product and equipment" includes brass parts. Brass parts have a large presence in Jamnagar. Thus, we have focused on the two clusters of Alang and Jamnagar.
- 1.16 Besides addressing the problems of these key industries, we have also identified specific interventions for boosting SME clusters. To provide greater focus to our study, we have highlighted a list of clusters in Exhibit 8 that have significant export potential. However, based on stakeholder consultations and analysis of the cluster potential, we have focused on **Shipbreaking cluster at Alang** and **brass cluster at Jamnagar**. We have identified these considering their economic potential, existing high employment and direct benefits to the coastal regions.

Location	Product	Annual turnover (Rs. Cr.)	No. of units	Employment
Bhavnagar	Machine Tools	< 10	100 – 500	<1,000
Bhavnagar	Plastic processing	< 10	100 – 500	<1,000
Jamnagar	Brass Parts	10 - 100	100 – 500	1,000 - 10,000
Rajkot	Machine Tools	10 - 100	500 - 1,000	1,000 - 10,000
Rajkot	Diesel Engines	10 - 100	< 100	<1,000
Rajkot – Jetpur	Textile printing	10 - 100	100 – 500	10,000 - 100,000
Rajkot	Machine Tools	10 – 100	500 - 1,000	1,000 - 10,000

Exhibit 8: SME Clusters with high export potential

Source: UNIDO and Small Scale Industry website

1.17 The gems & jewellery sector that has major presence in Surat thrives on the workforce that migrates from Saurashtra. In order to overcome the migration problems, we have also focused on the **gems & jewellery** sector to boost employment prospects of the region.

Migration of labour is common in Saurashtra due to development of other regions in comparison to Saurashtra and also due to lack of education and employment opportunities. Although Bhavnagar and Amreli have large skilled labour force in diamond cutting & polishing, these workers go to Surat for getting suitable employment opportunities, causing large-scale migration.

Also, Rajkot has a large share in the Indian hand-made jewellery market. Thus, it would be important to promote gems & jewellery sector in Saurashtra. Government would have to take a lead in this area.

There would be two key requirements: uninterrupted power and industry would need to be located in urban and semi-urban locations.

Stakeholder Consultations

1.18 Although a large number of places of tourist significance are present in Saurashtra, their potential does not seem to have been fully realized. Further, tourism provides large employment with relatively less capital investment in comparison to manufacturing sector besides providing direct benefit to the local populace. Thus, **tourism** forms a thrust area for our analysis. Each of these thrust sectors is explained as follows.

Agriculture

Introduction

- 1.19 Gujarat, one of the major industrialised states in India, has great potential to develop a vibrant agrarian economy by developing agro-product based industries deriving competitive advantage from its unique position in many agricultural commodities.
- 1.20 Gujarat is endowed with abundant natural resources in terms of soil fertility, river systems and climatic conditions. Gujarat has an area of 1.96 lakh sq. km., which is nearly 6.4% of the total area of the country. Agriculture provides employment to about 2/3rd of the work force in the state. A brief demographic profile of the state is given in Exhibit 9.

S. No	Particulars	Gujarat	India
1.	Area (sq km)	195984	3287263
2.	Total Population in crores	5.05	102.1
3.	Males Population in crores	2.63	75.85
4.	Females Population in crores	2.42	54.15
5.	Density (sq km)	258	324
6.	Sex ratio	921	933
7.	% of Literacy	69.97	65.38

Exhibit 9: General demographic information of the Gujarat

Source: Census 2001

- 1.21 Gujarat is having a large diversity of agro-climatic conditions ranging from arid to dry sub-humid due to its geographical position with 1600 km long of coastline, desert of Kutch, rocky area in Saurashtra and lush green landscape in South Gujarat. Typical climatic parameters of Gujarat are as follows:
 - (a) Maximum temperature: 45.5 degrees C (during May)
 - (b) Minimum temperature: 8 degrees C (during January)
 - (c) Rainfall range: 300 to 2500 mm
- 1.22 Located on the Tropic of Cancer, the state falls in the sub-tropical climatic zone and has a varied climate. It can be divided into five climatic regions as shown in Exhibit 10

Climate	Region in Gujarat
Sub-humid	South Gujarat (South of Narmada)
Moderately humid	Central Gujarat (between Narmada and Sabarmati)
Humid and sultry	South facing coastal region of Saurashtra
Dry	Region of Central Gujarat North of Ahmedabad and part of Central Saurashtra
Arid and semi arid	North Gujarat and Kutch

Exhibit 10: Climatic Zones of Gujarat

1.23 Gujarat can be divided into the following physiographic zones:

Physiographic zone	Details
Mainland Gujarat	It comprises of the eastern rocky highlands (altitude 300 to 1000 meters), the extensions of the mountains of western India and the western alluvial plains including the coastal plains (altitude 25 to 75 meters).
Saurashtra Peninsula	The peninsula of Saurashtra forms a rocky tableland (altitude 300-600 meters) fringed by coastal plains with a central part made up of an undulating plain broken by hills and considerably dissected by various rivers that flow in all directions. The eastern fringe of Saurashtra is a low-lying ground marking the site of the former sea connection between the Gulfs of Kutch and Khambhat. An elevated strip of ground connecting the highlands of Rajkot and Girnar forms the major water divide of Saurashtra.
Kutch	It consists of (a) the Ranns, salt-encrusted wasteland rising only a few meters above sea-level, and inundated during monsoon, divided into the Great Rann to the north and the Little Rann to the east, (b) the Banni plains between the Great Rann and the rocky mainland, (c) hilly region with the island belt of four rocky projections rising above the Rann, (d) the Kutch mainland and (e) the southern coastal plains.
	The rivers Banas, Sabarmati, Mahi, Narmada and Tapi are the important drainage lines of the Gujarat plain draining into the Gulf of Khambhat while the rivers Bhadar, Ojat and Shetrunji are those of the Kathiawar peninsula draining into the Arabian Sea. There are few seasonal and small rivers draining into the Gulf of Kutch.

Exhibit 11: Physiographic zones of Gujarat

1.24 Based on topography, soils, climate and hydrology, Gujarat can be divided into eight eco-regions as shown in Exhibit 12

S.	Eco-region	Area %
No		
1	Northern Rocky Highland	12
2	Southern Rocky Highland	7
3	Northern Alluvial Plain	14
4	Southern Alluvial Plain	12
5	Central Alluvial Plain	8
6	Ranns and Banni of Kutch	13
7	Peninsula of Kutch	8
8	Peninsula of Saurashtra	12
9	Coastal Zones of Gujarat	14

Exhibit 12: Eco-regions of Gujarat

Land Utilisation

1.25 **Agricultural lands occupy almost half of the available land in the state** as shown in Exhibit 13. Cultural and current fallows constitute about 15 percent of the area and thus there is an ample scope for the horizontal spread for cultivation of additional area. Cropping intensity in the state is around 115% and therefore, there are possibilities for vertical growth as well.

Exhibit 13:Land utilisation pattern – Gujarat

S. No.	Land use	Area in '000 ha	Percentage
1.	Total geographical area	19,602	
2.	Reporting area for land utilization	18,813	100
3.	Forests	1,861	9.89
4.	Not available for cultivation	3,742	19.89
5.	Permanent pasture& other grazing lands	849	4.51
6.	Land under misc. tree crops & groves	4	0.02
7.	Cultivable wasteland	1,974	10.49
8.	Fallow land other than current fallows	24	0.13
9	Current fallows	759	4.04
10.	Net area sown	9,600	51.03

Source: Land use statistics At a Glance 1996-97, Ministry of Agriculture, GOI, 2000

Agro-ecological conditions

1.26 **Gujarat's agro-climatic conditions are particularly suitable for non-food grain crops**. In the state, the area under food grains is only 41% as against 65% at the national level. Gujarat accounts for only 3% of the country's food grains production. Exhibit 14 shows the percentage area being cultivated under different crops in the total cropped area of around 10 million hectares in Gujarat.



Exhibit 14: % Area of production of various crops

1.27 Considering the available types of soils and the climates, various agro-climatic zones are defined in Gujarat. Such zones, areas within these zones and major horticultural crops grown in these zones are presented in Exhibit 15.

Exhibit 15: Agro-climatic Zones, Areas and Horticultural Crops within Zones in
Gujarat

S. No.	Zone	Areas	Major Horticultural Crops
1	South Gujarat, mountainous area, Navsari	Ambika river, South Dangs, Valsad, Navsari, Gandevi, Surat, Valod, Vyara, Uchchhal, Songadh, Mahuva	Mango, Sapota, Coconut, Jackfruit, Brinjal, Tomato, Chillies, Turmeric and Flowers
2	South Gujarat, Plain area, Bharuch	Part of Valsad between Ambika and Narmada river, Navsari, Gandevi, part of Surat, Kamrej, Nizer, Palsana, Bardoli, Mangrol, Part of Bharuch, Ankleshwar, Valia, Zagadia, and Rajpipla	Mango, Sapota, Banana, Coconut, Okra, Tomato and Beans
3	Central Gujarat, Anand	Between rivers Narmada and Vishvamitri, Panchmahal, Bharuch Port, Kheda, Anand, Borsad	Mango, Banana, Lime, Papaya, Amla, Custard Apple, Brinjal, Cabbage, Tomato, Cauliflower, Guar, Chillies, Ginger,

Source: Gujarat Agri Potential 2001, presentation at CII

S. No.	Zone	Areas	Major Horticultural Crops
			Coriander, Fenugreek and Fennel
4	North Gujarat	Ahmedabad, Gandhinagar, Sabarkantha, Banaskantha, Patan, Mehsana	Lime, Guava, Ber, Pomegranate, Brinjal, Cabbage, Okra, Tomato, Cauliflower, Guar, Cumin, Chillies, Ginger, Coriander, Fenugreek and Fennel
5	North West Area	Kutch, Malia, part of Rajkot, Surendranagar, part of Banaskantha, Radhanpur, Santalpur, Dry areas of Viramgam	Ber, Guava, Pomegranate, Mango, Custard Apple, Coconut, Dates, Potato, Brinjal, Cabbage, Okra, Tomato, Cumin, Garlic, Chillies and Coriander
6	North Saurashtra	Bhavnagar, Jamnagar, Surendranagar, Amreli, part of Rajkot	Mango, Sapota, Banana, Lime, Guava, Papaya, Pomegranate, Coconut, Brinjal, Potato, Onion, Okra, Tomato, Cumin, Chillies, Garlic and Coriander.
7	South Saurashtra	Junagadh, Porbandar, part of Bhavnagar, Una, Mahuva, Amreli, part of Kodinar	Mango, Sapota, Banana, Papaya, Coconut, Brinjal, Okra and Cumin.
8	Bhal and Coastal area	Khambhat, coast of Bharuch and Surat, Olpad, Vagra, Hansot, Matar, Dholka, Dhandhuka, Valbhipur, Bhavnagar and Limdi	Ber, Amla, Coconut, Chillies and Turmeric

Source: Directorate of Horticulture, Gujarat

Land holding and its tenure pattern

- 1.28 The land holding pattern of Gujarat shows trend of fragmentation and roughly 2/3rd of farming families' hold land less than 5 hectares. Exhibit 16 presents the operational land holding in Gujarat.
- 1.29 Further fragmentation is most likely to continue due to divisions in families or part sale by the farmers. This will increase the need for collaborative activities particularly in post harvest and marketing areas of value chain.

	Unit	1970-71	1976-77	1980-81	1985-86	1990-91
No. of Operational Holdings		•				
Total Holdings	'000 Nos.	2433	2713	2930	3145	3517
Marginal (0-1 ha)	'000 Nos.	579	656	711	801	924
Small (1-2 ha)	'000 Nos.	464	541	635	737	915
Semi-medium (2-4 ha)	'000 Nos.	555	652	728	785	890
Medium (4-10 ha)	'000 Nos.	601	671	686	678	669
Large (10 ha and above)	'000 Nos.	234	194	172	145	118
Area Operated						
Total Area	'000 ha	10000	11073	11068	9954	10292
Marginal (0-1 ha)	'000 ha	300	329	375	416	489
Small (1-2 ha)	'000 ha	681	792	930	1080	1343
Semi-medium (2-4 ha)	'000 ha	1597	1871	2083	2233	2515
Medium (4-10 ha)	'000 ha	3777	4156	4209	4126	4005
Large (10 ha and above)	'000 ha	3645	2927	2506	2099	1941
Size of Holdings						
Average size of holding	Ha	4.11	4.08	3.78	3.17	2.93
Marginal (0-1 ha)	Ha	0.52	0.50	0.53	0.52	0.53
Small (1-2 ha)	Ha	1.47	1.46	1.46	1.47	1.47
Semi-medium (2-4 ha)	На	2.88	2.87	2.86	2.84	2.83
Medium (4-10 ha)	Ha	6.28	6.19	6.14	6.09	5.99
Large (10 ha and above)	На	15.58	15.09	1457	14.48	16.45

Exhibit 16: Operational land holding by Major Size

Source: CMIE, Profiles of States, March 1997

Irrigation and Water management

1.30 Primarily, Gujarat is having rain-fed agriculture or mainly monsoon dependent. **Only about 1/3rd of the gross cropped area of the state is irrigated**. Around **80% of irrigated area is irrigated through wells**. The performance of wells is largely dependent on rainfall and **canals serve the remaining 20% of the irrigated area**. However, the situation will significantly change after completion of Sardar Sarovar project2 and it will have positive effect on cropping pattern, diversification and productivity. Area-wise break-up of various sources of irrigation is shown inExhibit 17.

Sources	88-89	89-90	90-91	91-92	92-93	88-89	92-93
Canals	359	300	472	471	557	17.6	21.1
Government canal	359	300	472	471	557	17.6	21.1
Private canal	0	0	0	0	0	0	0
Tanks	25	21	29	26	26	1.2	1.0
Wells	1653	1435	1989	1868	2056	81.1	77.8
Tube well	358	389	448	531	552	17.6	20.9
Other well	1295	1046	1541	13337	1504	63.5	56.9
Other sources	2	2	3	7	3	0.1	0.1
Total net irrigated area	2039	1758	2493	2372	2642	100.0	100.0

Exhibit 17: Source-wise Net Irrigated Area

('000 hectares)

Source: CMIE, Profiles of States, March 1997

- 1.31 Gujarat state has utilized the Narmada water for reviving various rivers in the state. In near future, the Narmada River will feed the seasonal rivers and give a large economic development push to Gujarat.
- 1.32 Gujarat Government has approved the Kalpasar Project to provide new lease of life to the people of Gujarat, reducing the distance between Kathiawad and Gujarat regions by around 250 km, besides providing water for irrigation, land reforms and transport facilities. This will have much effect on productivity of crops as HYV and Hybrid Seeds can be used with assured irrigation facilities.

² The height of the main dam at Sardar Sarovar Project has been raised to 100 metres with three metre's hump. The Narmada-based Mangrol-Maliya Group Water Supply Scheme has been completed, benefiting 31 villages in the first and 19 villages in the second phase. The Narmada-based Kutch Pipeline Project carries water up to Kutch. The project plans to build 271 big check dams in 21 seasonal rivers of north Gujarat and has been taken up under the Narmada-based plans.

Major Cropping Pattern

- 1.33 Major crops in Gujarat include cereals like rice, wheat, jowar, bajri, maize, ragi, millets, pulses like tur, mung, moth, udad, oil seeds like groundnut, sesames, rapeseed and mustard, castor, cash crops like cotton, tobacco, sugarcane, horticulture crops like potato, onion, banana, spices and condiments like garlic, fennel, cumin, and chillies etc. Exhibit 18 shows the various classification of crops.
- 1.34 Gujarat has highest production in the world for Castor (67%) and Fennel (67%). It has second/ third highest production in the world for Cumin (36%), Isabgol (35%), Groundnut (8%) and Guar seed (6%). Further, Gujarat has highest productivity in the world for Castor, Cumin, Fennel and Isabgol

Kharif Cereals	Rabi Cereals	Oil seeds	Others
Rice	Wheat	Groundnut	Cotton
Jowar	Jowar	Sesames	Tobacco
Bajri	Small Millets	Rape and Mustard	Sugarcane
Maize	Rabi Pulses	Castor	Potato
Ragi	Gram	Semi Rabi	Fennel
Small Millets	Bajri	Ground nut	Cumin
	Jowar		
Kharif Pulses			Chillies
Tur			Isabgol
Mung			Onion
Math			Garlic
Udad			Banana
			Papaya

Exhibit 18: Major crops of Gujarat

Source: Gujarat Agri-policy document of CII-Gujarat

1.35 An overall pattern of crop production in Gujarat on the basis of year 2000-01 data is shown in Exhibit 19: Crop pattern in Gujarat.



Exhibit 19: Crop pattern in Gujarat

1.36 Exhibit 20 shows that proportion of horticultural crops production in Gujarat is only about 3% of total agricultural production. The horticultural crops require high quantum of water and flourish in moderate temperature and as such, there is a limited scope for large-scale production of these crops in the semi arid areas of the state. Among horticulture production in the state, the proportion of fruits, vegetables and spices are presented in Exhibit 20.



1.37 It is evident from the above figure that among the production of fruits, vegetables and spices, the production of spices is 38 %, vegetables is 32 % and fruits is 30 %. Given the agro ecological conditions of Gujarat, the ratio within horticulture crops seems reasonable.

Area covered under the study

1.38 In this assignment, we have focused on the Saurashtra region, including the northern and southern parts.³ Saurashtra has great potential to develop a vibrant agrarian economy by developing fresh and agro- horti-product based industries deriving competitive advantage from its unique position in many agricultural commodities like groundnuts, sesame, castor and mango (Kesar). Some of these areas are undoubtedly in inaccessible and less developed parts of the state. Moreover any development initiative in these areas will have to take into account the ecosystem, economy and political regime.

Production Scenario

Agricultural Crops

1.39 This section gives the details on the agricultural crops of the Saurashtra region.

(Area '00 ha, Production '00 MT, Yield 'kg/ha)

	1999-2000			2000-01			2001-02		
District	Area	Prod.	Yield/ha	Area	Prod.	Yield/ha	Area	Prod.	Yield/ha
Amreli	1	1	1913	NA	1	1030	1	1	1985
Bhavnagar	1	2	1913	-	-	-	1	2	1985
Jamnagar		-	-	-	-	-	-	-	-
Junagadh	-	-	-	-	-	-	-	-	-
Rajkot	-	-	-	-	-	-	-	-	-
Surendranagar	5	10	1913	7	4	571	8	12	1500
Saurashtra	7	13					10	15	
Gujarat	6644	9849	1482	5835	4727	810	6640	10287	1549
India	451600	896800	1986	447100	849800	1901	402800	726500	1804

1.40 Rice is not a significant food grain crop in Saurashtra and constitutes insignificant area under cultivation as well as production due to limited availability of water. However, most of the area under rice cultivation is irrigated and thus, productivity is high. Exhibit 22 shows the details pertaining to rice production.

³ Although the focus of the assignment is to look at the development of coastal Gujarat, we have tried to have a slightly larger focus covering the whole of Saurashtra to leverage the inter-linkages between coastal Saurashtra and Saurashtra hinterland.

						•			
	1999-2000			2000-01			2001-02		
District	Area	Prod.	Yield/ha	Area	Prod.	Yield/ha	Area	Prod.	Yield/ha
Amreli	78	167	2141	26	59	2238	112	301	2684
Bhavnagar	68	108	1588	10	23	2273	64	127	1984
Jamnagar	47	80	1702	16	37	2313	98	278	2837
Junagadh	209	595	2844	58	137	2386	695	2356	3392
Rajkot	90	276	3062	29	66	2281	101	265	2633
Surendranagar	190	387	2037	129	298	2310	119	269	2260
Saurashtra	682	1613		268	620		1189	3596	
Gujarat	4821	10200	2116	2861	6490	2268	4701	11447	2435
India	274900	763700	2778	257300	696800	2708	263400	727700	2762

Exhibit 22: Wheat Production in Saurashtra

(Area '00 ha, Production '00 MT, Yield 'kg/ha)

1.41 Wheat is the second important food grain crop of this region and constitutes about 12 percent of the total area of the state. Except for the some parts of Surendranagar and Jamnagar districts, crops are under irrigatation but the productivity is low as compared to the best productivity of the state i.e. 3923 kg/ha. Exhibit 23 shows the details pertaining to wheat production.

Exhibit 23: Bajra Production in Saurashtra

		1000 000	0		2000 0-			2001 02	-
		1999-200	U	2000-01			2001-02		
District	Area	Prod.	Yield/ha	Area	Prod.	Yield/ha	Area	Prod.	Yield/h
									а
Amreli	450	477	1060	415	303	730	317	631	1991
Bhavnagar	976	673	690	962	595	618	700	1422	2033
Jamnagar	418	108	258	399	297	744	363	622	1713
Junagadh	351	536	1527	289	490	1695	245	548	2237
Rajkot	437	115	263	416	240	577	401	722	1800
Surendranagar	782	468	598	669	563	842	834	1352	1621
Saurashtra	3414	2377		3150	2488		2860	5297	1852
Gujarat	9262	8506	918	9892	8232	832	10712	15999	1493
India	89000	57800	650	98300	67600	688	95300	82800	869

Area '00 ha, Production '00 MT, Yield 'kg/ha

1.42 Bajra is the most important food grain crop of the Saurashtra and it constitutes about 37 percent of the area under cultivation in the state. In this region most of the Bajra cultivation is done in kharif season. The productivity of the Bajra is moderate to high and area under Bajra is declining but productivity is showing increasing trend. Exhibit 24: Pulses Production in Saurashtrashows the details pertaining to bajra production.

	1999-2000			2000-01			2001-02		
District	Area	Prod.	Yield/h a	Area	Prod.	Yield/ha	Area	Prod.	Yield/h a
Amreli	84	30	357	80	23	288	100	63	630
Bhavnagar	156	38	244	130	36	277	131	70	534
Jamnagar	161	62	385	137	51	372	188	127	675
Junagadh	131	61	466	161	87	540	204	133	652
Rajkot	162	57	352	115	50	435	221	161	728
Surendranagar	162	81	500	86	24	279	97	61	629
Saurashtra	856	329		709	271		941	615	
Gujarat	7004	4056	579	6346	1897	299	7304	3798	520
India	NA	NA	NA	203500	110700	544	216600	131900	609

Exhibit 24: Pulses Production in Saurashtra

(Area '00 ha, Production '00 MT, Yield 'kg/ha)

1.43 **Though pulses are not the important crops of this region but they constitute about 12 percent of the total area under these crops in the state**. The main pulses in this region are Mung, Tur, Urad and Moth. The productivity is low in comparison to state average except for the areas in Surendranagar. Exhibit 25 shows the details pertaining to pulses production.

Horticultural crops

1.44 Wide variety of tropical and sub-tropical fruits and vegetables crops is cultivated in the region. Commercial returns from horticultural crops are higher than the traditional agricultural produce. Off-season vegetable production fetches better returns to the cultivators. Horticultural crops are indispensable for human being as they ensure nutritional security, better land use, high productivity and return per unit area. These crops provide enormous job opportunities, encourage establishment of number of allied industries and are also helpful in improving the ecosystem and economic status of the people.

Exhibit 25: Pulses Production in Saurashtra

(Area '00 ha,	Production	'00 MT,	Yield	ʻkg/ha)
---------------	------------	---------	-------	---------

	1999-2000			2000-01			2001-02		
District	Area	Prod.	Yield/h a	Area	Prod.	Yield/ha	Area	Prod.	Yield/h a
Amreli	84	30	357	80	23	288	100	63	630
Bhavnagar	156	38	244	130	36	277	131	70	534
Jamnagar	161	62	385	137	51	372	188	127	675
Junagadh	131	61	466	161	87	540	204	133	652
Rajkot	162	57	352	115	50	435	221	161	728
Surendranagar	162	81	500	86	24	279	97	61	629
Saurashtra	856	329		709	271		941	615	
Gujarat	7004	4056	579	6346	1897	299	7304	3798	520
India	NA	NA	NA	203500	110700	544	216600	131900	609

- 1.45 Gujarat is endowed with varying type of climates and soils and has enormous availability of skilled and unskilled work force and increasing water availability from Narmada dam. This permits enough scope for diversification and development of various horticultural activities, which are 40-50% more remunerative as compared to traditional cereal crops. In Saurashtra, we can divide the horticultural crops into three broad categories, namely:
 - (a) Fruit Crops
 - (b) Vegetable crops
 - (c) Spices

Fruit Crops

1.46 In Saurashtra, Bhavanagar, Junagadh and Amerli are the prominent fruit producing districts. Bhavnagar and Junagadh constitute about 13 percent of total area of the state under fruit production. Saurashtra alone covers about 32 percent of the area under mangoes in the state. This area is known for the famous Kesar mango.

Mango

1.47 India ranks 1st in world production of mangoes. India has a large export market. The other major exporting country is Brazil. The export of mangoes has been mainly to SAARC and Gulf countries, and European markets. During 2001-02, export of mango increased to 44,429 tonnes compared to 37,109 tonnes during 2000-01. Mango exports from India in '03-04 grew 25% year-on-year to more than Rs 100 crore in rupee terms.

1.48 Although, Gujarat is in 7th position in India in Mango production but the **Kesar variety, which is very famous, is produced only in Gujarat and Maharastra** and thus, has its own potential. Although the productivity of China is about 11MT/ha, we can easily target this productivity by proper pre and post harvest management. The productivity comparison across locations is shown in Exhibit 26 while Exhibit 27 shows the state-wise area and production of mangoes in India.

	Production	Productivity (MT/Ha)
World	26479000	7.79
India	12733000	7.60
China	3513000	11.34
Gujarat	595206	7.50
Saurashtra	181628	7.13

Exhibit 26: Mango – Productivity comparisons across regions

State	Area	(ha)	Produ (ton	uction nes)	Productivity (tonnes/ha)	
	2001-02	2002-03	2001-02	2002-03	2001-02	2002- 03
Andhra Pradesh	3,41,200	3,70,300	24,45,800	29,62,100	7.20	8.0
Uttar Pradesh	2,53,000	2,47,600	19,50,000	40,31,300	7.70	16.3
Bihar	1,39,300	1,39,500	12,53,500	12,55,600	9.00	9.0
Karnataka	1,15,400	1,17,400	11,30,600	10,98,200	9.80	934
West Bengal	65,400	1,12,000	5,85,000	2,28,800	8.94	3.4
Maharashtra	1,64,400	66,400	5,59,000	6,15,900	3.40	6.8
Tamil Nadu	1,10,800	1,12,000	4,38,700	7,56,500	4.00	9.4
Gujarat	65,300	69,900	4,57,600	4,95,100	7.00	7.1
Orissa	1,07,300	1,13,100	4,02,400	4,02,900	3.80	3.6
Others	2,13,700	1,19,900	7,97,600	2,28,800	3.73	
Total	15,75,800	16,23,400	1,00,20,200	127,33,200	6.40	7.8

Exhibit 27: State-wise area and production of mangoes

1.49 The key domestic market for mangoes from Gujarat is the major metros. The international market for Gujarat's mangoes comprise of UK and Middle East primarily Saudi Arabia.

Vegetables crops

1.50 Saurashtra region is a very significant producer of vegetables of Gujarat. It covers 44 percent of the area and 48 percent in the production in the state. Almost all onions are grown in this part of the state and the major part of the production is from Bhavnagar. In Saurashtra, onion is the main vegetable crop followed by brinjal, cabbage and tomatoes. Major consumption centres of onions in West and North of India get their significant supplies from Bhavanagar areas in Saurashtra.

Onion

Country		2001		2002			
	Area (ha)	Production (tonnes)	Productivity (tonnes/ha)	Area (ha)	Production (tonnes)	Productivity (tonnes/ha)	
China	720,620	15,021,572	20.85	770,620	15,621,572	20.27	
India	520,000	6,500,000	12.50	520,000	6,500,000	12.50	
USA	65,390	3,068,670	46.93	64,840	3,055,610	47.13	
Turkey	99,500	2,150,000	21.61	113,000	2,270,000	20.09	
Iran	47,206	1,419,296	30.07	50,000	1,500,000	30.00	
Pakistan	105,600	1,563,300	14.80	103,800	1,385,000	13.34	
Japan	27,000	1,259,000	46.63	27,000	1,270,000	47.04	
Total	2,895,328	51,064,783	17.64	2,971,750	51,914,247	17.47	

Exhibit 28: Major onion- producing countries

1.51 The productivity of onion is far below compared with tropical countries where short day onions are produced as shown in Exhibit 29. Serious efforts are required to achieve at least 12.5 tonnes / ha in the coming decade, which is possible subject to the interventions discussed subsequently in this report.

Exhibit 29: Leading states for onion production in the year 2001-02

State	Area ('000 ha)	Production	Productivity
Maharashtra	107.7	1,306.5	12.1
Karnataka	124.3	892.8	5.6
Gujarat	24.0	640.2	26.7
Andhra Pradesh	31.8	559.5	17.6
Madhya Pradesh	21.5	307.5	14.3
Tamil Nadu	31.5	282.4	9.0
Uttar Pradesh	25.2	278.5	11.1
Haryana	14.9	236.9	15.9

State	Area ('000 ha)	Production	Productivity
		000 tonnes	tonnes / ha
Punjab	6.04	129.3	21.14
Orissa	27.0	213.0	7.9
Others	81.86	405.5	9.18
Total	495.8	5,252.1	10.6

Exhibit 30: Export of Indian onion

Ex	port	
Quantity (tonnes)	Value ('000\$)	
333,549	54,690	
215,766	42,269	
260,719	47,141	
343,254	61,509	
441,862	74,028	
	Ex Quantity (tonnes) 333,549 215,766 260,719 343,254 441,862	ExportQuantity (tonnes)Value ('000\$)333,54954,690215,76642,269260,71947,141343,25461,509441,86274,028

Source: DGCIS

- 1.52 In the last few years, onion export from India sharply increased from 2,15,766 tonnes in 1998 to 4,41,862 tonnes in 2001. The boost in onion export is due to production of quality bulbs. Most of the onions are being exported to Asian countries, viz. Malaysia, Sri Lanka, Bangladesh, U A E and Singapore. The domestic markets for onions from Gujarat are Punjab, Haryana, West Bengal and Delhi. The international market for onion dehydrated powder consists primarily of the European countries.
- 1.53 With more cooperation between SAARC countries and especially with Pakistan, the scope for increasing export of onion is bright. The minimum target, which can easily be achieved for export of onion in the coming ten years, is given in Exhibit 31.

Region	Present import (tonnes)	Import price (Rs/Kg.)	Main countries	Present quantities being exported (tonnes)	Potential for increase in India's export (tonnes)
SAARC	2,60,000	10-11	Sri Lanka, Bangladesh,	1,40,0000	2,00,000
Middle East	1,00,000	17-25	UAE, Kuwait and Saudi Arabia	35,000	1,00,000
Far East	5,50,000	10-25	Indonesia, Hong Kong, Malaysia	1,03,000	1,50,000
Europe and USA	75,000	40-75	Germany, UK, USA, and Netherlands	670	25,000

Exhibit 31: Export potential for Onion

Gujarat Infrastructure Development Board (GIDB) Saurashtra Coastal Corridor Final Report – February 2006

Region	Present import (tonnes)	Import price (Rs/Kg.)	Main countries	Present quantities being exported (tonnes)	Potential for increase in India's export (tonnes)
Total Additio	nal export				4,75,000

1.54 The focus on exports would lead to increased volumes of onions being sold and would also assure the farmers a remunerative price. The decision of Cabinet Committee on Economic Affairs' to remove onion from the restricted list of exports and allowing flexibility in terms of exports is a welcome step. Further, efforts should be made to introduce contract farming in suitable pockets for regular supply.

Spices

1.55 Saurashtra accounts for 48 percent of area and 57 percent of spice production of the state. The main spices of the region are cumin, chillies, garlic and coriander.

Flowers Crops

1.56 In this region, flowers are not so prominent horticultural crops as it cover only 7 percent of total area and 6 percent of total production of the state. Roses and marigold are the main flowers grown in the region. Bhavanagar is an important district for flower production.

	Mango		Chiku		Cit	Citrus		Ber		nana	Guava	
District	Area	Prod	Area	Prod								
Amreli	5880	38220	515	4635	339	2712	126	1134	0	0	216	2592
Bhavnagar	4400	30800	2480	24800	3520	40832	1175	14100	75	1875	1975	31600
Jamnagar	165	1155	175	1593	132	990	280	1960	0	0	0	0
Junagadh	14200	106500	3044	29527	280	2660	205	1435	1500	45000	180	1440
Porbandar	140	1050	145	1218	10	70	90	630	0	0	0	0
Rajkot	284	1988	189	1323	258	1806	162	1215	0	0	181	1629
Surendranagar	383	1915	116	951	807	6053	1081	11459	0	0	23	276
Saurashtra	25452	181628	6664	64047	5346	55123	3119	31933	1575	46875	2575	37537
% of State	32	31	30	31	21	21	25	24	4	3	37	40
Gujarat	79311	595206	22517	204007	25893	263028	12487	131351	42909	1760901	6969	92983

Exhibit 32: Production of Fruit Crops in Saurashtra

Area in Hectares, Production in M. T

Exhibit 33: Production of Vegetables in Saurashtra

Area in Hectares, Production in M. T

	Pot	tato	0	nion	Brinjal		Cabbage		Okra		Tomato	
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Amreli	0	0	2900	72500	1325	24019	0	0	669	4601	612	11016
Bhavnagar	0	0	30300	818100	572	11728	175	2450	875	10281	775	23250
Jamnagar	800	10400	5400	135000	1240	18723	770	9240	1140	7443	1170	17550
Junagadh	0	0	4300	107500	8510	69120	597	7164	3075	24840	0	0

PRICEWATERHOUSE COOPERS 🛛

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Section 1 Industry Analysis

	Po	tato	0	nion	Bri	njal	Cab	bage	O	kra	Ton	nato
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Porbandar	0	0	700	19600	560	6790	50	750	300	2370	350	7000
Rajkot	0	0	5700	114000	4100	50900	3340	63460	980	5880	3170	57060
Surendranagar	0	0	40	800	2061	22643	459	7344	2345	12897	966	14490
Saurashtra	800	10400	49340	1267500	18368	203923	5391	90408	9384	68312	7043	130366
% of State	3	1	96	96	36	28	38	36	27	25	31	31
Gujarat	31211	704099	51497	1315353	50929	732114	14097	249101	35190	273699	22912	420689

Exhibit 34: Production of spices in Saurashtra

	Cui	min	Fen	nel	Ch	illy	Ga	rlic	Gin	iger	Turr	neric	Coria	ander
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Amreli	3785	1550	0	0	496	496	1442	7228	0	0	0	0	300	149
Bhavnaga	1557	700	0	0	460	600	151	934	0	0	0	0	290	250
Jamnagar	19940	8964	0	0	2495	2600	14690	62082	0	0	0	0	1720	1620
Junagadh	9230	3500	0	0	4540	2725	9450	34500	0	0	0	0	1021	932
Porbandar	910	400	0	0	390	350	295	1250	0	0	0	0	85	76
Rajkot	35020	14250	0	0	2950	2325	9251	36255	0	0	0	0	1985	1685
Surendra	25476	7414	242	217	859	815	748	2672	0	0	0	0	382	169
Saurashtra	95918	36778	242	217	12190	9911	36027	144921	0	0	0	0	5783	4881
% of State	47	45	1	0	45	40	96	96	0	0	0	0	85	85
Gujarat	203011	81999	36095	46799	27110	24570	37676	151369	1911	22938	949	11183	6823	5714

Area in Hectares, Production in M. T

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Section 1 Industry Analysis

Area in Hectares, Production in M. T

	Ros	e	Mari	gold	Мо	ogra	Li	lly	Otl	ners	то	otal
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Amreli	21	63	15	65	0	0	8	28	0	0	44	156
Bhavnagar	120	480	40	400	0	0	0	0	5	20	165	900
Jamnagar	19	114	30	261	0	0	0	0	20	80	69	455
Junagadh	30	120	30	120	0	0	0	0	35	140	95	380
Porbandar	5	15	12	60	0	0	0	0	15	60	32	135
Rajkot	8	64	6	72	0	0	1	4	1	4	16	144
Surendranagar	0	0	0	0	1	6	0	0	0	0	1	6
Saurashtra	203	856	133	978	1	6	9	32	76	304	422	2176
% of Gujarat	10	7	7	7	0	0	1	1	8	8	7	6
Gujarat	1962	12120	1875	15044	408	2735	689	2412	922	3783	5856	36093

Exhibit 35: Production of Flowers in Saurashtra

PriceWATerhouseCoopers 🛛

Section 1 Industry Analysis

Other Crops

- 1.57 There are other crops, which are commercially important and are being grown as cash crops. Since there are semiarid climatic conditions and scarcity of water, the returns from cash crops is higher by about 25-30% and as such these are becoming popular. These crops are observed to have an advantage in terms of return per unit area (a factor of high productivity per acre and high price per MT) over the food grain crops. The key crops constituting this category include:
 - (a) Oil Seeds (Groundnut, Sesame and Castor seeds)
 - (b) Cotton
 - (c) Isabgul
 - (d) Guar gum

Oil Seed Crops

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	2811	4082	1452
Bhavnagar	1933	2634	1363
Jamnagar	4091	5693	1391
Junagadh	4440	7171	1615
Rajkot	3682	4658	1136
Surendranagar	224	221	1265
Saurashtra	17181	24459	968
% of state	93	94	
Gujarat State	18507	25921	1404

Exhibit 36: Groundnut (Kharif) Production 2001-02

Exhibit 37: Sesame Production 2001-02

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	339	72	213
Bhavnagar	520	74	143
Jamnagar	286	38	133
Junagadh	35	17	474
Rajkot	441	136	308
Surendranagar	833	243	291
Saurastra	2454	580	
% of state	82	66	
Gujarat State	3003	873	291

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	21	39	1861
Bhavnagar	14	25	1861
Jamnagar	152	254	1667
Junagadh	58	108	1861
Rajkot	183	312	1710
Surendranagar	45	84	1861
Saurashtra	473	822	
%of state	14	13	
Gujarat State	3463	6224	1797

Exhibit 38: Castor Production 2001-02

Exhibit 39: Total Oilseed Production 2001-02

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	3091	965	312
Bhavnagar	2023	728	360
Jamnagar	4131	469	114
Junagadh	4436	2985	673
Rajkot	4668	727	156
Surendranagar	1111	546	491
Saurashtra	19460	6420	
% of state	70	37	
Gujarat State	27931	17282	619

1.58 Groundnut production in Gujarat is mainly confined in the Saurashtra region and traded in two form i.e. Shell and shelled. In the Saurashtra, cultivation of oil seeds is most prominent as it covers 70 percent of the total oil seeds production area in Gujarat but produces only 37 percent of total production. The details on groundnut production in various states in the country is provided in Annexure II. Among oil seeds crops, groundnut is the most prominent crop of this region followed by sesame and castor. There is 40% oil recovery from groundnut. 10% of total quantity of raw groundnut produce is exported primarily to Middle East and Korea.

Cotton

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	935	1245	226
Bhavnagar	2153	2368	187

Exhibit 40: Cotton Production 2001-02

District	Area'00ha	Production'00MT	Productivity kg/ha
Jamnagar	360	481	227
Junagadh	175	397	386
Rajkot	1494	2303	262
Surendranagar	3768	4084	184
Saurashtra	8885	10878	
% of State	58	52	
Gujarat State	15394	20855	230

1.59 Saurashtra accounts for 58 and 52 percent of area and production of cotton, respectively in the state. Surendranagar alone produces about 40 percent of the total cotton of the region.

Isabgul

District	Area'00ha	Production'00MT	Productivity kg/ha
Amreli	1	*	389
Bhavnagar	-	-	-
Jamnagar	3	1	389
Junagadh	2	1	389
Rajkot	3	1	389
Surendranagar	5	3	626
Saurashtra	14	6	
% of state	7	5	
Gujarat State	200	117	583

Exhibit 41: Isabgul production

1.60 Isabgul is one of the most prominent commercial crops of the state but it is not an important crop of this region as it covers only 7 percent of the area and 5 percent of production.

Guargum

1.61 Guar is also known as the cluster beans Gaur seed has three major components viz. Hull or seed coat (14-17%) Endosperm (35-42%) and Germ (43-47%). In Saurashtra region, Junagadh is the leading producer, which contributes about 23 percent of the total production of the state. It has been observed that the high fluctuation in production from year to year are largely due to the crops are monsoon dependent.
Conclusion

- 1.62 An analysis of the production scenario indicates that Gujarat has a low share in food grain crops. Also, Gujarat's yield is quite low compared to the Indian average. Given the dominance of other states like Punjab, Uttar Pradesh, Andhra Pradesh and Tamil Nadu in food grains production and the absence of suitable agroclimatic conditions in the state, Gujarat should not focus on these crops but capture the potential of other crops such as horticultural crops.
- 1.63 Commercial returns from horticultural crops are higher than the traditional agricultural produce. Off-season vegetable production fetches better returns to the cultivators. Horticultural crops are indispensable for human being as they ensure nutritional security, better land use, high productivity and return per unit area. These crops provide enormous job opportunities, encourage establishment of number of allied industries and are also helpful in improving the ecosystem and economic status of the people.

Marketing scenario

- 1.64 Most of the fruits and vegetables grown in Gujarat are consumed within the state while the deficiency and some fruits and vegetables are imported from other states. Some of the crops, which are exported to other states and abroad are as follows:
 - (a) Fruits: Banana, Mango, Sapota, Dates, Guava and Papaya
 - (b) *Vegetables:* Onion, Okra, Bitter gourd Tomatoes and Potatoes
 - (c) *Spices:* Fennel, Cumin and Garlic
 - (d) Medicinal Plants: Isabgul
- 1.65 Most of the agriculture/horticultural produce are traded through local agents acting on behalf of commission agents operating in the main markets. Many a times, the farmers resort to distress sale due to perishable nature of the produce, lack of post harvest infrastructure and want of cash. Some of the produce is sold directly by the farmers in the local markets but most of them go to the local agents. Surplus horticultural products of the region are marketed at local, regional and national level. Some of the farmers bring their produce in trucks, trolleys, buses, tempos etc. directly to the market yard or sub-market yards. At the entrance, officials of the Market Committee give them an entrance slip. The produce is then brought and unloaded at the commission agent's shop where the auction takes place. The commission agents are registered with The *Mandi Samiti*s. Farmers sell their produce to the wholesaler / sub-wholesaler / retailer through the commission agent in the Market Yards.



Exhibit 42: Existing marketing structure

Legal Framework and Institutions in Gujarat

- 1.66 The entire marketing network for marketing of agriculture and horticulture produce is regulated within the legal framework of the State Government and is thus, applicable in Saurashtra region. The statutory requirements determine the relationship between various stakeholders.
- 1.67 Gujarat has its own Agricultural Produce Marketing Act (APMA). It sets the rules for the trading in fruits and vegetables. In Gujarat, state's Agriculture Produce Marketing Committee Act, (APMC Act) is applicable which regulates marketing of horticulture produce (mainly fruits, vegetables and spices). As per the provision of this Act, commodities covered under this act can only be marketed within APMCs' physical boundaries of the Market Yards and after paying APMC charges. Commodities covered under APMC Act, usually record about their quantity arrivals and price trends etc are maintained and this provides useful data base for such commodities in an organized form.

Central laws/rules applicable to the state

- 1.68 Regulations which are applicable at national level and relevant to horticulture development are as follows:
 - (a) Phyto-sanitary clearance / prior approval for import of seeds and planting materials including (germplasm, suckers, grafts, tissue culture, mother plants and genetically modified seeds etc ;) for horticulture crop varieties not native or growing at present out of our country.
 - (b) Phyto-sanitary certifications of Indian origin horticulture produce as per the requirements of importing country, applicable for the export of these items.
 - (c) Phyto-sanitary clearance / prior approval / certification for import and marketing of fresh horticulture produce, fruits and vegetables for human consumption.
 - (d) Regulation and control of import and marketing of pesticides, growth hormones and other chemicals used for horticultural crops, under Pesticide Control Act, implemented by Pesticide Control Board, GOI, under ministry of Agriculture.
 - (e) Registration and approval for manufacturing facilities and laboratories under FPO (Food Products Order) with Ministry of Food Processing, GOI for all Fruit & Vegetable processing units, other than falling under Tiny sector or Cottage industry.
 - (f) Packaging and marking of packaged horticulture produce/ commodity under Packaged Commodity Act.
 - (g) Prevention of Food and Adulteration Act/ Rule, (PFA), 1954/1955 applicable to all processed horticulture produces, directing for use and/ or restrictions of ingredients including food colours, preservatives, emulsifiers etc; in horticulture based processed foods items.

(h) Registration and certification for Processed Spices and Honey for "AGMARK", with AGMARK (Agriculture and rural Marketing authority, GOI) for quality and purity certification on voluntary basis. Registration and approval under BIS, where applicable compulsory for food products or packaging.

Implementing Agencies

1.69 As regards applicability of APMC Act, State Agriculture and Rural Marketing Department is an implementing agency. Gujarat State Agriculture Co-operative Marketing Board is a nodal agency for all APMCs covered under APMC Act. In particular jurisdiction of an APMC, including yards and sub-yards, respective APMC is an implementing agency and collecting market fees from purchasers of horticulture produce. Commission agents or traders pay market fees as per rates fixed by APMC for services provided by the APMC.

APMC Regulated markets

1.70 Details of APMC infrastructure in Gujarat and regulated periodic rural markets have been covered under the section of marketing infrastructure in Gujarat. In Gujarat, there are 176 Regulated APMCs and 137 regulated periodic rural markets.

Commodity Marketing

- 1.71 **Groundnut**: Groundnut produced in Saurashtra is traded in the APMCs of Saurashtra and Sabarkantha. The farmers take the produce to the Market Yards. Trading takes place between the farmer and the licensed agents of the APMCs. Oilseeds are traded through auctions and the highest bidder gets the commodity. The commission agent pays the total fee of the produce to the farmer on the spot and receives the total amount from buyer after a period of three days. The commission agent receives 1% of total value of produce from the farmer. After the trading is over, the traders store the produce in their godowns in the APMC premises, which is subsequently sold to the private and/or cooperative oil mills as per their requirement.
- 1.72 **Castor:** Marketing chain for castor is same as for other oilseeds but due to the existence of traders with no processing capacity of their own, volatile castor bean prices can squeeze processor's margins, considerably. Often there exist opportunities to lock into "Buy Spot Sell Future" transaction in castor seeds and yielding a net arbitrage return of 4% per month to the trader(s). Storage costs of castor seeds are negligible as castor seeds can be stored for 2-3 years with almost negligible loss in weight. Existence of such arbitrage opportunities implies a temporary mismatch between arrivals of castor in the market yards and direct purchases by processors for export or value addition.
- 1.73 **Sesame**: Sesame seeds trade is similar to that of other oilseeds (groundnuts & castor). It is traded through the APMCs, mainly in Amreli.

1.74 **Cotton**: In the marketing chain of the cotton, the cotton is brought to APMC Market Yards without seed. In the yards, the price is determined through open auction. However, only a small portion of produce is physically brought to APMCs for auction. Many farmers sell their produce in the village itself. The ginnery owners go to the villages and negotiate the price with farmers. The ginnery owners, however, pay the 0.5% cess to the APMC of the area.

Horticultural crops (Fruit, Vegetables & Spices)

- 1.75 Marketing of perishable produce is highly unorganized and a large number of intermediaries are involved. Two types of fruit & vegetable marketing systems are prevalent in Saurashtra as follows:
 - (a) Firstly, a consolidator collects the produce from the farmers and sends it to the commission agent operating at different regional markets. At these mandis, the wholesaler purchases the produce through auction conducted by licensed commission agent. The farmers are given payment after deduction of expenses for different activities, including commission etc. In some cases, even the correct price is not declared since transaction takes place under non-transparent negotiations called *"Hattha System"*.
 - (b) Secondly the institutional buyers, who have set up collection and procurement centres at different places in region, buy their requirements directly from fruit and vegetables from the farmers. However, these institutions pay market cess/fees to the respective APMC of the area.
- 1.76 As prevalent in other parts of states, growers seem to prefer handling and marketing of the produce through a commission agent with whom they have a long standing relationship. The individual farmer usually undertakes selling of vegetables through a specific commission agent.

Marketing Channels of Horticulture Products

Flow of produce from producer to consumers

- 1.77 The flow of produce from farmer to market varies with the type of produce and the distance to the market. In case of vegetables the chain is relatively short where local farmers/traders consolidate and send the produce directly to the terminal markets. In case of fruits, there are pre-harvest contractors, local traders/commission agents who form a part of the chain before the produce is dispatched to different markets.
- 1.78 Typically the chain consists of 5-6 levels as shown in Exhibit 43.



Exhibit 43: Mapping the chain from farm to consumer

- 1.79 The channel is long and the aggregate of margins in the chain from farmer to the consumer is very high since the above-mentioned margins are incremental i.e. charged on sale price. In addition, there are other costs like transportation, handling charges and wastage's at every stage. The farmers get only 25-40% of the price paid by the consumer. Moreover, multiple handling of the produce from one level to the other causes damage to the quality of the produce and adds to the wastage; value loss is estimated to be 30%-40% (value loss is higher than the wastage due to deterioration in quality during the process of marketing).
- 1.80 A study conducted by Institute of Rural Management, Anand observed that " a farmer by selling his produce in the local market through wholesalers/commission agents, a fruit and vegetable grower gets around 17 percent share of the ultimate customer's rupee".

Market Information

1.81 Market arrivals, prices and commercial terms are available only from the buyers in the area and most sellers are able to only receive pieces of information from the parties they interact with. Farmers are unable to receive any clear comprehensive information to enable sales and cultivation plans. Marginal farmers sell their produce immediately after the harvest for two main reasons, selling at the best quality and receive money in cash. Farmers do not have access to grading, storage and packing facilities and also do not possess adequate knowledge about the grading and its impact on prices. The traders also do not grade the produce at the village market level. However, the physical grading is done by traders at the terminal markets for forwarding the produce to the other markets and processing units.

Factors affecting *mandi* arrivals

- 1.82 **Seasonal Character**: Most of the horticultural produce has a seasonal character, which affects production, supply and quality of the produce. When a shortage of produce occurs, due to factors like heavy rain or extreme drought, the available produce gets consumed in the production areas. In the city markets, the shortage leads to scarcity in supply and consequent high prices. The season of one crop affects the market demand for another. For example, in Delhi, during the mango season, the demand for apples and other fruits drops, significantly. However, in case of vegetables, an emerging trend indicates demand and increasing consumption of off- season vegetables.
- 1.83 **Quality**: The quality factor affects the interrelation between the markets. In most cases the better qualities are sent to Mumbai and Ahmedabad. The commission agents at the city markets are normally well informed on quality aspects of the products from different regions and the variation in quality during the year. It is however, hard to compare different qualities based on prices and volumes of goods. Produce of certain specific regions fetches higher price at the market than crops from other regions. This is because the quality of the product is related to the reputation of the region of its origin. These regions also have their own grading and quality indicators like colour and size etc. for the specified product.

Evaluation & Intervention – Product Specific

1.84 Saurashtra faces problems of inadequate irrigation, fragmented processing industry and commodity dominated exports despite having many strengths. These problems can be overcome by developing irrigation infrastructure (particularly water saving methods like drip), consolidating and building agro-industries engaged in manufacturing of value added products. This region has the potential to develop agro-industry economy in the next decades. For this, Gujarat has to focus on a few crops where sustained competencies exits or can be built, be a technology gradation leader across the value chain, focus on value added products and on global integration.

1.85 For focused economic development of the Saurashtra region, it would be prudent to identify the key interventions for a set of focus crops. Based on costbenefit analysis, existing and potential marketing opportunities and the resource advantages existing in the Saurashtra region, we have identified a preliminary list of focused crops. These include: groundnut, castor, sesame, cotton, mango (horticultural produce) and onion (vegetable produce).

Groundnuts

1.86 Groundnuts are cultivated throughout the Saurashtra mainly for the oils (refined and vanaspati). Groundnut oils find extensive use as cooking medium, both as refined oils and vanaspati ghee. It is also used in soap making and manufacturing cosmetics and lubricants. The residue oil cake is an important protein supplement in poultry and cattle feed. China is the largest groundnut producing country followed by India (27%). The productivity of the groundnut in Saurashtra is 1400 kg/ha, whereas in China it is 2500 kg/ha. Use of high yielding varieties can enormously increase yield and therefore ensuring higher return in trade.

1.87 Gujarat is the leading state for production of groundnut; contributing 27% of the country's production and out of this, 93% is the share of Saurashtra.

- 1.88 Groundnut, a staple food for many developing countries, deserves a closer look as an export commodity. Less than 6% of the world groundnut crop is traded internationally, with export sales averaging close to US\$ 1 billion per year. There is, therefore, **scope for export growth in groundnuts**. Internationally the consumption of groundnut is increasing and India is one of the major sources after USA and China. Thus, there is scope of increasing HPS groundnut export.
- 1.89 Groundnut is traded in two forms: in shell and shelled.
 - (a) In Shell: World trade for export of groundnut in Shell has been showing declining trends.
 - (b) Shelled: Worldwide exports of shelled groundnut have been showing increasing trend.
- 1.90 Saurashtra groundnut has high acceptance in the export market and will continue to be in high demand, provided the aflatoxin contains remains negative. Saurashtra variety does not have generic aflatoxin but it comes due to poor post harvest management of the shelled groundnut. These can be achieved by introducing of proper post harvest management especially for drying and setting up a testing and certification laboratory in the region to test the aflatoxin content and give certification prior to exports. Laboratory for aflatoxin determination can be set up in the Junagadh region with a cost of nearly Rs 200 lakhs out of which 25 % is the government participation and 75 % the private participation. Subsidy can be availed from Ministry of Food Processing, Government of India.

- 1.91 Proper training and extension services should be provided to the farmers for post harvest management of groundnut to maintain the aflatoxin content to the nominal level.
- 1.92 Recently some secondary sources of oil have been explored to meet the demand supply gap of edible oils. These are rice bran, rapeseed, sunflower cakes, and groundnut cake. In this scenario, the focus should be on identifying other opportunities that are more remunerative. These include:
 - (a) Blanched Groundnut: Groundnut kernels devoid of their skin are known as blanched groundnut. Groundnut can be blanched manually as well as mechanically. Germany, The Netherlands, Australia and Sri Lanka are the major importing countries of blanched groundnut. They mainly prefer bigger kernels, which is only produced in Saurashtra. Processed groundnuts are exported in bulk as well as in consumer packs.
 - (b) *Roasted and Salted Groundnut:* Blanched groundnut can be further roasted and exported to Gulf countries, as they are the major importers. Export of roasted and salted groundnut is more remunerative than blanched groundnut.
 - (c) Peanut Butter. This is popular food item in the USA, where as in India it is still a new concept. In USA, 1/3rd of groundnut crop is used to make peanuts butter. Even a smaller country like Zimbabwe is doing well in peanut butter. Saurashtra is a major source of raw material of export quality of runner type of groundnut butter. Hence this region is major source of raw material for set up of any export-oriented processing unit in this region. With a production cost of approximately Rs 40 per kg and 90% recovery and a selling price of Rs 60 per kg, it is a highly remunerative product. Recently, Pepsico has taken some initiative in sourcing peanuts from Gujarat and getting peanut butter prepared in North. Small scale units of groundnut processing can be set up in Saurashtra region and they can result in 20-30 % increased sale price compared to raw groundnut. Currently only Jabson foods located at GIDC, Bhola in Bharuch exports such different varieties made from groundnut. However, organic farming certification is required. Thus, Gujarat government should showcase such opportunities to potential investors. This could be achieved through preparation of pre-feasibility reports and model project profiles, which can subsequently be showcased at events like Vibrant Gujarat.
 - (d) HPS i.e. Hand Picked Seeds: Both varieties Java and Bold are exported mainly to Europe, Gulf and near by countries. China's share is declining in HPS and if proper quality standards are maintained, Saurastra can take up the exports of HPS to an appreciable level. There are about 40 small scale plants for HPS Production.
 - (e) Chikki Chikki is exported mainly to middle-east countries catering to the Indian population existing in the area. The main centre of chikki production is Rajkot.
- 1.93 The irrigation infrastructure in the state needs to be improved. Further, the rain water harvesting should be promoted. All this would help the agricultural production including that of groundnut.

Case Study: Fadzavanhu Enterprises – Zimbabwe

Intermediate Technology Development Group (ITDG) international NGO has helped more than 100 women and some men increase their income through peanut butter production to ten times the average per capita earnings in Zimbabwe.

Most peanut butter producers are women working from their own homes. Traditionally they make the butter by manually grinding peanuts between two stones and then grinding them again. ITDG has introduced small electric grinding mills, which have reduced the drudgery involved in making peanut butter and increased quality and productivity. Women are able to rent time on the machine at ITDG's 'service centres' for small entrepreneurs; or in cases like **Fadzavahnu Enterprises**, a small woman's co-operative.

Technical advice is central to the project – for example, to avoid the risk of toxic mould on the peanuts. But business and marketing training may also be required to enable these small-scale producers to sell their product. Ladies of Fadzavanhu Enterprises – a women's co-operative group in Chitungwiza, a satellite town of the Zimbabwean capital Harare – who have been able to improve their families' quality of living by making peanut butter. Theirs is just one of the successful and sustainable small businesses ITDG has helped to set up through its agro-processing Programme. This is their story.

When the closure of a local textile plant left their husbands out of work the four women needed to do something to earn money to feed their families. Esnat, Memory, Lucy and Roster (Name of four ladies who run these business) realized that the peanut butter (used as a nutritious supplement to staple foods by many people in Zimbabwe) they were buying for their families was from large scale producers and quite expensive. They believed that if they bought peanuts from local farmers they could produce and supply the butter locally and more cheaply. Their difficulty was that starting a small business in a developing country like Zimbabwe isn't easy. Access to equipment, finance, training, business advice and reliable markets are difficult to come by. As well as advising on food safety, especially the health risk of the carcinogenic chemical aflatoxin from peanut mould, ITDG's project officer helped the women develop a business plan and secure a loan of £250 (US\$403) which they later repaid from their profits. With the loan the women were able to buy a small electric mill developed by ITDG to crush their peanuts, instead of grinding them twice by hand between two stones in the traditional way. Fadzavanhu Enterprises now produces peanut butter that is as good, if not better, than mainstream producers yet sells for 15% less in the local stores and two supermarkets. Esnat, Memory, Lucy and Roster's profitable enterprise has not only improved the quality of living for their families. It has also given them independence, savings and assets that now make the women credit worthy. Which means the women can now continue the expansion of their business by buying a second mill.

Castor

- 1.94 Castor oil is the only source of a hydroxylated fatty acid and is non-toxic, a renewable resource and biodegradable. It also serves as an industrial raw material for the manufacture of a number of complex organic derivatives. Castor oil is used as a raw material in the manufacture of a number of chemicals used in the manufacture of surfactants, specialty soaps, surface coatings, cosmetics and personal care products, pharmaceuticals, perfumes, plasticisers, greases and lubricants, and specialty rubber etc.
- 1.95 Castor is generally grown for its oil yielding seeds. The oil content varies from 35-50%. Initially castor oil was only used as domestic medicinal oil but gradually its application spread into sophisticated applications. Castor oil is a valuable input in some of the fastest growing industries. The residual cake is used as manure.
- 1.96 India is the leading producer of castor oil in the world, followed by China and Brazil with 0.8 and 0.4 lakh tons respectively. The present annual world trade in castor oil is estimated at about 2.00 2.50 lakh tons. The major importers of castor oil in the world market are European Union, US and Japan. The world demand for castor oil is estimated to be growing at the rate of about 3 to 5 % per annum. Both Brazil and China have experienced a steady increase in their domestic castor oil consumption in the recent years and thus utilize almost their entire production. India consumes only a quarter of its castor oil production and exports the rest.
- 1.97 Castor oil with its unlimited industrial applications, enjoys tremendous demand worldwide, estimated at about 220,000 tonnes per annum. The current consumption of Castor Oil and its derivatives in the domestic market is estimated at about 100,000 tonnes. The annual domestic consumption of castor oil in India is only about 80,000-1, 00,000 tons. Of this, the soap industry consumes about 25,000 tons, the paint and allied industries 35,000 tons and the lubricant and derivatives industry 20,000 tons.
- 1.98 India is also the biggest exporter of castor oil holding about 70% share of the international trade in this commodity. India's annually exports around 2.0 2.4 lakh tons of commercial castor oil. From India castor oil is exported in two forms First Special Grade and Castor Oil Commercial mainly through Kandla port.
- 1.99 India's castor oil production fluctuates between 2.5-3.5 lakh tons a year. In 2003-04, India's estimated castor oil production was 2.8 lakh tons. Castor is a khariff crop. The sowing season of castor is from July to October and the harvesting season is from October to April. The Indian variety of castor has 48 % oil content of which 42% can be extracted, while the cake retains the rest.

(Production: '000 tonnes)

		(
States	2001-02	2002-03	2003-04
Andhra Pradesh	83	86.0	132.0
Assam	0.7	1.0	1.0
Bihar	0.1	0.3	3.0
Gujarat	465.1	283.1	541.1
Karnataka	16.1	15.7	14.0
Madhya Pradesh	0.8	0.5	0.4
Maharashtra	3.1	7.0	5.0
Rajasthan	66.1	21.9	89.8
Tamil Nadu	8.0	5.6	6.5
West Bengal	0.1	0.0	0.0
India	652.7	427.5	801.0

Exhibit 44: Selected State-wise production for castor seed in India

Source: Ministry of Agriculture, Govt. of India

- 1.100 Gujarat produces 82 % of India's production of castor and 62% of world's production of castor. Saurashtra contributes 14% to Gujarat's overall production. With assured irrigation through Sardar Sarovar Project, castor production scenario in the state would get a dramatic boost. The major castor oil markets in Gujarat are Rajkot, Ahmedabad, Gondal, Gadwal and Bhabar.
- 1.101 There are a number of factors that influence the castor market including:
 - (a) Variations in castor seed domestic acreage, which in turn is influenced by probable yields and price realization and thus, the total potential income.
 - (b) Crop development based on monsoon progress in key growing regions
 - (c) Chinese and Brazilian crop size
 - (d) Comparative price with other vegetable oils in the domestic market,
 - (e) Upcountry demand of castor oil from the major cities, Export demand of castor oil from US, Europe and Japan
 - (f) The castor seed price tends to firm up during the planting period and eases down during the harvesting period. Prices tend to show inter-seasonal variation of almost Rs 200 - Rs 350 per quintal.
 - (g) Castor seed growers and crushers hoard the commodity before selling in expectation of better prices. Castor oil too can be kept in containers without spoilage for long period.

- 1.102 There is a large scope for improving Gujarat's earning from castor by converting the castor oil to various derivatives.
 - (a) *Castor Meal:* It is one of the most versatile natural manures and helps to neutralise the detrimental effect of chemical fertilisation.
- 1.103 De-oiled castor cakes are used as a basic raw material for paints, adhesive etc. Though most of the castor production comes from the north Gujarat, but Jamnagar provide an opportunity in the emerging area of castor oil use. A castor oil extraction plant can be established at Jamnagar. The cost of castor oil extraction plant with a capacity of 300MT per annum would be around Rs. 50 lakhs and will be established by a private party. Subsidy can be availed from Ministry of Food Processing, Government of India. Any possible hindrances like technology issues, capital investments, etc. should be overcome through government initiatives.
- 1.104 A considerable quantity of the castor oil is also used in adulteration of edible oils like groundnut oil due to price differential.

Sesame

- 1.105 It is an important and ancient oil-yielding crop and is rich source of edible oil. Its oil content generally varies form 46 to 52%. Its grain can be eaten after frying, mixed with sugar or in the form of sweet meals and is also one of the major items used in confectionary. Sesame oil is used as cooking oil. Although India is the largest producer of sesame, it lags behind Sudan and Myanmar in term of export. Export of sesame seed is limited in India due to domestic demand of sesame seeds for oil extraction.
- 1.106 Gujarat produces 27% of India's total sesame production and of this Saurashtra's contribution is 82%. Sesame is available in 4 varieties.
 - (a) White: Most prominent variety of Saurashtra and is widely preferred.
 - (b) Black
 - (c) Crushing quality sesame seed
 - (d) Hulled sesame seed: Hulling is done mechanically and manually.
- 1.107 Sesame Oil It is the major processed product obtained from sesame. Sesame oil is mostly favoured in north India as a cooking medium. The entire production of sesame oil is consumed in the domestic market.

- 1.108 Sesame seed extraction: High protein feed meal and used as a valuable ingredient in poultry feed. As discussed above and in previous chapter, there is a large scope for vertical and horizontal expansion, of sesame to make it export able surplus. Since Saurashtra is major raw material source of sesame oil extraction, a processing unit can be set up in Bhavanagar at a cost of Rs 4.5 crores for an extraction plant with a capacity of 15 MT/day with 25 % support from the govt and 75 % private sector participation. Subsidy can be availed from Ministry of Food Processing, Government of India.
- 1.109 A certified laboratory for pesticide residue analysis can be established in Surendranagar district or at Junagadh Agriculture University. Total cost for setting up such laboratory will be Rs. 200 lakhs with 25 % support from the government.

Cotton

- 1.110 Seed cotton can be categorised into two main parts: lint (1/3rd) and seed (2/3rd). Lint is used in yarn and fabrics manufacture. Two main products obtained from cottonseed processing are oil and de-oiled cake.
- 1.111 Cotton yield is well below the world average yield, because more than 70% of crop is rain fed. This holds true for Saurashtra cotton, which produces 54% of Gujarat is cotton production. In Saurashtra average productivity in the rain fed area is 225kg/ha, whereas in the irrigated field it is 450kg/ha. Thus, with the assured irrigation facilities there is scope for productivity enhancement. Saurashtra produces medium to super long variety of cotton but the mill consumption in Ahmedabad and nearby area is of medium short fibre type. Hence, large part of the cotton is sent outside for spinning or yarn manufacture.
- 1.112 Till recently, all efforts in cotton industry were to increase productivity. However now development is taking place in the area of organic cotton, natural colour cotton and genetically engineered cotton. These efforts are in the infancy. However, there is considerable economic potential in the future.
- 1.113 As discussed above, there is an opportunity to set-up spinning mill for utilisation of long fibre type cotton. We would further explore the current constraints in setting up such a mill. This could be due to technology issues, lack of downstream industries, etc. The marketing set-up in cotton is not so good. Hence, there are opportunities in developing infrastructure for supplying activities in cotton trading like scientific grading of lint using High Volume Instrument (HVI) machine providing storage facilities and development of cotton future market.

Spices

1.114 Spices are widely used as food flavouring ingredients. There are 8 major spices and out of these Saurashtra is known for chillies, cumin and garlic. The market for spice is generally categorised into:

- (a) Straight: This refers to spice sold in natural form or in straight powder form.
- (b) Value added products like Blends- premixed in right proportion.
- (c) Spice oil- there are highly value added products, and spice oleoresin- represents the complete flavour profile of the spice. It comprises both volatile and non-volatile resin present in spice.
- 1.115 Export of value added spices like oils and oleoresin are assuming significance in view of convenience and the aflatoxin problem in bulk spice.
- 1.116 The main problem faced by the spice industry is that there is a very little surplus spice available after domestic consumption. Surplus can be improved by productivity improvement, setting of more infrastructure facilities like drying yard, cleaning, sorting and grading facility and increase in area. Productivity can be improved by giving good quality seeds since seed replacement rate is very low and varieties get mixed. Moreover, package of practices suitable to microclimate of production belts needs to be disseminated. As regards wastages, the value loss is due to poor infrastructure for drying and storage, where the produce is contaminated with foreign matter like staws and rat excreta.
- 1.117 Another problem faced by the industry is the poor overall quality of produce as it gets mixed with bad quality produce rendering the whole lot as bad quality and un-exportable. Adequate cleaning, grading and sorting centre and laboratories are required at all major markets of species. There is a great opportunity for Saurashtra in down stream value adding processing industries. It is observed that average price realization on value added spices is double that of straight spices. There are negligible processors for encapsulated species, oils and oleoresin in Saurashtra.
- 1.118 Saurashtra provides an **ample opportunity in the emerging sector of value added spices like dehydrated, garlic flake and dehydrated garlic powder, cumin oleoresin extraction** etc. Currently, setting up of a processing unit for higher valueaddition is hindered by significant capital investments. Further, it would be more important to focus on developing a recognizable brand in the targeted markets. Thus, significant efforts are needed for brand building and promotion.

Horticultural Crops

- 1.119 Saurashtra is at an advantage due to peninsular varied climatic conditions and main horticultural produces are Mango, Chiku, Citrus, Ber, Guava, Onion, Brinjal, Cabbage, Okra and Tomato etc. Fruits and vegetables are mainly exported in two forms viz. fresh and processed (Dried dehydrated, Preserved pulp, Flakes). The potential for growing these crfops will further increase with additional water being made available form Narmada Dam.
- 1.120 Mango and onion are the major export items from the Saurashtra. Saurashtra accounts for the largest share of vegetable export i.e. about 100000 tonnes (CII-Report) and are mainly exported to the Gulf Countries and Bangladesh.

1.121 Mango is the most important fruit crop of Junagadh, Amreli and Bhavnagar. It is seasonal produce and the most prominent market acceptable variety produced in the region is kesar. However, it is shocking to note that out of the total produce of 5 lakh tonnes, only a meagre quantity is exported. Measures should be taken up to increase the export of Kesar mango such as setting up pre cooling units and pack house at the market yards,

Pre harvest management practice

- 1.122 The focus should be on matching the productivity level of China. It will lead to a decrease in the output unit cost that will be beneficial for the processing industry as raw material will be available at a cheaper rate. In order to make a processing unit viable, the raw mango should be available at a rate of Rs. 2-3 /kg.
- 1.123 Volume sales of mangoes are based on presence of the red color, acceptable stage of ripeness for consumption, uniform size grading, uniform stages of ripeness and the absence of disease or damage. The market requirements pertaining to quality of mangoes on arrival are with respect to the following:
 - (a) Physiologically mature;
 - (b) Commencing ripening with 30 to 50% coloration;
 - (c) Significant area of red colour on the fruit shoulders;
 - (d) Relatively firm;
 - (e) Minimum sugar content of 10%;
 - (f) Uniform shape;
 - (g) Free from disease, decay, sunscald, cracks, bruises, latex stains, insect and mechanical damage;
 - (h) Conform to the weight and size specifications;
- 1.124 In order to prevent the spoilage and deterioration of mangoes, the following practices need to be adhered to:
 - (a) Appropriate care of fruit to prevent cutting or bruising during picking or handling;
 - (b) Refrigeration of the fruit to minimise growth of micro-organisms and reduce enzyme activity;
 - (c) Packaging and storage of the fruit to control respiration rate and ripening;
 - (d) Use of preservatives to destroy microorganisms on the fruit.

- 1.125 A principal economic loss occurring during transportation and/or storage of mango is the degradation, which occurs between the field and the ultimate destination due to the effect of physiological respiration. Methods to reduce the levels of such degradation include:
 - (a) Refrigerate the produce to reduce the rate of respiration;
 - (b) Vacuum cooling
 - (c) Keeping the product in an environment having less than 5 percent of oxygen content.

Post – harvest Handling System

- 1.126 Mangoes can be successfully stored for up to three weeks if the recommended harvest maturity, post-harvest handling and storage conditions are employed.
- 1.127 All mangoes to be exported by air should be harvested in the physiologically mature, hard, green condition. Ripe fruits are highly susceptible to bruising and mechanical damage during handling and transport. Immature fruits should not be shipped. For mangoes exported by sea, the optimum stage of harvest maturity is the "half-mature" stage. Fruit should not show any signs of softening or degreening (yellow colour development).
- 1.128 Where possible, mangoes should be harvested by hand from the ground, by snapping the mango from the stem. Fully mature fruit will detach easily, whereas half-mature fruit will not. Where harvesting by hand from the ground is not possible, harvesting implements should be used. Outgrading should be carried out in the held to remove immature, undersized, damaged, bruised, scarred or ripe fruit.
- 1.129 After harvest, latex should be allowed to drain away from the fruit and the fruit placed in plastic field crates. Bags, sacks and buckets are to be avoided as these generally result in mechanical damage and bruising. On arrival in the packing area, the mangoes should be graded for removal of immature, under-sized, damaged, bruised, scarred or ripe fruit. Acceptable fruit should be placed in water for washing to remove debris and latex stains. Mangoes harvested from areas or trees which are known to suffer from anthracnose or for fruit destined for long term storage, treatment is required in a hot water bath (550øC for 5 minutes) containing 0.05% Thiabendazole. This technique shows good control of anthracnose, but generally requires the use of specialized equipment, as temperature control of the water bath is essential for the effectiveness and prevention of fruit damage. After fungicide treatment, the fruit should be allowed to cool and dry in preparation for grading and packing.

Export Grading and Packing

1.130 The fruits should be checked prior to packing to ensure the absence of blemishes, bruises, insect and mechanical damage. Fruits should be graded in each carton according to the variety, size and maturity (firm green full-mature and half-mature fruits will ripen at different rates and should not be packed in the same carton). Net weight requirements are 4 to 5 kg depending on the carton and the market destination.

Packaging

1.131 Mangoes should be packed in single layer one- or two-piece full-telescopic, selflocking flbreboard cartons. Ventilation and handle holes are recommended to provide adequate ventilation and ease of handling. Carton labeling requirements for the individual markets should be followed. A layer of shredded paper in the base of the carton is recommended, as this will assist in cushioning the fruits. Each alternate mango in a carton should be wrapped in a tissue to reduce fruit to fruit rubbing; small identity labels attached to alternate fruit will assist in product presentation.

Post harvest management center

- 1.132 A Pack house⁴ at Junagadh for 50 MT can be established for Rs. 150 lakh.
 - Given the Mango production in Saurashtra is 5, 95,206 tonnes and considering 25% spoilage and 50% domestic consumption, we can expect an increased production of 1,000 MT till 2010-11. This can be achieved through better agronomic practices.
 - In order to handle this amount of produce, atleast 4 pack houses with an investment of Rs. 500 lakh each would be needed. A packhouse consists of the following: (i) sorting & grading line (ii) pre-cooling (iii) cold storage (iv) loading bay. Subsidy can be availed from APEDA. The pack house has to be established in phase wise manner first in Junagarh, then Jamnagar and in the third phase in Amreli.

Source: PwC and Global Agri Analysis

1.133 Chiku production is concentrated in Jamnagar, Amreli and Bhavnagar and varieties grown are Kalipatti and Calcutta round. Guava is the third important fruit and mainly concentrated in Bhavnagar. Here, Allahabad safeda and red guava are grown. Red guava is best suitable for pulp.

⁴ A packhouse consists of the following: (i) sorting & grading line (ii) pre-cooling (iii) cold storage (iv) loading bay

- 1.134 It is has been observed that there is shortage of quality planting material of fruits. Presently, very little of sorting, grading and packaging of fruits and vegetable is done. If these facilities are provided, it will lead to better price realisation for farmer and reduce wastage. There are 19 Cold Storage in Saurashtra, which are used for F&V. The storage acts as a buffer between the market and supply. There is need to improve this infrastructure by setting up specialized pack houses along with cold storage for fruits and vegetables. Based on our current analysis, we feel that the following infrastructure facilities should be developed:
 - (a) Junagadh : Mango and banana (2-3 pack houses)
 - (b) Bhavnagar: Mango, Chiku, pomegranate, citrus (2 pack houses)
 - (c) Amreli and Jamnagar: Mango (one each)
- 1.135 At present there are about 47 food-processing units in Saurashtra and are mostly doing canning and pulping. There is a dehydration unit for vegetable in Bhavanagar.
- 1.136 In this background, Saurashtra offers tremendous potential for promotion of food processing industry. Primarily, there is opportunity for investing in post harvest sector. The post harvest activities are broadly classified into two categories.
 - (a) Primary: Activities such as sorting, grading and packaging facilities and these facilities are negligible in Saurashtra, however, there is existence of co-operative marketing societies, which plays a significant role in the post harvest activities but do not provide any value added service. These facilities can be developed in conjugation with the state and private parties.
 - (b) Secondary: the processing and value addition. These are less than 2 % of total produce where as it is as high as 70 % in developed countries. A food park concept may be considered for the F&V sector and common infrastructure could be developed as common user facilities. Dehydration of vegetables has been growing importance in recent years and has good export market, too.
- 1.137 A food park concept may be considered for the F&V sector and common infrastructure could be developed as common user facilities, like cold storage, sorting grading line and processing units. It can be located at Junagadh in an area of 50 acres. A detailed project report would need to be prepared to determine the cost and associated project contours. The cost of the food park could be upwards of Rs 50 lakhs. A pulp processing plant can be set up in the area which can take up the processing for chiku, guava and mango if available at cheaper rates at a cost of Rs 20 crores. Subsidy can be availed from Ministry of Food Processing, Government of India.

Vegetable crops

1.138 The main vegetables grown in the saurashtra region are onion, garlic, okra, tomato and brinjal.

Onion

- 1.139 Saurashtra region has extensive cultivation of red and white onion. The main varieties cultivated are Agrifound Dark red, Agrifound White and some local varieties. These varieties are of exportable quality.
- 1.140 By and large onion is dried by sun drying technology and does not ensure consistency in hydration level nor guarantee the quality. Exportable variety of onion should be mature, dormant free, free from decay, scallions, free from damage caused by seed stems, splits, tops, roots etc.
- 1.141 There is high competition for export of fresh onion from Nasik. Nasik is able to effectively compete in the export market due to closeness to Mumbai port and thus, has lower transport costs, although the quality of Saurashtra's onion is better. Port facilities can be created at Mahuva and Kandla port.
- 1.142 There is a **considerable scope for increasing the exports of dehydrated onions** from India as the demand is growing at the rate of 7% per annum in E.C. markets India should take advantage of this by strengthening its processing facilities.
- 1.143 Dehydrated (reconstituted diced/minced) onions are used by some fast-food chains for hamburger toppings or ingredients in burritos and similar products. They are also sold in significant quantities to bakers for use in onion bun, roll, and bagel production; and are a primary component of many dehydrated packaged soup and sauce mixes. The competition for dehydrated onion mainly exists from China, Malaysia and Indonesia with respect to price. The landed price in Europe of dehydrated onion from China is much less than that from India as the transportation cost to the far away ports and freight charges are more.
- 1.144 Also, in case the dehydrated onion is kept for a longer period, its colour starts changing. Therefore, ventilated storages are required to be set up at the shipyard.2 such facilities are required to be set up and the cost for setting up one such facility is Rs. 350 lakhs. (Total Rs. 700 lakhs by Government support.)

Post harvest management

- 1.145 The only post-harvest treatment required for the long storage of bulb onions is a thorough curing of the bulbs. Curing is a drying process intended to dry off the necks and outer scale leaves of the bulbs to prevent the loss of moisture and the attack by decay during storage.
- 1.146 Onions after curing are graded manually before they go in to storage or for marketing. Sorting and grading is done after storage also to fetch better price. The outer dry scales usually rub off during the grading process, giving the onions a better appearance for market. It has been experienced that if storage is arranged after proper sorting and grading, losses in storage are reduced.

1.147 For local market, the onions are graded based on their size. These include: Extra large onion (>6 cm dia.), Medium (4-6 cm dia.) and Small (2-4 cm dia.). The extra large onions have great demand and fetch good price.

Packaging

1.148 Packing should be small for easy handling during transit and may vary according to market demand. Onions are packed in jute (hessian) bags for transporting to yard or brought as loose. For safe handling, 40 kg open mesh jute bags having 200-300 g weight should be used in domestic market. For export, common big onions are packed in 5-25 kg size open mesh jute bags. Nylon net bags, when used for packing have resulted in less storage loss because of good ventilation.

Handling

1.149 Bulbs intended for storage must be free from cuts and handled with extreme care. Onions should not be dropped on to non-resilient surface from more than 6 feet height. If onions are to be stacked after packing in store or trucks, the better height is 2-2.5 metres. Losses due to rot is reported to be more if onions are stored in gunny bags than in loose or wooden crates.

Storage

- 1.150 Proper storage of bulbs is necessary both for consumption and also for seed production. Onions should not be stored unless adequately dried either in the field or by artificial means. It is necessary to dry the neck tissue and outer scales until they rustle when handled otherwise the bulbs will rot in storage. In India, the farmers practice different storage methods. The onions are bulk stored in special houses with thatched roof and side walls are made up with bamboo sticks or wire mesh for good air circulation. In North India, the sides are also covered with gunny cloth. Onions are stored in these sheds by spreading them on dry and damp proof floor or racks. Periodical turning of bulbs or removal of rotten, damaged and sprouted bulbs should be done. Well-ventilated improved storage structures with racks or tiers having two or three layers of bulbs would be desirable for proper storage.
- 1.151 The salient features of improved storage structures include:
 - (a) Construction of storage godown on raised platform helps in reduction of moisture and dampness
 - (b) Use of Mangalore tiles roof or other suitable material prevents build up of high temperature inside.
 - (c) Increased centre height and more slope is better for air circulation and preventing humid microclimate inside godown.
 - (d) Bottom ventilation provides free and faster air circulation to avoid formation of hot and humid pockets between the onion layers.

- (e) Avoid direct sunlight on onion bulbs to reduce sunscald, fading of colour and quality deterioration.
- (f) Restriction on width of each stack to 60-70 cm for cool humid weather, 75-90 cm for mild and humid weather and 90-120 cm for mild and dry weather conditions
- (g) Restriction of stacking height to 100 cm for small and multiplier onion and hot weather and 120 cm for mild weather and for big onion to avoid pressure bruising.
- (h) Cubicles should be made instead of continuous stack leaving sufficient space for ventilation from all the sides.
- (i) One cubic metre area of store accommodates about 750 kg onions.

Transport

- 1.152 Onion stocks are transported in bullock carts, tractor trolleys and trucks as also railway wagons are used for longer distance movement within the country. Onions are transported in ventilated ships as well as sailing vessels / motorboats for export to Gulf and South-East Asian countries. It is also shipped in 3.5m containers or 7m containers by loading on ships.
- 1.153 Since it is a low-cost high-volume crop, transport charges are biggest hurdle. Government must compensate the farmers for transport cost as incentive. Further, the paper work should be simplified on priority basis. These would give a boost to the exports.
- 1.154 There are certain other constraints in onion export, which can be overcome by the following:
 - (a) Popularization of improved varieties, quality seed production and distribution, expansion of area in nontraditional pockets and contract production for export
 - (b) There should be expansion in area in early-kharif, kharif and late Kharif crops in particular pockets to maintain sufficient quality on regular basis
 - (c) Taining should be given to farmers in production, post-harvest handling and marketing
 - (d) Attractive eco-friendly consumer packaging should be introduced
 - (e) Electrically ventilated containers for export of yellow onions to European markets
 - (f) Construction of more ventilated storage facilities at shipyards and minimizing the time in loading of product.

Evaluation & Intervention – Common

Contract Farming

- 1.155 Private sector participation in Indian Agriculture is imperative so as to provide much needed impetus for growth. Viewed in this context, contract farming in India⁵ is essential so as to promote rural self-reliance in general by pooling local available resources and expertise to meet new challenges. It will also reduce migration from rural to urban areas and promote processing and value addition.
- 1.156 Challenges in implementing contract farming are many as success stories in a classical mould are few. However, one can not deny the accomplishments of a range of Indian contract farming models in India viz. Amul, NDDB, the Maharashtra sugarcane co-ops, the rapid spread of poultry projects etc. In fact, true success and rapid spread will come with deep-seated changes in mindset and policy reforms. There is, therefore, need to enact laws of contract farming to facilitate activity between Corporates and farmers. This is needed along with strengthening the overall legal framework concerning agriculture. The land holdings have gone down. The challenge for the nation lies in deriving direct benefit from R & D, scientific and technological innovations, and knowledge, infrastructure created by agriculture scientists and corporate houses by creating co-operation of a large number of growers to achieve economies of scale. Diversification in agriculture to fisheries, horticulture, poultry are very important and hence contract farming need be promoted to achieve volumes, value addition and marketing by way of linkages between growers and organized sector.
- 1.157 Participation of private sector is crucial. It would use better technologies and improve marketability of agricultural produce. In order to encourage this activity, Govt. fiscal support is a must as mentioned below.
 - (a) Food processors involved in contract farming be exempted from all taxes.
 - (b) However, they should be encouraged and induced to invest in lieu in rural infrastructure and farmer's upliftment to the extent of tax exempted.
 - (c) No taxes or duties on import of agriculture equipment be levied.
 - (d) Abolish all fees, taxes, cess, duties, levy on procurement effected by a registered contract-farming programme.

⁵ All processable and exportable crops can be promoted through contract farming in Saurashtra. These include: vegetables, spices, peanuts, castor and cotton amongst others.

- 1.158 In order to ensure success of the concept not only contract farming be made legal with adequate institutional arrangement with forward & backward linkages to enable small farmers to participate in it. The contracts should be transparent & participatory and adequate bank finance for small and marginal farmers be ensured. There should be contract farmers associations or cooperatives to safe guard their interest, which should ensure sustainability of contract & higher income to farmers on stable basis.
- 1.159 Above all, strong & adequate infrastructure facilities are provided to farmers and land use planning be suitably taken care of. Last but not the least; it may be stressed that the contract farming could prove counter productive, unless organized markets exist. In any case the contract farming approach had considerable potential in the light of preponderance of small and marginal farmers who can no larger be competitive without access to modern technology & support.

A Case Study of contract farming on onion

Contract farming for onion was introduced in Halvad Taluka of Surendranagar district and Mahuva Taluka of Bhavnagar district. Contract farming may reduce the risk of non-availability of quality materials for the company, and also provides assured market and price for the farmers, protecting them from volatile prices. The case study focuses on the following:

- To estimate the cost and returns from contract vis-à-vis non-contract farming in onion cultivation.
- To compare the resource-use efficiency in onion production in both the group.
- To examine the effect of contract farming on price, production and income from the onion cultivation.

On analysing the contract vs non-contract farming, the following findings emerged:

- The average total cost of cultivation (Cost C2) per hectare of onion cultivation was about Rs. 58,000/- and Rs. 60,000/- for contract farmers and non-contract farmers, respectively.
- Paid cost accounted for 63 and 64 per cent of the total cost in case of contract and non-contract farmers, respectively
- Human labour, seed and irrigation charges were found the major components of cost of cultivation in both the groups of onion growers.
- Though the difference in onion yield and labour productivity between two groups of both the talukas was marginal, the contract farmers enjoyed the benefits of higher price, net income and reduction in unit cost of production
- The contract farmers of Halvad Taluka did not incur marketing cost at all, whereas their counterpart incurred a total marketing cost of Rs. 13.89 per quintal/
- About two-thirds of the contract farmers of Halvad Taluka fixed the onion price before sowing and 15 days after sowing, while less than 50% contract farmers of Mahuva Taluka fixed the onion price just 15 days before harvesting.

	Contract	Non-contract
Cost of cultivation	Rs. 58,000	Rs. 60,000
Paid cost	63 %	64 %
Marketing cost	Nil	Rs. 13.89/quintal
Price range	Fixed	Fluctuating according to market trends

Rationalisation of Market Fees

- 1.160 Analyses of market fees levied in states indicate that they are not only varied but also do not bear any relationship with the quality of service or efficiency of market operations. The present system of levy of fee at multiple points for the same commodity at different stages of transaction needs to be replaced, by single point levy of market fee in the entire process of marketing in the state. Further, collection of market fee should be more in the nature of service charge based on the quality services provided. The levy charges can be of different slabs inconsonance with the type of scale of services/facilities provided to all market users. There is also considerable variation in the structure of taxes and fees on the agricultural produce in various states, which distorts the operations of the domestic market. There is need for bringing uniformity in the state level tax structure in agricultural commodities for improving the marketing efficiencies.
- 1.161 In this connection, we would like to make certain concrete suggestions in this regard, including:
 - (a) Cess should be collected only for the transactions done within the market premises and that too only if service is rendered.
 - (b) For sales done in the Bazaar where traders procure goods by self-effort and sell in their shops, cess should not be charges.
 - (c) Where there is no service by the market committee, there is no justification for charged cess.
- 1.162 Considering the facts and circumstances mentioned above, it would be important to review the matter and consider it on an urgent basis ensuring that due justice and fair deal is done to Saurashtra in the resolution of the above problems.

Reorientation of training & extension systems

1.163 With the globalisation & liberalisation of markets, agricultural marketing is under going tremendous transformation. This underlines the paramount need for agriculture being made market driven, cost effective, competitive, innovative & responsive to high tech & IT applications. Major areas are extension and training in marketing, land reforms, grading and standardization, packaging, pledge financing, transportation, forward & future market, commodity exchange agribusiness, direct marketing, contract farming, storage & cold chain, warehousing, market infrastructure, quality certification & WTO & its implications. All these major areas will have to be oriented for beneficiaries so that necessary capacity could be built up for major operations in local language. The underlying objective should be to promote good farming practices in the larger interest of farmers as well as consumers. Privatisation of extension services in the form of tailor made packages with adequate financial support is necessary so as to cope up with the limited reach of public extension services. Ministry of Agriculture, in association with NABARD, has recently launched a unique programme to take improved methods of farming to each & every farmer across the country with the assistance of agricultural graduates. Even agri-clinics and agri-business centres would provide 'paid for services' for enhancement of agricultural production and income of farmers.

Production and quality enhancement programme

- 1.164 Production planning should be as per market requirement i.e. quantity, quality, timing and for location demand. It is therefore necessary that farmers are oriented to produce as per market requirements. Data on arrival quantities of various agricultural/horticultural produce in markets traditionally being catered be collected, analysed for wholesale prices of an individual item, and based on this data early and late production be planned for each item. However, whereever it is possible to store the item, the same is stored and withdrawn for sale as requirement and remunerative returns.
- 1.165 Further, institutional intervention is required to popularize the adoption of modern production techniques including introduction of high yielding varieties, adequate use of chemical fertilisers and optimum application of irrigation etc. Similarly, introduction of new market oriented crops like; malt grade barley, maize etc can be achieved through facilitating R&D interface of farmers and processors.

Demonstration

- 1.166 The Department of Agriculture, GOI is already carrying out the demonstrations on production techniques of high yielding varieties, IPM, INM and crop management practices etc. It is suggested that demonstrations are the most effective system of technology transfer and, as such, these programmes may be further intensified encompassing the following components-
 - (a) Introduction of high yielding varieties released by the SAU/R & D Institutions in the state. Demonstrate that the yield of these varieties is higher as compared to local varieties.

- (b) Farmers may be trained at these demonstration centres by showing crop management practices at critical stages crop production.
- (c) Integrated pest management to control pests and diseases with using bio-pesticides.
- (d) Fertilizer usage, particularly split dosage and importance of organic manure.
- (e) Intercultural operations, preferably by demonstrating use of mechanical farm equipment and machinery.
- (f) Modern irrigation systems and water conservation techniques.

Training

- 1.167 Training is one of the most important activities and it should be organised in consultation with the private sector/ cooperative sectors, universities and potential buyers. The training be organised in such a manner that its ultimate aim should be to grow products as per market requirement in terms of quantity and quality. The farmer's identification should be strictly based on the guideline developed by the joint exercise of programme implementing agency and potential buyers. Training includes; crop identification, aim and approach of contract farming, importance of organic farming, judicious use of agro inputs and seeds, post harvest handling, stage of harvesting, segregation and grading as per requirement of the market.
- 1.168 A separate training programme be organised for up gradation of the knowledge and skills of extension workers so that they can further train the selected farmer.
- 1.169 The extension network is already in existence; therefore, it will not require investment into human resource and infrastructure. Rs.10000 per farmer for 6 days training for 1000 farmers per district. Subsidy is available from the Ministry of Agriculture, Governemnt of India.

Nursery

1.170 Nursery is the foundation for development and production of horticulture crops in the region. The availability of quality true-to-type healthy planting material increases productivity as well as quality of produce in fruit and vegetable crops. The state should encourage setting up of nurseries by the private entrepreneurs/cooperatives for production of planting material/seedlings for major horticultural crops at different locations in the region. Persons engaged in nursery production are trained and regular inspection and advice be given to them during nursery growing period for a crop.

Fruit Nursery

- 1.171 Modernization of nurseries in the Government Sector, for multiplication of quality planting material of the fruit crops identified for area expansion, needs to be undertaken. It is suggested that the nursery at a district level (with a 500 m² poly house and other infrastructure) be established or existing ones be modernized. These nurseries should produce high quality planting material; maintain mother plants and infrastructure for bud wood and production of disease free young grafts.
- 1.172 One fruit nursery is proposed to be established in the region. The cost of modernization of fruit nursery will come to Rs. 90 lakhs.

Vegetable Nursery

- 1.173 A modern seedling unit for supply of seedlings of vegetables to the farmers is an absolute necessity. At present farmers produce vegetable seedlings of their own in open fields. There are problems of seed germination and spread of diseases to seedlings. By using sterilized, green houses i.e. plug technology, disease free seedlings will be produced and supplied to the farmers. With this technique, vegetable seedlings will be supplied to the farmers in the early or late season to help take advantage of off-season requirements of different markets.
- 1.174 The Ministry of Agriculture, Government of India has schemes for nursery modernization under which a subsidy is given for modernization of nurseries in private/cooperative/public sectors.
- 1.175 For planting material for production of vegetables the nursery can be set up in Mahuva area of Bhavnagar, Rajkot & Junagarh. The cost will come to Rs. 100 lakhs. Nursery will be set up with 25 % support from the government.

Market oriented approach for production

- 1.176 The present crops and varieties are not oriented towards the market requirement and the changing processing / consumption patterns. There is need to a give fresh look by adopting new crops and varieties. Some of the suggestions for market oriented production are as follows-
 - (a) In Guava, there is need to introduce processing varieties having pink flash, good juice content and less seeds.
 - (b) Cultivation of vegetables in accordance with demand in the near by big cities and overseas markets like gulf countries should be encouraged.

Post harvest treatment, packaging and storage

- 1.177 Post harvest losses in fruits and vegetables are very high; some times they are as high as 40 percent. About 10-15 percent fresh fruits and vegetables shrivel and spoil before it reaches the consumer, lowering the market value and acceptance by the consumer.
- 1.178 To understand and appreciate the need of infrastructure for post harvest handling of horticultural crops one should understand the present post harvest scenario under which produce is handled in the region.
 - (a) Harvesting at improper maturity increases post harvest and storage disorders and reducing the eatable quality and quantity.
 - (b) Use of improper harvesting gadgets and keeping products in unhygienic field conditions increases the contamination.
 - (c) Harvesting during high temperature hours of the day.
 - (d) Rough handling, dropping or throwing produce, fingernail punctures.
 - (e) Over packing.
 - (f) Exposure to direct sunlight for longer duration after harvest.
 - (g) Improper sorting, washing/cleaning, sanitation, and excessive trimming.
 - (h) Use of rough packing containers or wooden boxes, containers without ventilation, over stacking during interim storage period and over loading of containers during transportation.
 - (i) Lack of any cooling system during packing, transport, storage and transportation of produce.

Post-harvest management

1.179 Modernization of nurseries in the Government Sector, for multiplication of quality planting material of the fruit crops identified for area expansion, needs to be undertaken. It is suggested that the nursery at a district level (with a 500 m2 poly house and other infrastructure) be established or existing ones be modernized. These nurseries should produce high quality planting material; maintain mother

Collection centre/Pack houses

1.180 Setting up of Collection and Sorting/Grading Centres for fruit and vegetable items, may be for group of items or an item specific only. Each Centre may have facilities to handle at least 10 MT of vegetables or 50 MT of fruit or both per day. It is estimated that each of these Centres would require an investment of around Rs.15 Lakhs. Growers should contribute funds in form of shares/equity for establishment of the infrastructure and manage the same by employing professional and skilled staff. State may help in obtaining loan from financial institutions

Development of Rural godowns & cold stores

- 1.181 In order to ensure optimum utilisation of agricultural crops as also fruits and vegetables and reduce waste to the minimum so as to ensure enhancement of income of the farmers, it is highly essential to strengthen cold chain and other infrastructure and to examine the feasibility of introduction of irradiation system on semi perishable produce. Since cold storages become prohibitively costly due to high cost of electricity and other taxes and duties, suitable subsidy be given to such activity so as to promote investment in such cold storages. Storage infrastructure is found necessary for carrying the agricultural produce from production to consuming periods.
- 1.182 Saurashtra needs much more storage facility than what is available now. This is especially more important for hilly and remote areas in area of the region. The private sector needs to be encouraged to participate in enter the storage and warehousing activity and make investments of high magnitude. Village Panchayats, cooperatives, SHGs and farmers organizations may be encouraged for undertaking warehousing. However, we recognize the relevance and utility of cool chains and therefore support the government programme of end used subsidies for cold storages. Cold storages are most important infrastructural need for perishable and semi perishable commodities, which need an immediate attention. In future, there would be a need for multi-chamber type of cold storage units for various entrepreneurs; there is a need in the country. For encouraging private entrepreneurs there is a need to provide incentives to make the units viable for some initial years. There are requirement of reefer containers / vans for transport of perishable items for domestic and export marketing. At present their availability in the Saurashtra is negligible considering the present production of perishable commodities. Private, cooperative and joint ventures should create this. There is a need to encourage the investors in the area by providing suitable incentives. The Govt's role in the matter should be positive, constructive & facilitative to induce private sector participation.

Bio-diesel oppurtunity

1.183 Govt of India has announced bio-diesel policy. Blending of diesel upto5% and will be increased to 20% eventually. Purchase price at Rs. 25 per liter that translates into Rs. 8 per kg of seeds of Jatropha and at 3MT per acre into Rs. 24,000 per annum. Kandla in Gujarat is one of the purchase centers.Jatropha is one of the best sources for bio-diesel and can be grown in marginal and wastelands. Saurashtra climate is ideal for cultivation. Requires only about 5 life saving irrigations @ 15-25 liters per plant. Eligible for carbon credit. Many corporate willing to invest in plantation, contract farming and esterification plants (1 lac MT per annum project will attract Rs. 450 crores for plantation and esterification unit).

Policy on High-tech project

1.184 Explicit policy on protected cultivation of horticulture and floriculture crops, nurseries, tissue culture labs as an 'Agriculture Activity' covering: Pollution, Irrigation, Electricity at agricultural rates, Non-applicability of Factories Act, Non agriculture tax exemption by revenue department, Will mitigate procedural delays and afford benefit of lower costs; Maharashtra has issued such notification in 2002.

Agricultural Marketing Sector

- 1.185 It is significant that Agriculture continues to occupy pivotal position in the Saurashtra economy in as much as it continues to be main stay of life for majority of population. The structural transformation that has taken place in Agriculture has inevitably led to organisation of forward and backward linkages. Income and employment in the farming sector will come about only if the prevailing mismatch between production and post harvest technology, value addition by processing of agro-product and the whole range of agri-business is set right through modernization of agricultural marketing by adoption of reforms in this sector.
- 1.186 Although Saurashtra produces about one third of fruits and vegetables of Gujarat, yet hardly (1-2%) it is processed whereas in industrialised countries 70% of produce is processed. Despite appreciable increase in food production, the benefit of added volume is not available to the farmers due to negligible processing in this sector, Keeping in view the tremendous scope in this direction and decrease in agricultural income highlighted the paramount need for promoting agro-based industries in the rural areas by offering attractive fiscal & financial incentives in the form of investment and employment incentives. In short, what we should aim at is sustainable growth of agriculture through technologically, environmentally, economically & socially.
- 1.187 Above all, an efficient agricultural marketing system is vital to provide incentive to farmer to produce more and attain higher productivity, to adjust production planning according to changing production needs of the economy and faster competition among the traders and eliminate the exploitation of farmers particularly small & marginal ones and thereby improve their income & living standards and enhance competitiveness of our agri and horticultural products in world markets.

1.188 Considering that APMC rules are decades old, it is important to examine and review the regulatory framework, while preparing zone level development plan for a particular segment of the sector. On one hand, regulations can give support to the development and protect existing operators, while on other hand it can be detrimental for the fast and free development of this segment, if the rules and regulations are not flexible and changing with the needs of the segment. Regulations should not become barriers or speed-breakers for the growth of particular sector and they should not unduly complicate the process and delay in developmental activities.

Amendment of APMA (Regulation)

- 1.189 In the emerging context, the APMC Act has become out dated and hence requires to be amended urgently to make farmers competitive and enable purchasers to purchase commodities directly from the farmers. Unless the marketing structure at grass root level is strengthened, the well being of the farmers cannot be improved. The condition of present markets is very poor in terms of price discovery mechanism, infrastructure, hygiene and material handling resulting in non-transparency and high value loss. We believe that involvement of stakeholders in building market infrastructure will help in introducing transparency in marketing chain. This will also help in information flows and farmers to get market signals.
- 1.190 Govt of India has prepared a Model Act, which inter alia, provides for private markets, contract farming and direct purchase from farmers by the processors etc. The adoption of this Act by Gujarat will facilitate the improvement of marketing systems and infrastructure within the state..
- 1.191 It has to be realised that the 'Systems' and 'Acts' for agriculture marketing have been developed a century ago under planned marketing system. However, such an old system is not in tune with the present scenario of WTO and liberalisation. Besides, it has failed to improve farmer's income due to less use of improved technology and methods. Even today the traders have to undergo 28 legal Acts including Essential Commodities Act and APMC Act. Viewed in this context, it is essential to remove Essential Commodities Act and review other 27 Acts so as to facilitate free trade.
- 1.192 Also, it is of utmost importance to encourage quality-verifying laboratories by Govt. and private agencies and agriculture markets to meet with requirements of globalization.
- 1.193 In addition to the above, the following measures are also required to be taken viz. private & cooperative sectors be enabled to establish & operate agricultural marketing infrastructure to facilitate direct marketing of agricultural commodities from producing areas & farmers fields, to permit contract farming programmes by processing or marketing firms, simplification & rationalization of market fees and introduction of single point levy for products traded in the market, boost market infrastructure development projects, deregulation of areas where new market will be set up, allocation of suitable land for market with necessary suitable land for market with necessary approval & infrastructure facilities, long term capital for initial capital investment etc.

Direct Marketing

- 1.194 There is no denying the fact that direct marketing encourages farmers to undertake grading of farm produce at the farm level and obviates the necessity to haul produce to regulated market for sale. Direct marketing enables farmers and processors and other bulk buyers to economise on transportation cost and to considerably improve price realization. In South Korea, for instance, as a consequence of expansion of direct marketing of agricultural products, consumer prices declined by 20 to 30 % and producer-received prices rose by 10 to 20 %. This also provided incentive to large-scale marketing companies to increase their purchases directly from producing areas.
- 1.195 Direct marketing enables farmers to meet the specific requirements of wholesalers from the farmers' inventory of graded produce and of retail consumers based on consumers' preferences, thus enabling farmers to dynamically take advantage of favourable prices and improve their net margin. Direct marketing enables farmers and buyers to economise on transportation costs and to improve price realization considerably. The promotion of direct marketing is suggested as one of the alternative marketing structure that sustains incentives for quality and enhanced productivity; reduce distribution losses, improving farmer incomes with improved technology support and methods. The market will operate outside the purview of the Agricultural Produce Marketing Act and will be owned and managed by professional agencies in private, cooperative sector, wholesalers, trade associations and other investors. The government's role should be that of a facilitator rather than that of having control over the management of the markets.
- 1.196 Direct Marketing by farmers to the consumers was experimented in Punjab and Haryana with certain improvements. The concept also got popularized in A.P & Tamil Nadu. Considering, the vastness of the country, more and more such markets need to come up in organised sector with private investment so that they can be developed in tune with market requirements with farmers participation in backward and forward linkages. For example, a modern market set up by NDDB at Bangalore has adopted most advanced system of auction (clock based auction system), material handling and storage and other facilities like ripening chamber, cold stores etc. The market has also promoted growers co-operatives in production belts not only in Karnataka but also in far-flung areas like Agra and Nasik (to source potatoes and onion). The growers are given comprehensive training not only for crop production but also for post harvest operations like grading, handling and transport.
- 1.197 There is a need for preparation of common code of conduct and modalities with regard to ownership, operation and need based infrastructure and the farmers circulate the same widely to spread the concept of direct marketing. In order to facilitate direct marketing concept, it is essential and desirable that concept of mega markets for Agriculture should be encouraged.
- 1.198 An efficient agricultural marketing is essential for the development of the agricultural sector; in as much as it provides outlets and incentives for increased production, the marketing system contributes greatly to the commercialisation of subsistence farmers.

Modernisation and developments of existing markets

- 1.199 On Line Future Trading: As Saurashtra is rapidly moving from shortages to surpluses in respect of agricultural commodities, etc., it is highly essential and desirable that necessary online linkages with NCDEX/Bombay Commodity Exchange and with other commodity exchanges in the country be facilitated through provision of incentives and facilities. Such a measure will go a long way in ensuring regular availability of commodities to industries at reasonable prices with benefit to the farmers and the consumers. Even the State Govt. be advised to provide relief in stamp duty for such transactions. Since the working of futures trading on healthy lines is in the larger interest concerned and online trading will give tremendous boost to it. Additionally, it is utmost essential to introduce forward contract and certified godowns system with development of negotiable instruments to have easy access to credit.
- 1.200 Forward & Futures Markets: In the light of the perceived advantages from forward and futures markets in terms of price discovery and risk management, as market based instruments, such markets have been identified as important tools of price stabilization. Extension of forward and future markets to all major agro commodities has, therefore, assumed great importance. Only if the markets are allowed to function under proper regulatory environment, the agricultural economy - one of the largest in the world - can fully exploit the benefits of markets in the state, country and abroad. Commodity futures trading in the country also suffers from a number of their limitations viz limited membership of exchanges, essence of many hedgers who have substantial underlying positions, absence of transparency, limitation of prudential regulation and absence of a legal frame wok for warehouse receipt system with full negotiability & transferability. Concerted efforts, therefore, need to be made to expand the scope of futures trading, along with general economic reforms. Efforts have to be made for increasing the number of commodities permitted for futures trading. It is needless to stress that the system of warehouse receipts needs to be universalized in futures trading for enhancing trade volumes and in minimizing transaction costs. Warehousing Receipts should act as good evidence of the receipt for goods and the terms of the contract and storage proof for their quality and condition, or "apparent order and condition". Warehousing receipts (WHR) would go a long way in achieving these objectives apart from covering quality risk, which is an important risk component of commodity futures trading. If quality risk is not covered price risk management by means of futures contracts have limited meaning and could have only notional success. Legal framework for making warehouse receipt transferable and negotiable has to be strengthened in making negotiable warehouse system. Gujarat Govt has to be proactive and invite private sector as well as NCDEX etc. and give support through State Warehousing Corp. to introduce warehouse management to meet specific requirements.

Establishment and Regulation for Controlling Marketing System

- 1.201 Gujarat State Agricultural Produce Marketing (Regulation) Act may be amended so as to allow private and/or cooperative sectors to establish infrastructure for Market Yards and manage providing services required by the market users. Government of Karnataka has already amended the Act and allowed National Dairy Development Board, Anand to establish Fruit and Vegetable Wholesale Market in the state.
- 1.202 Amend the existing Regulation Act so as to allow Corporate or Cooperative sector to have agreements with growers for contract farming and direct procurement of agricultural produce for processing or export in domestic and overseas markets.
- 1.203 All those Market Yards or Sub-market Yards under APMCs, who are unable to collect or generate revenues adequate enough to manage their markets, may be given on contract to professional agencies. Such efforts have already been initiated by the governments in Rajasthan and Jharkhand.

Promotion of pledge financing & marketing credit

1.204 The credit flow to the rural sector still remains riddled with problems and the government is trying ways and means to make it more farmers friendly. Experts feel that there is an urgent need for revamping the institutional set-up. Bank loans to the farmers are at much higher rates of interest than those for housing, transport and purchase of car and consumer durable. Majority of the farmers are unable to access credit from institutional agencies and depend upon local moneylenders who charge much higher rates of interest. It is pleaded that the Indian farmer cannot have access to global markets by making their produces cheaper in a situation of high interest rates. It is also stressed that biotechnology sector needs not just credit support but venture capital as well. Therefore, the focus should be on a combination of measures, such as encouraging group loans, providing tractors for custom hiring, encouraging state agro-industries corporations to acquire tractors and combine harvesters for custom hiring and providing loans for tractors and power tillers to rural youth under self employment schemes.

Promoting of Information Technology

1.205 Market information is needed by farmers in planning production and marketing, and is equally required by other market participants in arriving at optimal trading decisions. The existence and dissemination of complete and accurate marketing information is the key to achieving both operational and pricing efficiency in the marketing system and IT has an important role to play in the process.

- 1.206 There are several areas of agricultural marketing with which farmers need to be fully familiarized in order to improve price realization. Promotion of nationally and internationally acceptable standards of grading and standardization, packing and labelling, storage and warehousing and sanitary and phyto-sanitary measures and quality certification in farm sector will enable trade and processing sector to undertake large scale agricultural marketing operations in domestic as well as international markets. Once the farm produce is standardized and labelled, backed by quality certification, it can be directly offered for sale in national and international markets. Besides, decisions taken directly affecting marketing by concerned departments be made public through press as well as on website and internet.
- 1.207 Moreover, a detailed atlas on agricultural markets in English, Hindi and Gujarati be prepared and widely circulated in rural areas. Market information network be strengthened and with that end in view there is urgent need for introduction of kisan T.V. Channel. Even facility of electronic trading or E-commerce should be provided and private sector be encouraged and induced for improved of the infrastructural in the market yard. In addition to above, with liberalisation of trade and removal of barriers to trade, efforts will have to be made to meet and apply sanitary and Phytosanitary standards to enhance market access and need of domestic consumers.

Other recommendations

- 1.208 Based on facts, figures and observing field conditions, following measures and establishment of infrastructure are suggested for horticulture sector.
 - (a) Organisation of Fruit and Vegetables Growers' Associations in the main production belts for collective marketing.
 - (b) Introduction of new value added crops like Jatropha can be done in the region which is suitable for the region and has high potential for the future. In addition, an integrated Jatropha plant should also be set up so as to generate an alternative fuel.

Impact of Sardar Sarovar Project (SSP)

- Total area under commercial crops in Saurashtra = 3686350 ha. Out of this, 10 % area⁶ will be benefited with the impact of the SSP.
- Total cost of cultivation for 10 % area= Rs 516 crores annually
- Cost of cultivation per ha = Rs. 25,000 annually
- In Saurastra, out of total cultivation cost, 20% is the approximate cost of irrigation i.e. out of Rs. 25,000, cost on irrigation is Rs. 5,000
- Normally irrigation cost is 5% i.e. Rs. 1,250
- Cost difference = Rs. 3,750

⁶ As per the Project, 9% of Saurashtra's area would be covered. Additional area coverage is assumed at 1%.
By implementation of SSP, the potential savings can be Rs. 3750* 368635= Rs. 138 crores per annum
Proper irrigation will also help in productivity enhancement⁷ that will generate additional revenue of Rs. 165 crores per annum.
Total potential benefits from SSP = Rs. 300 crores per annum (approximately)

1.209 In addition to the above, we recommend the following additional interventions:

- (a) In order to ensure optimum utilisation of agricultural crops as also fruits and vegetables and reduce waste to the minimum so as to ensure enhancement of income of the farmers, it is highly essential to strengthen cold chain and other infrastructure. Accordingly a Irradiation center should be developed at Rajkot / Bhavnagar.
- (b) Set up a Terminal market at Rajkot so as to facilitate the local agri business and also inter district trading.
- (c) Establish a fruit and vegetable market at Bhavnagar so as to provide a good avenue for setting up businesses in the concered area. It will provide a platform for local businessmen to undertake their trade.
- (d) Bulk storage, fumigation and dedicated berth at Kandla

⁷ The main problem in Saurahtra region is of irrigation. The Productivity of all the commercial crops is expected to increase by 20 to 30 % with proper irrigation facilities.

Marine⁸

Overview

- 1.210 Gujarat is endowed with a wide range of marine and inland aquatic resources. The state has a long coastline extending to 1600 km, a continental shelf area⁹ of 0.18 million km², Exclusive Economic Zone (EEZ)¹⁰ of 0.214 million km², rivers and tributaries extending to 3865 km, reservoirs with 0.286 million ha, ponds and tanks of 0.071 million ha and brackish water area of 0.376 million ha. Gujarat occupies 32% of the continental shelf area and 10% of the total EEZ of India. Fishing industry, which has grown substantially in the last four decades with the continuous intensification of fishing effort, contributes significantly to the economic, social and nutritional well being of the people of Gujarat.
- 1.211 The fishery industry in Gujarat plays an important role in economy of the state and **gives livelihood to about 4.50 lakh fishermen or 7.53% of the total fishermen population in India**. However, the proportion of active fishermen in Gujarat is 10.88% of the total active fishermen in the country. Exhibit 45 gives details about the fisheries sector in Gujarat vis-à-vis India.

S. No.	Item	Gujarat	India	% Share of Gujarat
1.	Area sq. km.	196	3287	5.96
2.	Fishermen Population			
	Marine Fishermen	2.75		
	Inland	1.74		
	Total	4.49	59.59	7.53
	Active Fishermen	1.57	14.43	10.88

Exhibit 45: Fisheries at a glance in Gujarat and India

⁸ Most of the facilities and activities of the fishery sector are largely located in Saurashtra. Even though, in the review, the reference is to Gujarat as a state, the marine activities primarily relate to Saurashtra.

⁹ Beyond the terrestrial boundary of the country into the sea, the extension of the land mass is the continental shelf. In general, on the East Coast of the Bay of Bengal, the continental shelf is very narrow. In fact, after a few km, there is a sudden drop to the depth. Gujarat coast is unique with the land of the country under the sea extending upto 1.64 lakh sq. km area with a negotiable depth of around 40 meters. With the land –water interaction, the productivity of the shelf is higher than in the deep-sea area.

¹⁰ In the Malta Conference in 1976, all countries had agreed on defining the Exclusive Economic Zone (EEZ) as the area upto 200 nautical miles from their coasts. India also has a separate EEZ for Andaman & Nicobar Islands.

S. No.	Item	Gujarat	India	% Share of
				Gujarat
	Fishing Gears/ Nets	14.27		
3.	No. of Landing Centres			
	Marine	190		
	Inland	613		
	Estuarine	78		
	Total	881		
4.	Continental shelf area lakh sq.km.	1.64	5.06	32.41
5.	Exclusive Economic Zone (EEZ), lakh sq. km.	2.14	20.20	10.59
6.	Length of rivers and tributaries km.	3865	171334	2.26
7.	Area of reservoirs, lakh hectare	2.43	20.50	11.85
8.	Area of ponds and tanks, lakh hectare	0.71	28.55	2.49
9.	Area of Brackish water, lakh hectare	3.76	14.22	26.44
10.	Potential area of Brackish water, lakh hectare	1.87	8.67	21.57
11.	No. of Fishing Boats			
	Traditional Boats	12653	191207	6.62
	Motorised (out of Traditional)	4283	31726	13.50
	Mechanized Boats	8356	46968	17.79
	Total Boats	21018	238125	8.83

(Source: Gujarat Fisheries Statistics 1999-2000)

- 1.212 **Total fish production** from the state increased from 0.079 million MT in 1960-61 to 0.74 million MT in 1999-2000 and **constituted 13.08% of the national production**. Marine fish production increased during this period from 0.079 million MT to 0.67 million MT and inland fish production from a zero base to 0.07 million MT in the corresponding period. **Gujarat's contribution in fish production is the third largest in India**, after that of West Bengal and Kerala **and second largest in marine fish production** after Kerala.
- 1.213 Of the total fish production in Gujarat, **marine sector contributes over 90% of the catch**. Gujarat's share in the total fish production has been fluctuating in volume terms and has come down in value terms in the last decade. The main reason could be the declining fish catch and quality of catch. It is reported that 35% of the catch in the marine sector is low value miscellaneous fish. Junagadh district contributes the bulk of the marine landings, followed by Valsad, Jamnagar, Amreli, Kutch, Bhavanagar, Rajkot, Surat, Baruch and Kheda. The Saurashtra coast between the Gulf of Kutch and Gulf of Cambay, presents unique oceanographic features and is endowed with a wide variety of highly relished table fishes.

Centre	2000 - 01
Veraval	174791
Porbandar	55885
Mangrol	36736
Jaffrabad	43838
Jakhao	47964
Dwarka	15889
Port Okha	31506
Rajpara	18623
Navabandar	21745
Umarsadi	13490
Others	169407
Total	629874

Exhibit 46: Contribution of major landing centres to marine fish production (MT) in Gujarat

- 1.214 In the inland sector, Indian major carps contribute about 65% of the catch followed by freshwater prawns (11%) and miscellaneous fish (24%). Reservoirs contribute 50.4% of the catch, followed by rivers (26.9%), estuaries (13.4%) and lakes (10.5%). The bulk of the inland catch is derived from Surat, Jamnagar, Bharuch, Ahmedabad, Vadodara and Valsad districts. Freshwater prawns are mostly derived from Surendranagar, followed by Sabarkantha, Kheda, Ahmedabad, Valsad and Vadodara.
- 1.215 There are about 692 fish landing centres in the inland sector. The fish landings from inland sector have grown from 14,167 MT in 1971-72 reached a peak of 80,000 MT in 1998-99 and have declined to 50,844 MT in 2001-02.

Mapping of value chain

- 1.216 During the year 2000-01, 12734 MT of fish was utilised as fresh fish. 18985 MT of dried fish, 4061 MT of fish meal, 1427 MT of fish manure and 28 MT of fins and maws were produced in the state. The bulk of the fish landed in Gujarat state is sold in Mumbai.
- 1.217 In the early sixties, local consumption was hardly 4-7%. However, the scenario has since changed and presently **local consumption state has gone up to about 60%**. The **per capita consumption within the state has doubled** after the nineties, and has touched 10.58 kg per year during 1999-2000. The estimated value of the catch and the average landed price of the catch are given in Exhibit 47.

Year	Value	Average landed price
	(Rs. In million)	(Rs. / kg)
1960-61	17.58	0.22
1970-71	78.07	0.52
1980-81	571.29	2.61
1990-91	3108.87	6.21
1997-98	10258.40	14.61

Exhibit 47: Estimated value of marine fish production in Gujarat

- 1.218 With a lack of value-addition in Gujarat, the present average value realization is only Rs. 50/- per Kg of fish as compared to Rs. 110/- per Kg at Mumbai, Rs. 150/- per Kg at Kochi and Rs. 400/- per Kg at Vishakapattnam.¹¹
- 1.219 The composition of exports has also undergone considerable changes in Gujarat. Exports started with dried fish¹² during the sixties. High value shrimp dominated the exports in the mid-seventies, eighties and till mid-nineties. From mid-nineties onwards, the trend started changing and low value fish, squid and cuttlefish started dominating the exports. Over the last one decade, shrimp and other crustaceans showed a downward trend and there has been a reduction to the extent of about 50% at the end of the decade. Squid and cuttlefish showed an increase of about 30%. Frozen fish registered a 50% increase till 1996-97, and 30% thereafter. The dried items showed a considerable increase in 2000-01 and surimi entered the trade only in 1999-2000.
- 1.220 The marine products export seems to have revived in Gujarat during the fiscal year 2001-02 during which the state exported 1,32,175 MT of marine products, valued at Rs. 6257.20 million. The state's performance was at low during 1998-99 (70,432 MT valued at Rs.3674.5 million) and 1999-2000 (74,619 MT valued at Rs. 3893.8 million). Exports improved in 2000-2001, when the state exported 1,24,159 MT valued at Rs. 6156.5 million. The performance in the year 2001-02 has been the highest in terms of quantity-wise, but value-wise it was only next to that of 1997-98 (Rs. 6378.5 million).

¹¹ Primary interactions

¹² These included Bombay duck, golden anchovy, ribbonfish, shrimp, jewfish, threadfin bream, sharks and rays, and fish maws.

- 1.221 Commodities exported from Gujarat during 2001-02 consisted of frozen fish 70.82%, frozen squid 9.73%, frozen cuttlefish 7.80%, frozen shrimp 3.04%, dried products 0.88% and others 7.78%. Frozen lobster and surimi did not figure in exports during 2001-02. During the same period, in terms of value, the maximum contribution was by frozen fish 53.73%, frozen squid 12.58%, frozen cuttlefish 11.17%, frozen shrimp 9.86%, dried products 1.06% and others 11.60%. Gujarat's share in total exports from India during 2000-01 was 28.19% in terms of quantity and 9.55% in terms of value.
- 1.222 Export trends from the state during the past few years seem to suggest a decline in exports of frozen shrimp, IQF shrimp and quality fin-fishes and an increase in exports of low value fin-fishes and cephalopods. Gujarat is a late entrant in the area of direct export of marine products, although export of dried Bombay duck, golden anchovy and shrimp, salt-cured threadfin bream and jewfish and other dry fish products like fish maws, was taking place through Bombay from the early fifties. There was a product diversification from dry fish to fresh fish and shrimp in the late sixties, as trawling for demersal fish became prominent in Gujarat and mechanised gillnetters were added to the fishing fleet of Gujarat. Direct export of fish and fishery products, especially the frozen products, were being carried out through the port of Veraval and later Porbandar and New Kandla. During 2001, direct exports of marine products took place through the ports of New Kandla (32.40%), Porbandar (25.52%) and Pipavav (42.06%).
- 1.223 However, in recent times, fisheries sector in Gujarat has been facing increased challenges. These include:
 - (a) The fishing operations have been extended beyond 90-metre depth contour and the number of days per fishing trip has increased.
 - (b) Quality and quantity of the output has declined. Low value fishes have dominated the landings, whereas the contribution of prime varieties of fish has declined. The processed low value fish dominate exports, resulting in an average realisation of almost one third of the national average.
 - (c) The mechanised fishing fleet in the state has expanded manifold over the years. Thus the resource is being shared by too many for economic viability of individual fishing effort. About 24-25 % of the total fishing fleet, operating up to 90 metre are demersal trawler, which are intensively exploiting the inshore and off shore water.
 - (d) Out of about 60 processing and export units operating in Junagadh and Porbander districts, almost 20 have closed due to lack of raw material and/or their inability to cope with the quality.
- 1.224 Given the large resource potential along with the entrepreneurial zeal of the people, it is essential to overcome the existing constraints. Development of fisheries would improve the socio-economic status of the coastal rural community. Besides income generation and providing employment, it would help in upgradation of industry and would facilitate in increased exports leading to earning of valuable foreign exchange.

Year	Μ	Marine Fish		Inland Fish		Total F	ish Prod	luction	
	Gujarat (in lakh tonnes)	India (in lakh tonnes)	Share of Gujarat (%)	Gujarat (in lakh tonnes)	India (in lakh tonnes)	Share of Gujarat (%)	Gujarat (in lakh tonnes)	India (in lakh tonnes)	Share of Gujarat (%)
1960-61	0.79	8.80	8.98	0.00	2.80	0.00	0.79	11.60	6.81
1970-71	1.51	10.86	13.90	0.00	6.70	0.00	1.51	17.56	8.60
1980-81	2.99	15.55	19.23	0.17	8.87	1.92	3.16	24.42	12.94
1990-91	5.00	23.00	21.74	0.46	15.36	2.99	5.46	38.36	14.23
1999-2000	6.70	28.34	23.64	0.70	28.23	2.48	7.40	56.57	13.08

Exhibit 48: Fish Production in Gujarat in Comparison to total production in India

Source: Gujarat Fisheries Statistics, 1999-2000

- 1.225 During the last four decades, Gujarat's share in the total fish production of India has increased from about 7% in 1960-61 to 13% in 1999-2000. Also, the inland fish production in the state started only in 1980-81 and it rose to 70 thousand tones during 1999-2000. However, as shown in Exhibit 48, its share in India was still only 2.48%.
- 1.226 An important area of concern for the policymakers in Gujarat is the state's stagnant contribution in the fisheries sector. The contribution of Gujarat in marine as well as inland fish production to India is almost stagnant since 1992-93.

Fisheries Resources and Potential

1.227 Gujarat is the northern-most state on the west coast of India, lying between 20.1° and 24.7° N lat and 68.6° E long. The coastline is 1600 km long, with two extensive Gulfs (Gulf of Kutch and Gulf of Cambay) and 19.68% of the total coastline of the country belongs to Gujarat. The state also owns 32.54% of the country's continental shelf lying in the depth zone of 0-50m. The EEZ off the Gujarat coast forms 10.59% of Indian EEZ. Some basic parameters of the marine fisheries of the state of Gujarat and India are given in Exhibit 49.

Parameter	Units	Gujarat	India	Gujarat's Share (%)
Coastline	Km	1600	8041	19.90
Continental shelf area	X 10 ⁵ km ²	1.64	5.06	32.41
Exclusive Economic Zone	X 10 ⁵ km ²	2.14	20.20	10.59
Brackish water area	X 10 ⁵ ha	3.76	14.22	26.44
Potentials for brackish water	X 10 ⁵ ha	1.87	08.67	21.57

Exhibit 49: Details of parameters related to marine fisheries

Parameter	Units	Gujarat	India	Gujarat's Share (%)
culture				
Total fishermen (1997)	X 10 ⁵ No.	4.49	67.30	6.67
Total active fishermen	X 10 ⁵ No.	1.57	24.85	6.32
Total fish landing centres	No.	881	3937	22.38
Marine fishery potential	X 10 ⁵ t	7.03	39.00	18.03
Total fishing fleet (1999)	No.	25985	280490	9.26
Mechanized boats (1999)	No.	11372	53684	21.18

(Sources: Gujarat Fisheries Statistics, 99-00)

1.228 Gujarat's annual marine fishery potential is estimated at 0.57 million MT (CMFRI, 1997), which is about 17 per cent of the all-India potential upto 300 m depth, off the Gujarat coast, based on the surveys conducted by various agencies. The maximum sustainable yield (MSY) off the northwest and Gujarat coasts was assessed as given in Exhibit 50.

Region/Area	Resource ¹³	Resource Potential (x 10 ⁵ t)
North west coast	Midwater	5.20
	Demersal	6.90
	Total	12.10
Gujarat coast	Midwater	2.50
	Demersal	4.50
	Total	7.00

Exhibit 50: Maximum sustainable yield estimates off northwest of India

(Source: MOA, GOI 2000)

1.229 These surveys also reveal that deep sea demersal stocks are supported by threadfin bream, bull's eye, skates, catfishes, ribbonfishes, Indian drift fish, etc. the midwater stocks are supported by the horse mackerel, seads, ribbonfishes, little tuna, squids and myctophids and these species are reported to sustain the fishery in a significant way.

¹³ Based on the depths at which resources are available, it is classified into: pelagic, midwater and demersal. Pelagic resources are the ones available at the surface. The pelagic resources are mostly available in the euphotic zone (which is the productive zone). The euphotic zone usually ranges from 5 m to 10 m depending on the depth till which 1% of the solar light reaches (which in turn is dependent on the turbidity of water).

- 1.230 During the period 1990-1999, pelagic resources¹⁴ contributed to 36.7 per cent of the annual average catch, demersal resources¹⁵ contributed 34.4 per cent and crustaceans¹⁶ and cephalopods¹⁷ formed 21.7 per cent and 4.2 per cent, respectively. Exhibit 51 contains the details about the marine fish landings in Gujarat.
- 1.231 The fish catch has already reached the MSY of nearly 7 lakh tonnes for the state. In such a situation, the focus should be on the following:
 - (a) Increase export value by increasing product value
 - (b) Export more from existing catch quantum, as only 1.3 lakh tonnes exported from 6.7 lakh tonnes of landings;
 - (c) Size and quality of fish improvement needed through mesh size regulation and better preservation of fish in fishing boats / harbour hygiene.

¹⁴ The major pelagic resources include Bombay duck, ribbonfishes, clupeids, carangids, seerfishes and tunas.

¹⁵ The major demersal resources include croakers, perches, elasmobranches, catfishes, pomfrets, flatfishes, threadfins, eels, and lizardfishes.

¹⁶ The crustacean catches are composed of non-penaeid shrimps, penaeid shrimps, crabs, stomatopods and lobsters.

¹⁷ Cephalopod catches are chiefly composed of squids and cuttlefishes.



Exhibit 51: Category-wise % composition of marine fish landings in Gujarat (99-00)





Trends in Marine Fish Production

- 1.232 With the initiation of commercial trawling in the waters off Gujarat, the state established a niche for itself among the marine fish producing states in India. The rich diversity of resources and innovation developments in fishing technology helped the state to become one of the leading producers of marine fish in the country. The advances made by the state in this sector is evident from the fact that its marine fish production increased from less than 0.1 million t in 1971 to about .62 million t in 2000. The catch reached a peak of about 0.7 million t in 1998. However, developments in fishing methods, increase in intensity of fishing and targeting of specific resources of high economic value have created an impact on the fishery output, and over the years the quality of the catches has changed considerably.
- 1.233 By analyzing the variations in percentage contribution of different resources to the total fish catch, we clearly identify the resources that are declining and those that hold promise for the future. While some groups like lobsters, white fish, seals and large penaeid shrimps are fast declining, the groups that are steadily shrinking includes pomfrets, threadfins, sharks, clupeids like hilsa spp, the large croakers, large perches and mullets. On the other hand, the fishery is being well supported (quantitatively) by resources like non-prenaeid shrimps, small croakes, clupeids, carangids, cephalopods, Bombay duck, ribbon fish, searfish, threadfin bream, lizard fish and flat fishes.

- 1.234 About 75% of the total marine fish landings of Gujarat are of comparatively low economic value. Bombay duck forms the mainstay of the dol net¹⁸ fishery. However, over the years, these large resources have practically dwindled and the major part of the catch of croakers in composed of small sized species that fetch low value. Non-penaeid shrimp that used to be a major contributor to dol net catches has now become a major component of trawl net catches also. The bulk of the catch is composed of Acetes spp. of low commercial value. Trawler operators bring this resource as a by catch and its stale condition makes it good only for fishmeal plants.
- 1.235 As has been the general trend in the capture fishery scenario in India, the marine capture fishery production in Gujarat reached the peak production in the late nineties. This has been solely due to the uncontrolled expansion in the number of large and efficient fishing vessels, especially the trawlers. This has resulted in the average catch per boat per year coming down from about 150 t to less than 40 t in the late nineties.
- 1.236 Studies conducted by CMFRI on the resource characteristics on some of the major exploited marine fish stocks of the state, including Bombay duck, white pomfrets, perches, small sciaenids, penaeid prawns and lobsters, have shown the most of these resources are either already or on the verge of being over –exploited. Studies conducted by the Institute in the eighties itself have emphasized the need of regulation of fishing effort to save the industry from disaster.¹⁹
- 1.237 Under these circumstances, there is an urgent need for effective control on the number and capacity of the fishing boats in the coastal water of the state. So the implementation of a closed season along Gujarat coast mostly serves the purpose of a reduction in fishing effort rather than protecting the spawning stocks.
- 1.238 As has been indicated earlier, more than 75% of the fish catch of the state is composed of low value species, which are sun dried, or block frozen and exported mostly to China and Southeast Asian countries. Value addition, therefore has a major role to play in sustaining the fishing industry of Gujarat.

Suggestions

- 1.239 In view of the present-day situation, the need of the hour is to maximize production from the vast resources of the state in a judicious and well-managed fashion so as to conserve the resources and ensure productivity for generations to follow. This can be achieved by focusing research and commercial activities towards:
 - (a) Fleet-size reduction

¹⁸ Type of net

¹⁹ Balan et al., 1987

- (b) Promotion of sustainable fishing activities through participatory rural development programmes
- (c) Promotion of coastal mariculture and open sea farming²⁰
- (d) Promotion of exploitation and utilization of non-conventional resources like seaweeds and gastropods
- (e) Promotion of marine aquarium industry
- (f) Conservation of resources through mesh size regulation, regulation of bottom trawling, regulation of fishing activities in identified breeding / nursery grounds, regulation of fishery of breeding adults and young juveniles, regulation of fishery of endangered / threatened species and promotion of sea ranching programmes of commercially important and cultivable species like shrimps and lobsters.

On Shore Infrastructure for Fisheries

- 1.240 Considering the intensive harvesting and post harvesting activities at the Veraval and Probandar fishing harbors and in their off-shore areas, investment may be attractive to create on-shore infrastructure to cater to a cluster of landing sites in the neighborhood. The on-shore infrastructure to be developed includes the landing centers and fishing harbours along with the requisite ancillary facilities. There should be facilities for clean water, clean atmosphere and clean ice. Also, suitable cold storages²¹ would need to be built. Apart from the on-shore infrastructure, the boats would need to be suitably equipped to bring fish in good condition to the shore.
- 1.241 It would be advantageous to establish adequate on-shore infrastructure to cope with the expected intensive fishing activities off Veraval and Porbandar. Also, it would be important to organize satellite facilities to cater to the distant fish landing and port harvest centers as well.

Fishing Harbours Development and Upgradation

1.242 12 of the 25 districts in the state are coastal. There are more than 213 villages spread along the coast, with about as many landing centres. The state has 44 fishing harbours extending between the minor landing centres of Koteswar in Kutch and Ummergaon in the South. 12 of these harbours are medium ones and the rest are minor.

²⁰ Coastal mariculture involves the use of land, whereas open sea farming doesn't require land.

²¹ Cold storages to keep fish would need to be kept at temperatures between -22° C to -33° C. In comparison, the cold storages for agro and horticultural produce would need to be kept at around 4°C. Further, it would important to have uninterrupted power supply for cold storages that store fish. This is so because thawing and refreezing of fish leads to development of bacteria.

1.243 Fisheries Terminal Divisions (FTDs) were constituted to take care of the management and improvement of Veraval and Mangarol fishery harbours and to improve the shore facilities in view of the expected expansion of the fleet size. The operations of the FTD involves facilitating the landing of fish by the mechanized and traditional fishing vessels at specified locations and providing facilities for handling, preservation, transportation and marketing of the catch. The berthing facilities are offered for the mechanized vessels at the specific places through the fuel outlets of the GFCCA and other primary cooperatives.

Constraints faced by the harbours

- 1.244 Some of the major constraints in the harbours include:
 - (a) Dearth of basic amenities and ancillary facilities. Berthing capacity has become grossly insufficient with the increase in the number of trawlers.²²
 - (b) There are no proper approach roads to many of these harbours.
 - (c) No facilities yet for a feeder vessel with refer containers and handling facilities for export cargo at many harbours.
 - (d) Inadequate availability of potable water.
 - (e) Poor power supply position.
 - (f) Inadequate drainage facilities.
 - (g) Inadequate repair facilities for fishing boats.
 - (h) Lack of trained labour for pre-processing and processing of fish/Shrimp.
 - (i) Lack of HRD facilities for post harvest operations.
 - (j) Lack of promotional policies for encouraging private investment.
- 1.245 At times, the fishermen from Saurashtra venture into the territorial waters of Pakistan and are caught there. Although the fishermen are released, the boats are held back by the Pakistan authorities. In all 218 fishing boats from Saurashtra coast are in the custody Pakistan presently.

²² Capacity of the Porbandar harbour is for 1000 boats, but presently about 1800 boats are berthing in the harbour. In addition, there are 700 FRP (Fibre Reinforced Plastic) boats at the harbour.

Future Directions in Development of Fishing Harbours in Gujarat

- 1.246 With the help of World Bank projects, facilities have been created in Gujarat. This has led to substantial enhancement and intensification of the fishing activities in Junagadh district. This has led to the problem of overcrowding of fishing fleet in harbours, like Veraval, to unmanageable levels and lowering of standards in the maintenance of hygiene.
- 1.247 Along the coast of Saurashtra, few more sites should be selected for development of full-fledged fishing harbours, after detailed pre-investment survey. Some suggested locations for such projects are:
 - (a) Shivrajpur, between Dwarka and Okha in Jamnagar district
 - (b) Adri, near Veraval in Junagadh district
 - (c) Prasnavada, near Veraval in Junagadh district
 - (d) Chhara, near Kodinar in Junagadh district
 - (e) Simar, near Una in Junagadh district.
 - (f) Dari and Madhwad
- 1.248 The process of undertaking these projects should be expedited fast. These projects could be taken up under the Central Govt. schemes.²³
- 1.249 The Department already has the approvals for construction of new harbours at Okha (Jamnagar), Dholai (Valsad), Navsari and Lemugaon. It seems the preinvestment surveys have been made the Central Agency CICEF from Bangalore. However, the steps taken are preliminary. We gather that the papers/files are currently with various Departments of Gujarat Government, which need to be submitted to Ministry of Agriculture, Govt of India for approval and grants under the Central Govt schemes. A select list of schemes including the above-mentioned schemes is present in Annexure V.
- 1.250 Efforts must be made to maintain international standards for hygienic handling, preservation, processing and transportation of fish catch. Privatization and/or joint venture schemes could be thought of for fishing harbour development in the state, in the future. Under such schemes, private entrepreneurs may be encouraged to select new sites for harbour development, instead of expansion of existing harbours.

²³ Construction of harbour – 100% grant; Construction of jetty – 50% grant

Veraval

- 1.251 Veraval harbor has the built-in capacity for 700 boats but presently there are 3700 boats in the harbor out of them, about 1500 are actively operating. There is a proposal to develop the western side of the harbor for commercial shipping. This will help reduce pressure on fishing harbour. There is a need for a new fishing harbor at Adri.
- 1.252 Landing jetties and auction halls should be renovated and improved. Processing facilities, cold storages, ice-plants, diesel outlets etc should be established in proximity of the fishing harbors.
- 1.253 The open waters along the coast are alarmingly polluted with heavy metals (Pb, Cd) due to unchecked effluents from the coastal industry, which needs to be mitigated urgently.
- 1.254 In order to create the tranquil zone, the entry mouth of the breakwater is very narrow that obstructs the replenishment of harbor water creek through tidal incursion.
- 1.255 The Veraval harbor needs thorough dredging²⁴ by suction mechanism to remove the sludge to improve the aquatic environment and reduce the stink.
- 1.256 In addition to the technical facilities at the fishing harbors, certain essential civic facilities such as public toilets, drinking water, food stalls and kiosks for daily use items are also necessary.
- 1.257 Breakwater entry to the Harbour Creek is to be cleared of the scattered boulders swept in by strong tidal currents to deepen the shallow opening.

Mangrol

- 1.258 The capacity of Mangrol harbour is 700 boats but presently there are 1800 boats berthing in the harbour. Another key problem of the Mangrol harbour is silting and sand drifting in harbour channel. The harbour needs a face lift as at Veraval. However, the situation at Mangrol is not as bad as at Veraval.
- 1.259 At Mangrol, out of four cold storages, only one is partly operational with private ownership. Also, the ice factory is 4-6 km away from the harbour and that too isn't of good quality.

²⁴ Ongoing dredging operations at Veraval, Mangrol and Porbandar are not efficient and purposeful.

1.260 There is a proposal to construct an additional breakwater on the eastern side of the harbour which will not only stop the unfavorable water current and reduce sand drifting, but also provide additional berthing space for commercial ships, container ships as well as larger fishing vessels.

Porbandar

- 1.261 Construction of a 100m long jetty for MSV needs to be undertaken so as to function as a dedicated berthing place to accommodate the vessels for a period of about 9 months in a year. The project may cost around Rs. 3-4 crores.
- 1.262 Also, a technical study may be conducted for construction of eastern breakwater of about 800m to accommodate larger commercial vessels, deep sea fishing vessels, navy vessels as a logical expansion of Porbandar fishing harbour.
- 1.263 Porbandar harbour needs to be dredged with better and efficient machinery. Breakwater does not meet with the requirement of the fishing harbour.
- 1.264 The conditions at the auction hall are unhygienic with the hall floor developing pot holes harbouring bacteria. There is a growing concern about the hygienic condition of the Porbandar harbour. Some exporters, in spite of being Porbandar-based, operate from Dwarka port.
- 1.265 The civic facilities at the harbour need to be improved. For example, construction of an overbridge over a 50 ft broad creek needs to be undertaken to facilitate approach for the people to the other side. Also, other facilities like medical facilities, central school, post office, public conveniences, etc. need to be developed.

Estimation of costs for development of fishing harbours

1.266 A number of fishing harbours are under planning. The costs of the harbours are shown in Exhibit 52. The implementation of the Okha Minor Harbour Project is slated to start in 2005-06.²⁵

Name of Port Project	Investment Outlay in Crores
Okha Minor Fishery Harbor Project	25.02
Veeraval Minor Fishery Project	43.26
Porbandar Fishery Harbor Project	25.00
Jaffrabad Fishery Harbor Project	14.95

Exhibit 52: Cost estimates for development of fishing harbours

Source: GMB Year Book 2002-03

²⁵ GMB website

1.267 However, through our discussions and understanding, the development of new harbours would be costlier than the estimates shown. A detailed study is required in the current context to understand the associated costs in detail.

The cost of development of Veraval fishing harbour would cost around Rs 100 crore. The development of Mangrol and Porbandar fishing harbours would cost nearly Rs 50 crores each.

Stakeholder consultations

Fishing Fleet – Status and Constraints

1.268 The marine fishing industry of Gujarat has a fleet of over 24,000 fishing vessels, of which 65 per cent are mechanized. Exhibit 53 shows the growth of the state's marine fishing fleet from 1980-81 to 1997-98. At present, more than 70 per cent of the mechanized boats are trawlers. In 1999, more than 50 per cent of the trawlers conducted multi-day fishing²⁶.

Exhibit 53: Category-Wise Break-up of Gujarat's Marine Fishing Fleet

Category of fishing	1980-81	1985-86	1990-91	1994-95	1997-98
boats					
Trawlers	1781	1919	2814	4634	6390
IBM Gill netters	622	956	1946	3110	3275
OBM FRP boats	0	0	1044	2545	3551
OBM wooden boats	843	1673	1834	1814	1854
Dol netters	213	310	498	545	628
Total Mechanized boats	3459	4858	8140	12648	15698
Total non-Mechanized boats	6023	8018	8677	8370	8918
Grand Total	9482	12876	16817	21018	24616

(Sources: Gujarat Fisheries Statistics, 99-00)

1.269 Other fishing gears operated by the mechanized and non-mechanized sectors include dol nets, gill nets and hooks and lines, apart from stake nets, drag nets, cast nets, fence nets and trap nets, which are operated by the artisanal fishermen.

²⁶ Single-day operations are done in the depth range of 20-50 m, mostly exploiting ribbonfishes, croakers, crustaceans, squids, etc. Multi-day operations are carried out in deeper waters (20-100 m) and the catches are chiefly comprised of ribbonfishes, croakers, threadfin breams, cephalopods and non-penaeid shrimps.

- 1.270 Gujarat ranks second in the number of mechanized boats among all the maritime states in the country. Since 1982, boats/canoes made of fibre glass re-enforced plastic (FRP) are also in use. The mechanized boats are filled with either inboard marine diesel engines or OBMs. The non-mechanized boats are engaged in artisanal fisheries and include dugouts, keeled and planked flat bottom boats.
- 1.271 Pristine clean fish is caught in the sea. But it gets infested with a variety of bacteria and viruses while bringing on shore. The unhygienic conditions of the harbour further degrade the fish catch. Consequently, even the most sophisticated modern processing plants cannot negotiate with the infected fish.
- 1.272 Thus, it is essential that the mechanized boat sector be upgraded with better preservation and freezing facilities to ensure quality of fish for better price realization.
- 1.273 The old fishing vessels could be gradually replaced with well-equipped resource specific fishing trawlers.

Fishery Exports

1.274 Direct exports of fish and fishery products from Gujarat commenced only in the year 1972, when the reefer vessels started calling at the Gujarat ports. The growth of fishery exports over the years is summarized in Exhibit 54.

Year	Quantity (t)	Value (Rs. In million)
1971-72	208	4.00
1980-81	6,665	129.00
1990-91	22,155	752.50
1996-97	123,213	5,705.80
1997-98	125,561	6,378.50
1998-99	70,432	3,674.60
1999-2000	76,418	3,893.80
2000-01	124,159	6,156.50

Exhibit 54: Growth in Fishery Exports from Gujarat

(Sources: MPEDA, 00-02)

1.275 Gujarat's share in the total export of India, during 2000-01, was 28.19 per cent in terms of quantity and 9.55 per cent in terms of value. The reason for this is that in Gujarat marine fisheries, the landings constitute largely finfish, which has low value compared to shrimp and cephalopods. Since the quantum of shrimp/cephalopods in the export basket is comparatively meager, the value realization is low.

Export of Fresh Water Fish

- 1.276 Of the total inland fish production in Gujarat, 42 per cent comes from aquaculture in ponds, 17.44 per cent from reservoirs, 10.46 per cent from rivers and 29 per cent from estuarine waters.
- 1.277 There is enough scope in future to increase the share of freshwater fish and shellfish in export. Some processing plants have started export of fresh water fishes in headon and gutted conditions. The main market is in the Middle-East countries.
- 1.278 Giant freshwater prawn has emerged recently as an important item of export trade, particularly the United States of America. Monoculture of freshwater prawn as well as polyculture with carps needs to be promoted in the Gujarat and expanded horizontally.

Marketing of Live Fish

1.279 During 1999-2000, India exported 1676 tonnes of live fish valued at Rs. 380 million. Hong Kong, Malaysia and China are main big markets for live fish. Prawns, mussels, crabs etc are suitable for exporting in live condition. *Clarias*, eels and murrels are packed in moist gunny bags. So are crabs and lobsters. Carps could be transported live by road up to 50-100 km conveniently. Prices for live fish are higher by 30-50 per cent than iced fish. Gujarat should further explore possibilities of live fish transport and trade.

Fish Processing and Quality Assurance

- 1.280 The fish landings at Veraval and Porbandar, was the highest in the state at 1,43,090 tonnes and 1,03,238 tonnes respectively during 1999-2000. The total export of fish from the state was 0.124 million tones during the period, which formed 24.18% of the total export from India. The value realized was Rs. 6155 million forming 1.55% of the total export earnings.
- 1.281 The fish and fish products are exported to Japan, EU, China, South East Asian and Middle East countries. The low value fish species such as ribbonfish and scianids are exported to China, Taiwan, Korea and Hong Kong.
- 1.282 During the year 2000-01, there were about 61 freezing plants in Gujarat that have come down to 59 in recent times. Of these units 15 are approved for exports to the EU. Exhibit 55 highlights the various fisheries based facilities in the state.

Facility	No. of units	Capacity
Ice factory	688	12,522 t.day-1
Cold storages	247	16,411 t

Exhibit 55: Fisheries based facilities in Gujarat (2000-2001)

Facility	No. of units	Capacity
Freezing plants	61	4452 t.day-1
Frozen storage	56	26,818 t
Fish meal plant	3	413 t.day-1
Fish pulverizing plants ²⁷	56	1202 t.day-1
Boat building yard	42	380 units.year-1
Net making plants	9	608.9 t.day-1

Source: Gujarat Fisheries Statistics 2000-01

Present Status of Fish Processing in Gujarat

- 1.283 Fish drying, semi-drying, salting, icing, freezing and fishmeal production are the main methods of processing in Gujarat.
- 1.284 Bombay duck, jawala golden anchovy, other anchovies and white fish are dried and marketed to different parts of India. Semi-dried and salted sharks, rays, tunas, catfishes, leather jackets, marlins, etc., have demand in southern states and some quantities are also being exported. Large varieties of fishes and shrimps are iced and marketed in Delhi, Punjab, Madhya Pradesh and Rajasthan.
- 1.285 The products for export are frozen mainly in plate freezer. Bigger fishes like tunas and fillets from ghol and koth are frozen in blastfreezers. Value added items like cuttlefishes and squids, and drived items such as fillets, tentacles and rings etc., are individually quick-frozen (IQF). Other value added items like king fish steaks, cut crab; octopus and shrimp in retail pack are exported from Gujarat.
- 1.286 With the wider acceptance and use of individual quick freezing (IQF) technique, flake ice insulated boxes and refrigerated containers, the quality and value of fish products has increased.
- 1.287 Mince based products like surimi in bulk pack and imitation crabsticks in consumer packs are being produced for the export market. The landings of Japanese threadfin bream (the main raw material for surimi) have been very high in recent years. Gujarat is the leading state in India, in fishmeal production. However, the quality of fishmeal is low as it is produced by reduction of dried by-catch of poor quality.

²⁷ Pulverization is breaking the dried fish into pieces. The raw fish may be even steamed and then dried to turn into small pieces. It is different than mincing etc that is the process of making dove of all kind of fish flesh mixed to make surimi products. From the dove of fish flesh, various shapes and sizes dices are used to make products to look like the specific fish or shrimp or other favourite product in their shape.

Fish Utilization Pattern in Gujarat

1.288 According to the data available, the exports account for 25 per cent of the fish production, contributing over Rs. 6,000 million. Fresh fish marketing in iced form is mainly confined to internal markets of the state and different parts of the country.

Quality aspects

1.289 With the application of HACCP in seafood processing, the level of sanitation, hygiene and quality awareness have improved significantly. However, the condition of road, drainage, sanitation and hygiene, etc., particularly in harbour area, requires substantial improvement. The presence of heavy metals, residual pesticides, antibiotics and hormones, etc., can pose problems and the maximum permissible limits are to be enforced. There are reports of heavy metal and other pollutants originating from the industrial units located along the Saurashtra coast. Untreated sewage dumped in the fishing harbour and backwaters is a major bacterial problem.

Water and Ice Quality

1.290 The requirement of water in fish processing is very high. The bacteriological quality of water is generally poor. The ice prepared from such water is also poor in quality. By providing sufficient quantity of good quality water, the quality of processed products can be increased substantially. EU has stipulated 62 parameters, to determine the quality of water for fish processing use, such as pesticide residue, heavy metals, polycyclic aromatic hydrocarbons, etc.

Microbiological Hazards

1.291 The fish and shellfish harvested from sea are generally free from pathogens and contain natural bacterial flora. However, handling and storage onboard, use of insufficient ice, poor sanitation and inhygienic conditions at landing centres, increase the bacterial load. In recent years, rejection of some containers on account of poor microbiological quality has been reported.

Prospects for Development of Fish Processing Sector in Gujarat

Value added fish products

1.292 Exports of marine products from Gujarat are characterized by high volume and low value items like bulk packed ribbonfish, sciaenids and whole squid and cuttlefish. Ready to eat products, retort pouch packed consumer packs and skewers, etc. as per consumer requirement must be promoted. The questions of eco-labelling, bar coding on packages and shelf life of the products would arise to meet WTO stipulation.

Export of dried fish

1.293 Dried fish is having good demand by the animal husbandry, poultry and aquaculture sectors in most parts of India. Dried fish from India have been exported to many neighbouring countries like Sri Lanka, Myanmar, Singapore, Malaysia, Mauritius and Nepal. Recently, dried fish has entered high value market by exporting quality product under chilled temperature storage and transport. There is need to give due emphasis on processing, quality control and marketing of dried product to realize full export potential.

Current Status of Shrimp Farming

- 1.294 As per the National Commission on Agriculture (1976), Gujarat has 0.376 million ha of coastal fallow lands with varying degrees of potentials for brackish water aquaculture. The potential area is estimated to be 0.195 million ha. To promote brackish water shrimp farming, Gujarat adapted the coastal land lease policy in April 1987, which was revised in 1994. Total area was surveyed of which 40,520 ha was found suitable.
- 1.295 Presently, shrimp farming is conducted in 381.20 ha area with the shrimp production of 345-292 tonnes with a growth rate of (+) 7.21 per cent during 2002 against the previous year. Considering the potential, Government of Gujarat should encourage shrimp farming in various parts of Saurashtra including Bhavnagar, Amreli, Junagadh, Porbandar and Jamnagar.
- 1.296 Government of Gujarat has already undertaken initiatives for development of fisheries in the state. These include initiatives for HRD development and use of existing post harvest infrastructure. Districts and State level committees scrutinize applications from farmers/entrepreneurs for shrimp farming for due clearance from Aquaculture Authority.

Constraints

1.297 Climatic conditions with extremely hot summer, lack of private investments, limited use of post harvest infrastructure and non-seriousness in adapting scientific protocol for culture operations are major constraints.

Inland Fisheries Resources

1.298 Inland fisheries resources of Gujarat include rivers, reservoirs, lakes, ponds, tanks and estuarine and brackish water areas with details as specified in Exhibit 56. However, many rivers and reservoirs are seasonal due to low rainfall in the western side of the state, viz. Narmada, Tapti, Mahi, Sabarmati and Banas.

Resources	Area
Village ponds and tanks	0.71 x 10 ⁵ ha
Irrigation tanks	0.40 x 10 ⁵ ha
Major and medium reservoirs	2.43 x 10 ⁵ ha
Rivers and canals	3865 km
Estuarine area	0.21 x 10 ⁵ ha
Brackish water area	3.76 x 10 ⁵ ha
Water-logged area	0.94 x 10 ⁵ ha
Area expected to be developed under Sardar Sarovar Project	
Reservoir area	34,876 ha
Command area ponds and tanks	10,500 ha
Water-logged area	6,000 ha
Estuarine area	500 ha

Exhibit 56: Inland water resource of Gujarat

- 1.299 In village pond and reservoirs, mainly three species of major carps. Viz., catla, rohu, and mrigal are cultured. Exotic carps like common carp and grass carp have also been introduced. Composite fish cultures done in a scientific manner in small perennial village pond are yielding good results. There are twelve circular hatcheries in Gujarat state. A total of 487 million spawn was produced during year 2002-2003.
- 1.300 The need for introduction of fast growing species for aquaculture; yearling stocking in seasonal tanks and reservoirs of Saurashtra and North Gujarat; scientific management of reservoirs with adequate stocking and controlled fishing; polyculture of giant freshwater prawn and fish; carefully planned fisheries development schemes pertaining to Sardar Sarovar Project are recommended as means to maximize inland fish production from the state.

Inland Fish Production

- 1.301 There are about 692 fish landing centres in the inland sector, which includes 357 in freshwater bodies, 257 in the riverine stretches and 78 in the estuarine areas. A total of 7,255 boats including 332 mechanized and 6,923 non-mechanized boats, are operated in the inland sector.
- 1.302 The fish landings from inland sector have grown from 14,167 t in 1971-72, reached a peak of 80,000 t in 1998-99 and declined to 50,844 t in 2001-2002. Average growth rate during this period was 6.54 per cent in terms of quantity landed and 23.01 per cent in terms of value.

1.303 Bharuch, Valsad and Surat districts are comparatively more productive. In Bharuch district, riverine fish production is more, whereas in Valsad, Surat and Kheda districts, village pond culture production is prominent. In Saurashtra area, production is mainly in medium reservoirs like Bhadar, Mtchu, Aaji, Fofad and Moj. In Surendranagar district, main production is from Nal Sarovar, Bharamani and Limbdi Bhogavo reservoirs.

Reservoirs

- 1.304 The total area of the reservoirs is 0.243 million ha. There are 7 large, 28 medium and 115 small sized reservoirs in the state. Major reservoirs of the state are listed in Exhibit 57.
- 1.305 Fish production from reservoirs in the last five years was 8,017 t in 1996-97, 12,290 t in 1997-98, 2,277 t in 1998-99, 13,212 t in 1999-2000, and 7,812 t in 2000-01. Highest production was recorded from Ukai reservoir, which attained an average production of 115.62 kg.ha⁻¹, against the state average of 32.36 kg.ha⁻¹.
- 1.306 Inland fish production during 2000-01 was 40,591 tonnes with a growth rate of (-)
 42.28 per cent compared to 80068 tonnes with a positive growth rate of 13.65 per cent against the previous year.

Leasing System and Fishing Rights in Reservoirs

1.307 Reservoirs have been leased to Gujarat Fisheries Department Corporation or Gujarat Fisheries Control Co-operative Association Ltd. with varying rates of royalty and target quotation. These bodies either conduct yearly auction to contractors or give their own fixed rates to fisherman. The Fisheries Department monitors the fish harvesting to control over exploitation.

Ponds and Tanks

- 1.308 The total area of the ponds and tanks is 0.071 million ha. Suitable areas for pond culture in the state are available in Valsad, Surat and Bharuch district in south Gujarat and Kheda and Anand districts in central Gujarat. Fish farmers of Surat and Valsad are practicing fish culture in scientific manner adopting proper seed stocking, manuring and feeding practices. Average production in Valsad and Surat districts reaches 2,000 kg per ha per year. In Saurasharta area production is less than 500 kg per ha per year. The lower productivity in Saurashtra is primarily due to unfavourable temperature and water conditions. The problem of high temperatures during summers can be avoided by developing ponds of depth 1.5 − 2 m instead of the usual 1 m depth ponds.
- 1.309 Most of the fish culture programs are carried out by 17 Fish Farmers Development Agencies (FFDAs) in the state.

Reservoir	District	Area, ha
Ukai	Surat	60095
Kakarapar	Surat	44200
Kadana	Panchamahal	16600
Dharoi	Mehsana	10700
Panam	Panchmahal	8980
Seturanji	Bhavnagar	6734
Damanganga	Valsad	5144
Watrak	Sabarkantha	4475
Bhadar	Rajkot	4400
Dantiwada	Banaskatha	4047
Karjan	Banaskatha	3677
Sankoli	Amreli	3285
Hathamati	Sabarkantha	3236

Exhibit 57: Major Reservoirs in Gujarat

(Sources: Gujarat Fisheries Statistics, 99-00)

- 1.310 In fresh water aquaculture, the farmers are unable to adapt scientific protocol for fish farming due to lack of efforts in extension and training.
- 1.311 One drawback experienced in village pond culture, is the leasing system through local Panchayat. Panchayat can give pond on lease only for three years to beneficiaries. This practice does not give sufficient incentive for long-term development and maintenance of the ponds by lessee fish farmers, causing low levels of production.

Problems and Prospects for Inland Fishery Development in Gujarat

1.312 There are several reasons for low production from the inland sector in Gujarat state. In Gujarat, majority of the districts have low rainfall and most of the ponds and reservoirs are seasonal, which affects long-term culture prospects. Fish seed stocking in ponds and reservoirs is inadequate and potential is not fully utilized. Poaching in large reservoirs is a major cause for low fish production. In many places religious taboos prevent fish harvesting. Another reason contributing to low aquaculture production is inadequate adoption of supplementary feeding practices. Insufficient training and low adoption of scientific culture practices also contribute to the low production from inland waters.

- 1.313 In order to enhance the inland fish production in Gujarat, there is need to increase fry grow-out areas for culture practices in each district, making full use of the available potential. There is also need for introducing fast growing species for culture. In the seasonal water tanks and reservoirs of Saurashtra and North Gujarat, fingerlings stocking could be useful. Scientific management of reservoirs with adequate stocking and controlled fishing could go a long way in improving production. Polyculture of giant freshwater prawn and fish is another approach which could be pursued for increasing production. Fisheries development of Sardar Sarovar Project need to be carefully planned and promoted in such a way as to maximize fish production from the reservoir proper and command areas.
- 1.314 On going freshwater aquaculture through FFDA and finance institutional help may be taken up on faster track. The carp culture expansion would need to be supported by carp hatchery, which could be established outside Saurashtra as well to avoid water constraints.
- 1.315 High value shrimp farming in coastal saline zone would have scope with selection of right species. Tiger shrimp is not abundantly found in Saurashtra waters. Tiger shrimp culture with brooder stock procured from east coast areas may not sustain the operations commercially and technically. However, *Fenneropenaeus indicus* (White shrimp), *Fenneropenaeus merguensis* (Banana shrimp) and even *Litopenaeus vannamei* to be imported from USA may provide scope for at least one crop a year due to climatic and high salinity problems. Shrimp farming would need hatchery support adequately.

In Diu, there has been a unique effort on the shrimp farming front. 8 farms of 5 ha each have been prepared and seeds are brought from Chennai. The output is 1 ton/ha. With a cost of Rs 120/kg and a selling price of Rs 240/kg, it has resulted in significant benefits to the fisherman community associated with shrimp farming.

Fisheries Regulation and Policies

- 1.316 Control and regulation of fishing and fisheries within territorial waters is the exclusive province of the state, whereas beyond the territorial waters it is the exclusive domain of the union. The Ministry of Agriculture, as per the allocated rules of fisheries, helps the coastal states and Union Territories in development of fisheries within the territorial waters, besides attending to the requirements of the sector in the EEZ.
- 1.317 Fish Production from near shore waters (0-50 meter) has reached its optimum yield levels and has been stagnant for some years. To sustain this production and to ensure that the major fisheries do not suffer any irreparable damage, improved management features, based on community participatory approach have to be put in place earliest.

- 1.318 National Review Committee (2000), recommended a fleet size expansion of motorized crafts by 4000 to 8283, mechanized crafts by 75 to 8440 and no increase in traditional fleet. Small-mechanised fishing fleet size of Gujarat during 1999 consisted of 11372 vessels. Small mechanized fishing fleet operating along Gujarat coast is at least by 35% in excess of the optimum fleet size. Aimed midwater trawling for resources such as horse mackerel and scad is a distinct possibility, provided necessary linkages are established so as to make use of the relatively low value resources by value addition and efficient marketing. However, this may require induction of a limited number (2 to 3) of larger fishing vessels with higher horsepower, having onboard facilities for freezing and storage, sophisticated navigation equipment, acoustic fish detection and monitoring devices, and highly skilled crew. Other avenues for development of deep-sea fishing are pelagic drift long lines for oceanic resources such as tunas, pelagic sharks, sailfish and marlins; and bottom vertical long line and trap fishing in sectors unsuitable for bottom trawling. A precautionary approach is essential in inducting the fishing vessels for deep-sea fishing.
- 1.319 Small trawlers may be encouraged to diversity into fishing activities that can be practiced further off-shore, in order to reduce over crowding in coastal waters and reduce the pressure on the fish stock.
- 1.320 The bottom trawls operated from mechanized and motorized craft are being excessively used. The trawl biomass appears to be over exploited so a reduction in the trawl effort is necessary to sustain the trawl fishery.
- 1.321 Mechanized vessels below 20m OAL require major inputs in their design to not only increase their voyage period but also facilitate preserving the catch in good condition.
- 1.322 On-shore infrastructure to support increased exploitation of the resource would need rational investment with technology possibly through foreign collaboration.
- 1.323 MFRA promulgated by the states (except Gujarat) and Lakshadweep provides zonation for different categories and sizes of fishing vessels to operate in demarcated areas and type of gears. There has to be an efficient monitoring and surveillance mechanism.

Co-management or participatory approaches have been promoted as an alternative to command and control conflicts in marine fisheries management. In the management of near shore fisheries, the frequent conflicts between artisanal boats and the mechanized fishing boats have been mitigated through zonation of fishing areas separately for the two sectors. Successful examples are in Konkan Coast, Kerala, Tamil Nadu, and Andhra Coasts. In Bali Island, Indonesia, the community owned artificial reefs supported by RIMF, Jakarta, resulted in the increased demersal productivity. In South Senai, Egypt, declaration of no – take zones within the Marine National Park, the small-scale fishery benefited by increased CPUE in the adjacent areas.

- 1.324 In the fast developing international scenario of trade and food security, non-tariff trade barriers will play a major role. With the growing interest in linking environment and labour standards to international trade, the state should be concerned with awareness.
- 1.325 The inland open waters including rivers, reservoirs, estuaries and flood plain lakes require different regime for their management. Being state property, these resources have multiple uses including fisheries. These are either in open access or managed as common property resources and lack a well-defined fisheries management regime.
- 1.326 To trap the inherent high biological productivity of the reservoirs, the success stories at Gobindsagar in H.P and Gandhisagar in MP and Ukai in Gujarat need to be replicated.²⁸

The DFID funded program in West Bengal and Orissa is an exemplary case depicting success in SHG formation for rural aquaculture and capture fisheries. Facilitated by the community organizations (CO) the project used Group Formation at the entry point. This helped build Social Capital in clusters of villages whereas Financial Capital was built up through savings wherein micro financing also contributed. The Natural Capital would already be available with the potential fish catch or fish production as well as from other ancillary vocations. But the Physical Capital in the form of nets, boats, baskets, ice landing centers, transport, communication etc would need to be provided. Similarly, The Human Capital with technical knowledge and fishing / preserving skills would have to be provided.

1.327 Diversification of aquaculture is essential. Fish farming integrated with agriculture and livestock production along with rural activities would ensure progress without any social conflict as in China.

Deep Sea Fishing Policy

1.328 However, it is informed that Government of India Ministry of Agriculture has drafted the Deep Sea Fishing Policy under which the Government proposes to revive the deep sea fishing operations. The government has been advised to invoke foreign equity and expertise through wet chartered vessels and joint venture to tide over the capital intensive propositions and promulgate strict rules for their fishing areas in the deep sea to avoid any social conflicts.

²⁸ Both in Gobindsagar in HP and Gandhisagar in MP, very high productivity have been achieved (120 kg per ha in comparison to all-India average of 20 kg per ha). This was so as good practices were followed that included controlling the water salinity, temperatures, etc. Ukai in Gujarat is a successful example of social fisheries.

1.329 Once Gujarat acquires a deep sea fishing fleet in both Government and private sector, it would fish not only in the Indian EEZ but also beyond in the international waters. In addition, under contractional managements, the Gujarat Deep Sea Fishing Fleet could operate in the EEZ of other maritime countries bordering the Arabian Sea and elsewhere and generate exportable commodity.

Fishery Management Statutes and Regulations

- 1.330 In view of the prospective changes in the International law of the Seas at the UNCLOS-III, the Indian Parliament extended the constitutional recognition to the new concept of an Exclusive Economic Zone (EEZ) in May 1976, and enacted the Teritorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zone Act (1977) with effect from January, 1977. As a result, territorial waters up to 12 nautical miles were vested with the exclusive jurisdiction of the states, while the rights for management and exploitation of the EEZ was exclusively with the Central Government.
- 1.331 In November 1981, the *Maritime Zones of India (Regulation of Fishing by Foreign Vessels Act (1981)* came into force. It laid down conditions, under which foreign fishing vessels could operate in Indian Maritime Zones, clearly prohibiting fishing in territorial waters. The Deep Sea Fishing Policy (1991) adopted during this period, however, was scrapped later. The Indian Coast Guard had been established in 1978 itself, as a consequence of the Maritime Zones Act and directly dealt with antipoaching activities in the Exclusive Economic Zone of India.

Saurashtra and Kutch Fisheries Rules

1.332 Saurashtra and Kutch Fisheries rule in 1950 and 1953 were notified and operational in the respective regions of the new Gujarat state, till the mid-seventies. Later, due to court directives, the imposing of royalty and license fee were scrapped. However, the other sections of the Saurashtra and Kutch Fisheries Rules have not been officially scrapped as yet.

Conservation of Marine Resources

1.333 The Government of Gujarat declared the first Marine National Park (MNP) under the Wilf Life (Protection) Act (1972), and the Forests Act (1976). The Marine Part area covers 162.89 km² and a marine sanctuary covers 295.03 km² in the Gulf of Kutch.

Fishery Act in Gujarat

1.334 Fishery like agriculture is a state subject and the Central Govt. is not eligible to inact any Act in the states. However, Central Govt. drafted a Model Bill pertaining to Fisheries Management in the states and circulated it as an advisory exercise to all the states. Various states such as Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and Pondichery landed to the advice and have drawn up their Marine Fishing Regulation Act (MFRA). Gujarat has adopted its Fisheries act in 2003. 1.335 Similarly the country's Fishing Act was enacted in 1897. Attempts have been make to repeat it and enact new Act in accordance with the demand of the time.

Issues for consideration

Demands for Electricity

- 1.336 For sustained functioning of the post harvest infrastructure, the availability of electricity could be a major constraint. The ice-factories, the cold storages, the processing plants, the harbour facilities, the packaging units must be able to operate at least for 200 days a year for their economic viability.
- 1.337 The cold storages need to maintain a freezing temperature of below (-) 22^oC unlike the usual cold storages for horticultural produce. Electricity demand would need to be assessed area wise and back up of facilities would need to be provided.

Diesel Subsidy

- 1.338 In the past, there has been a subsidy on the excise duty on diesel per kilolitre. However, it has always been difficult develop a foolproof mechanism to distribute the subsidized diesel to the right quarters. Therefore, the Government of India has always been apprehensive about the issue.
- 1.339 The alternative would be to organize a sustainable and responsible fishing operation and make those economically viable and absorb the diesel cost within the profit margin of the fishing operations. In the meantime, the diesel subsidy would remain a transient advantage.

Fishmeal production in Gujarat

- 1.340 Trawling generates a lot of bycatch, as the gear is non-selective. It is estimated that a boat lands around 1 t of bycatch from multi-day voyage fishing and 100-500 kg of bycatch from daily fishing. The bycatch comprises of mostly trash fishes, juveniles of commercially important species, crustaceans, cephalopods, etc. It is locally known as *kutta* and is mainly used for drying, fishmeal and fish manure production.
- 1.341 The material that is used for the production of fishmeal is mainly divided into two categories:
 - (a) Bycatch from the trawl fisheries and
 - (b) Fish offal and processing wastes.
- 1.342 The protein content of commercially available fishmeal varies between 32 and 47 per cent.

- 1.343 Apart from Veraval, raw material for fishmeal is being procured from nearby landing centres *viz.* Okha, Jakhau, Porbandar, Mangrol, Navabundar, etc. Most of the plants are simple drying and pulverizing units. There are presently no operation wet reduction plants in Veraval. There were about 42 plants in Veraval, a few years ago, most of them producing nearly 2500-3500 t of fishmeal per year. At present there are only 28 fishmeal plants producing only 500-700 t per year.
- 1.344 The fishmeal industry is presently facing many problems. As there is a rise in the production of *surimi* products and other value added products in the Veraval region, most of the low cost fishes are utilized by this industry. Prohibitive cost factors on capital investment, infrastructure, raw material, running costs, etc. have cut into the profit margins. A fishmeal plant requires a regular and steady supply of fish, in order to be economically viable. The fishermen store the bycatch without icing and add large quantities of salt for its preservation. The poor quality of raw material has a deleterious effect on quality of fishmeal. This has led to a decline in the demand of Gujarat fishmeal from the dairy and poultry sectors. There is a general lack of awareness among fishmeal processors regarding the quality requirements of the raw material.
- 1.345 To avoid import of fishmeal by the animal husbandry, agriculture and poultry sectors, it is essential to revive the fishmeal industry.

Ornamental Fishes and Aquaria

- 1.346 During the last two decades, large numbers of aquaria are being installed in public places. All these people need end-to-end service and for entrepreneurs it has opened up a new area of aquarium making, sale, supply of ornamental fish, maintenance and supply of live fish. These areas employ many young people in metropolitan cities such as Gauhati, Kolkata, Mumbai, Chennai and Vizag.
- 1.347 Supply of tray of ornamental fish to aquaria house in smaller cities for sale by real people is a lucrative business. Supply of formulated dry feed and live feed is profitable.
- 1.348 In a metropolitan city, about 10 to 12 entrepreneurs can set up an enterprise and earn an income of Rs. 60,000/- per year. MPEDA and CIFE have indicated that the sector has potential of providing remunerative employment to more that one lakh people if they can develop the trade and export of at least Rs.200 crores per annum.

Major Issues and Recommendations for Development of Fisheries in Saurashtra

- 1.349 While analyzing the fisheries development of Gujarat state, it should always be borne in mind that, although the state is one of the leaders in the marine fisheries in the country, the population of the state is mostly vegetarian. Fish and similar food is a taboo in the state even now. It is true that this attitude is changing and the sentimental objection towards fish is gradually waning, especially among the younger generation. Promotion of an economic sector like fisheries, in such an environment, without even a statutory support, was not at all easy task. However, there are some areas, which need be looked into for making the fisheries sector a more effective and eco-friendly economic pursuit.
- 1.350 Some of the main issues that emerge from the foregoing discussions are as follows:
 - (a) The entire fisheries operations in the Gujarat waters are confined to about 100 m depth contour. The traditional non-motorized, traditional motorized and mechanized fishing fleets operate in its conventional ground (especially up to 50 m depth) and, hence, there is a great congestion in this region and strain on the resources in the coastal waters.
 - (b) The demersal trawlers have increased tremendously in number and are to the tune of about 7000 out of the total fleet of about 29,000 (24 per cent). At present, there are no provisions to regulate the trawl cod end mesh size through the statutes fo the Government. The gill-netters, which used to have large meshed nets, have reduced the same to very small sizes. This results in indiscriminate destruction of the juveniles and affects the recruitment to the fish stock.
 - (c) Catch per unit effort has started showing a declining trend, which results in longer fishing time and increase in the operational costs of the boats.
 - (d) Horizontal expansion of the fishing operations, deploying oceanic trolling, tuna long lining, squid jigging, mid water trawling and the like may help a long way to dilute the congestion within the conventional grounds. These operations are cost intensive and technology specific. But our experience in the chartered fishing operations and the results of the exploratory fishing operations of the Fishery Survey of India do indicate that these are not difficult, if we are able to procure suitable vessels, technology and tie up the capital investment. The recent guidelines issued by the Ministry of Agriculture, Government of India, on 1st November 2002, allows the operation of tuna long liners, tuna purse seines, squid jiggers, long liners, mid water/pelagic trawlers and the trap fishing in the deeper waters off Gujarat and Maharashtra, except in some specific locations.
 - (e) There has been a substantial variation in the catch composition of the state. The catch used to be of prime quality fish (about 25 per cent), lesser important fish (about 30 per cent), shrimp and lobster (about 10 per cent), and uneconomic fish varieties (about 35 per cent) in the late sixties. However, the present composition of the marine fish landings in the state are as follows: low value finfishes such as croaker, anchovy, ribbonfish and eel (about 55 per cent), Bombay duck (about 14 per cent), quality finfishes such as pomfret, seer, jewfish, threadfin, perch and grey mullet (about 10

per cent), crustaceans (about 10 per cent) and small squid and cuttlefish (about 4 per cent).

- (f) There is reduction in the size of the landed quality finfishes, like pomfret, jewfish threadfins and shrimps.
- (g) Exported items have changed from the lucrative shrimps and quality finfishes to low value fish, which have lesser per unit value realization. The restrictions imposed by the overseas markets and the inability of the local processing houses to comply with them has resulted in the rejection of marine fishery products in the overseas market.
- (h) Expand the landing, berthing, handling and cold storage facilities, wherever possible. The infrastructure created, especially at Veraval, Mangrol and Porbandar, have turned out to be very inadequate vis-à-vis the expansion of the fishing fleet.
- (i) Extend support to ensure the maintenance of fish quality onboard the fishing craft and quayside.
- (j) Expand and strengthen domestic marketing of fish by supporting fresh fish preservation, transportation and marketing through hygienic and organized retail outlets.
- (k) Introduce statues/rules to ensure eco-friendly fishing operations, fish handling, storing and processing.
- (I) Encourage the resource enhancement through coastal and estuarine aquaculture, wherever feasible, with backward linkages including establishment of hatcheries.
- (m) Ensure public participation in the areas of regulated fishing, hygienic handling and processing through effective extension services.
- (n) The landing centres/fishing harbours are unhygienic and the facilities for water, handling, washing, cleaning, storing, etc. are very limited. The fisheries terminals do not have facilities and lack effective management due to want of statutory support and suffers on account of dual management by the Gujarat Maritime Board and the State Fisheries Department.
- (o) It is unfortunate that the low value fish and the premium varieties are handled, cured or stored in the same locality. Although, the drying/curing of low value fish were originally designed to be carried out away from fish landing sites, this is not practically taking place.
- (p) A great amount of environmental degradation has resulted due to improper disposal of the wastes into harbour waters. The fish catch are very often washed with the harbour water.
- (q) The Indian Fisheries Act (1897), Indian Merchant Shipping Act (1958), the Maritime Zone of India (Regulation of Fishing by Foreign Fishing Vessels Act (1981), the Deep Sea Fishing Policy (1991) (repealed in 1991), have been the legislation available. The fisheries rules formulated under Indian fisheries Act (1897) by the erstwhile

Saurashtra (1950) and Kutch (1953) states were repealed in the seventies. However, the Gujarat Fisheries Act was recently introduced.

- (r) Boxing of fish is advisable. Government can take the initiative and distribute the requisite kind of boxes to the fishermen.
- (s) Refrigeration equipment to be upgraded with screw compressors, standard machines, readymade tunnels (puff). Government can push for fiscal incentives e.g. custom duty reduction
- (t) Processing plant workers to be trained and given incentives. The incentives should be given to the firm as well as the fisherman undergoing the training.
- (u) At the landing centers, areas may be isolated for high value / good quality fish and bycatch to improve hygiene.
- (v) Transportation of raw material from landing centers to processing units in isolated boxes and trucks, specially designed puffs for quality and reduced use of ice.
- (w) For better management of cold storages, FIFO (First In, First Out) technique by computerized loading / unloading is recommended.
- 1.351 It is projected that for reaching Rs. 100/- crore increase in export (valueaddition of 20-30%), an investment of about Rs. 50/- crore (lasts for 10-15 years) is needed in IQF, Vacuum packing machines, Beheading, skinning, filleting machines, Quality water (desalination), Harbor improvement with supporting infrastructure and well equipped quality testing laboratories.
- 1.352 To support export, it is essential to organize domestic marketing, modern fish markets and local outlets with running water, live fish sale. Central Govt. scheme with 100% financing to establish modern fish markets in states has not been availed of by Gujarat / Saurashtra.
- 1.353 It is heartening that the State Government and fishery operators have come forward to declare a fishing holiday of 65 days ending on 15 August, for the last four years, at the instance of the Government of India. In addition to this, the following recommendations are suggested for further development of fisheries in Gujarat:
 - (a) Limit the fishing operations in the conventional grounds. Earmark the near-shore waters for the artisanal fishermen and restrict the mechanized fishing to deeper waters beyond this zone.
 - (b) Promote diversified fishing for tuna, cephalopods and other fishes, beyond, in the deep sea and encourage selective fishing with fiscal support.
 - (c) A limited number (2 to 3) of freezer trawlers, with sophisticated navigation equipment, acoustic fish detection and monitoring devices, and highly skilled crew, could be introduced to undertake aimed midwater trawling. There is also scope for introduction of deep-sea fishing are pelagic drift long lines for oceanic resources such as tunas, pelagic sharks, sailfish and marlins; and bottom vertical long line and trap fishing in

sectors unsuitable for bottom trawling. The deep sea fishing operations may be with equity share and technology transfer through joint ventures and chartered vessel programmes, sharing the profit for a limited period.

1.354 Steel hulls, fuel saving devices, efficient designs of boats²⁹ may be stipulated while permitting replacement with a view to better / cheaper maintainance, higher efficiency, economics of operation, quality of fish etc. Fishing boat is to be equipped to process the fish on board to reduce cost, improve quality. Provision of advanced equipment onboard such as fish finders, echo-sounders, GPS, ship to store communication would bring efficiency in fishing operations. Government can provide initial grants /soft loans for bringing about these changes.

The cost of fixing a boat with various gadgets including fish finder and GPS amongst others would cost around Rs 3-4 lakhs per boat.

Government of Gujarat should stop replacement of wooden boats. In place of wooden boats, steel boats should only be allowed for replacement. Further, making of steel boats would give a boost to the ship-breaking industry in Alang that can provide good quality steel at a low cost for the same. However, it would be important to re-train the existing workers making the wooden boats.

Steel boats are better as these are cheaper to maintenance, have a long life span of 15 years and have better fuel efficiency.

Source: Stakeholder consultations

A key issue faced by the fishermen is the lack of credit from banks. Given the large amounts of NPAs in the past, the banks are not keen to lend to fishermen. These fishermen in turn borrow from private lenders and thus, later resort to distress sale of catch to pay back the credit.

The key reasons for non-payment of dues in the past have been the low returns from fishing combined with loan waiver schemes. The fishermen have a feeling that the Government would waive off the accrued loans and associated charges. This leads to lack of interest amongst private players to repay the bank loans.

Government should encourage formation of fishermen co-operatives as these would get the bank loans with greater ease.

Source: Stakeholder consultations

²⁹ Cost of wooden boat = Rs 15 lakhs per boat; Cost of steel boat = Rs 20 - 25 lakhs per boat
Mining

Overview

1.355 Gujarat has a large mineral resource base. Exhibit 58 shows the important minerals, places of occurrence and estimated reserves in Gujarat. It is clear that the Saurashtra region accounts for a number of these mineral resources. With respect to Coastal Saurashtra, the minerals present include Limestone, Bauxite, Lignite, Chalk and Bentonite amongst others.

Mineral	Estimated Reserves	Important Places of
	(In Lacs Tons)	Occurrences (Districts)
Limestone	119870	Kachchh, Junagadh, Porbandar,
		Amreli, Bhavnagar, Jamnagar,
		Panchmahals, Sabarkantha,
		Banaskantha
Bauxite	1050	Kachchh, Jamnagar, Jungadh
Lignite	21390	Kachchh, Bhavnagar, Surat,
		Bharuch
Dolomite	7200	Vadodara
Silicasand	9835	Kachchh, Surendranagar,
		Bharuch, Sabarkantha
Basemetal	85	Banaskantha
Chalk	570	Porbandar, Rajkot, Jamnagar
Chinaclay	1630	Mehsana, Sabarkantha, Kachchh
Fluorspar	116	Vadodara
Fireclay	1552	Surendranagar, Rajkot
Granite	20050	Amreli, Banaskantha, Mehsana,
		Sabarkanatha, Panchamahals
Manganese	25	Panchamahals, Vadodara
Marble	2596	Banaskantha, Vadodara
Wallostonite	30	Banaskantha
Quartz	40	Panchamahals
Bentonite	1050	Kachchh, Bhavnagar
Coal	30	Surendranagar, Kachchh
Gypsum	33	Kachchh, Jamnagar

Exhibit 58: Important Minerals, Occurrences and Estimated Reserves

Gujarat Mineral Policy 2003

1.356 As seen in Exhibit 59, the key minerals of Gujarat include oil, natural gas, limestone, lignite, bauxite, chalk, clay and quartz and silica.

2001-02 (Provisional)			
Mineral	Production (in tonnes)	Value (Rs in '000s)	
Agate	41	40	
Bentonite	252,846	28,938	
Bauxite	1,531,374	268,953	
China Clay			
Crude	70,750	7,495	
Refined	15,001	10,440	
Dolomite	197,015	21,517	
Fireclay	75,689	3,853	
Flourspar Crude	45,422	15,898	
Gypsum	319	47	
Limestone	14,977,025	1,422,159	
Manganese Ore	11,630	2,071	
Ochre	42	6	
Quartz and silica	620,720	69,153	
Soap stone	408	43	
Oil (in '000)	6,001	33,425,570	
Natural gas (Million C.M.)	2,797	8,391,000	
Lignite	5,766,654	3,060,256	
Chalk	161,952	30,432	
Clay (others)	4,266,434	118,570	
Ball clay	11,148	645	
Moulding sand	7,569	354	
Pipe clay	1,460	164	
Perlite	137	113	
	Statis	tical Abstract of Gujarat State 2003	

Exhibit 59: Mineral Production in Gujarat

1.357 Exhibit 60 shows that limestone, bauxite, chalk and clay are the most important minerals currently being produced in Saurashtra.

Exhibit 60: District-wise Mineral Production in Saurashtra

Production in tonnes

	Amreli	Jamnagar	Junagadh	Porbandar	Bhavnagar	Rajkot	S'nagar	TOTAL
White Clay	153							153
Clay Others (Marle)	20,783,762	-	1,379,143	495,473	-		344	22,658,722
Limestone	6,028,257	868,247	5,608,037	2,364,817	-	-		14,869,358
Natural Clay	51,174							51,174
Bauxite		1,182,374	-	3,960			10	1,186,344
Gypsum		10				-		10
Moulding Sand		-			1,850	150	5,569	7,569
Chalk		2,013	-	152,887	1,330	5,722		161,952
Dolomite					3,440			3,440
Lignite					-			-
Perlite						137		137
Fireclay						18,256	50,052	68,308
Silica sand						137	120,743	120,880

Statistical Abstract of Gujarat State 2003

Mining opportunities in Saurashtra

1.358 Saurashtra has a number of key minerals with significant economic potential. It is already exploiting its rich mineral resources including limestone, bauxite, chalk and clay. However, there are other key minerals present in the region that have significant potential present, namely, lignite and bentonite. In this section, we discuss the potential with respect to minerals that would have high economic value and thus, could be given higher priority.

Limestone

- 1.359 The Indian cement industry dates back to 1914 with the first unit being set up at Porbandar with a capacity of 1,000 tonnes. The Indian cement industry is today second only to China and ahead of countries like the US and Japan.
- 1.360 There are around 60 major cement companies in India with 116 plants. There are nearly 300 mini cement plants in the country today. With no major capacity expansion in the pipeline, the demand-supply level is expected to achieve parity on a macro level by FY07.
- 1.361 Out of India's total capacity of 146 million tonnes, **Gujarat accounts for over 17** million tonnes. Also, it accounts for production of 10 million tonnes of cement out of India's total production of 122 million tonnes.
- 1.362 The cement industry is going to witness a rapid domestic growth of 8% per annum in the coming years. A lot of this growth would be contributed by the Northern and Western markets. Further, due to the strong demand from the Middle East, double-digit export growth is a distinct possibility.
- 1.363 With the evolving demand-supply scenario and no new Greenfield projects coming up, the cement prices are likely to firm up in the coming years. However, the demand increase is likely to be over 35 million tonnes. With no Greenfield projects in pipeline and new projects having a gestation period of 3 years, it would need to be catered through **brown-field expansions. This presents a significant opportunity for Gujarat and especially Saurashtra**.
- **1.364** Gujarat is the 4th largest producer of limestone in the country. It accounts for almost 10% of India's production and 12% of the limestone reserves in the country.
- 1.365 Saurashtra region accounts for nearly the whole of limestone production in Gujarat. During 2001-02, Amreli accounts for 40% and Porbandar accounts for 37% of the total limestone production in the state.

1.366 Given that Saurashtra has abundant reserves of cement grade limestone there is a potential for setting up cement plants and augmenting capacities of existing plants in the region. There is considerable potential for setting up plants in Probandar / Junagadh and Amreli on account of abundant reserves. The proposed 2.00 million tonne p.a. cement plant by Indorama Cement in Jafrabad taluka of Amreli district seems to suggest that there is sufficient potential for setting up plants in these regions. Indorama Cement has applied for a limestone mining lease which is currently awaiting approval of the state government. The proposed lease area is 891.71 hecaters and according to the assessment done by Indorama as part of its prospecting lease, the limestone reserves in the specified area are approximately 194.30 Million tonnes. These reserves would be sufficient for a plant life of 45 years. According to the district officias of Geology & Mining Department, the state govt. is expected to approve the lease in the very near future and pave way for setting up of the 2 million tonne plant. Details of the present limestone leases in Amreli district are as follows:

#	Name of the company	Reserve in lease area
1	Narmada Cement Company Ltd	33 Million Tonnes
2	Ultratech Cement Ltd	145 Million Tonnes
3	Indorama Cement (Proposed)	194.30 Million Tonnes
	Total	372.30 Million Tonnes

(Source: Department of Geology & Mining – Amreli district)

- 1.367 Similarly, according to the officals of the Geology & Mining Department in Porbandar & Junagadh, there are abundant reserves of limestones in the region, particularly in the costal region. According to them, there are reserves sufficient to set up multiple plants in the region. This would be particularly true since Junagadh and Porbandar region has approximately 1500 million tones of limestone reserves.
- 1.368 According to the concerned officials, no reserve assessment has been undertaken by the government for last few decades. In light of the above instances, it would be pertinent for the governmet to undertake a detailed assessment of the reserves in these areas to better exploit these reserves. For example, according to a publication of the Department of Geology and Mining, GoG, the estimated reserves in Amreli are approximately 540.85 Million Tonnes. With Rajula taluka which accounted for approximately 50% of the total reserves in Amreli being shifted to the adjoining district, the present reserves of Amreli district have reduced and would now be approximately 270 Million Tonnes. On comparing the same with the figure of 372.30 million tones indicated in the table above, it seems that not all reserves have been captured in the government estimates.

- 1.369 It therefore seems that there are adequate limestone reserves in these regions.for setting up new plants or building capacities. However, inspite of sufficient reserves investments have not flow into the region mainly on account of the following reasons which have been identified and explained in the subsequent sections of this report:
 - Inordinate delays in issue of mining leases
 - Operational bottlenecks at the local level
 - Monoploy of transport operators
- 1.370 With the operationalisastion of Pipavav Railway line, bottlenecks related to connectivity and transportation have been considerably mitigated.

Bauxite

- 1.371 Gujarat ranks 3rd in India in terms of bauxite reserves and accounts for 5% of country's reserves. Saurashtra region produced nearly 77% of Gujarat's total bauxite production in 2001-02 with entire contribution from Jamnagar. Bauxite is available at Bhatia village, Jamnagar, which is just 45 km from Porbandar.
- 1.372 Most of the aluminium manufacturers have captive bauxite mines. However, Gujarat does not have any such alumina / aluminium manufacturers. This could be attributed to the **low-grade of bauxite present in Gujarat. Almost 70% of the bauxite found in Gujarat is of low grade**. Gujarat should focus on developing industries based on low-grade bauxite including aluminium, cement and refractory amongst others. Specific R&D efforts could also be directed to identify the best use of such bauxite.

Chalk

1.373 Gujarat contributes to nearly 100% production of whiting chalk. With the abundant presence of the mineral in the region, it would be prudent to promote downstream industries in this area including rubber, paint, tyre and other industries.

Lignite

- 1.374 With **15% share in India's production** in 2000-01, **Gujarat is the second largest lignite producer in the country**. The key industries where lignite is used include: power, textiles and chemicals amongst others.
- 1.375 In Saurashtra, **Bhavnagar has significant lignite deposits**. However, this is not being leveraged. During 2001-02, **there was no production of lignite in Saurashtra.**

1.376 Since Saurashtra lacks in power generation, the presence of lignite in Bhavnagar could be suitably exploited for electricity generation.

Nirma plant in Bhavnagar is already using lignite for generating electricity for captive consumption. However, the company brings lignite to Bhavnagar from Panandhro mines in Kutch. This is highly uneconomical and therefore, various impediments could be removed to make use of lignite resources of Bhavnagar. The primary impediment is the delay in provision of license to Nirma.

Also, Nirma had proposed a lignite-based power plant at Ghogha during Vibrant Gujarat 2003. Government of Gujarat should take necessary steps to help in grounding of the intended investments.

Stakeholder Consultations

Bentonite

- 1.377 Gujarat is the largest producer of bentonite in the country with nearly 90% of India's production in value terms in 2000-01. In the Saurashtra Coastal Corridor, bentonite is primarily found in Bhavnagar.
- 1.378 Bentonite is a clay mineral predominantly useful in following industries iron & steel industry for iron ore pelletization (helps in isolating iron ore pellets with the maximum percentage of iron), foundry, construction, fertilizer, water well & oil well drilling, bleaching clays, water proofing, agricultural pesticide and animal feed.
- 1.379 Promoting greater value-addition within Saurashtra would be the key to exploiting the mineral wealth. Government of Gujarat should actively promote downstream industries in Bhavnagar and other Saurashtra districts.

Key issues

1.380 Our discussions with stakeholders seem to suggest that the number of mining leases obtained is low due to the number of permissions and clearances required from a host of departments. The approval process seems to be a significant deterrent to obtaining mining leases. Sometimes, because of the inordinate delay, it is possible that some investors might relocate their investment to other locations in the country. Considering Saurashtra's current status on economic development and its intrinsic strengths in mineral endowments, such developments could be a huge setback. A illustrative list of mining lease applications from Amrli district pending approval of the State Government is provided below for information purpose:

Exhibit 62: Statement Showing Mining Lease pending with the State Government for approval as on 31st Dec, 2005

#	Name of the company	Taluka	Area in Hectares	Mineral	Date of Application	Date of Technical report to Commissioner Geology & Mining	Status
1	Ispat Industries	Jafrabad	773	Limestone	10/7/96	17/3/97	Approval pending
2	Indorama Cement	Jafrabad	1147	Limestone	4/5/97	23/7/97	Approval pending
3	Narmada Cement	Jafrabad	14	Limestone	15/3/97	10/7/97	Approval pending
4	Narmada Cement	Jafrabad	158	Limestone	24/5/98	8/9/99	Approval pending
5	Indorama Cement	Jafrabad	891	Limestone	17/1/05	24/3/05	Approval pending

(Source: Geology & Mining Dept, Amreli)

1.381 Further, delays in approvals lead to illegal mining starting in certain regions. Due to illegal mining in certain regions, the organized players find it difficult to increase their capacities.

Considerable time is spent in obtaining clearances from numerous agencies including Indian Bureau of Mines, Nagpur and Gujarat government. Sometimes, it takes very long for getting NA for land. Sometimes it takes up to 3 years. This leads to illegal mining activity.

It took Macdis nearly 9 years for getting mining lease in Amreli for a copper plant. (Certain issues concerning forestland were involved in this particular case). By this time, a very different phase in the cyclic copper demand has shaped up. Therefore, this investment may not even materialize.

Stakeholder Consultations

1.382 Lack of good infrastructure connectivity is hampering the growth of the mineral-based industries in the state. Good connectivity infrastructure would imply 'reliable connectivity at affordable price'. Further, considering the kind of mineral resources of Saurashtra e.g. limestone, the final produce (in this case, say cement) is logistics-intensive. The high logistics cost of transporting cement (30-35% of the total cost) makes cement market highly localized. Due to this, even if cement demand shoots up, only limited output from Gujarat can be used to service it in the current situation.

A major cement company in the region - Saurashtra Cement feels that if good connectivity is provided between Saurashtra and Southern India (via South Gujarat or otherwise) would help it to access southern markets.

Stakeholder Consultations

- 1.383 The disparity in the royalty charged from industry versus the traders is considered a problem by the industry. For example, the royalty for limestone is high for industry at Rs 45 per tonne in comparison to Rs 15 for traders.³⁰
- 1.384 In mining areas, significant problems are surfacing because of the transporters' lobby. This, if not corrected soon, could become a potential deterrent for future investments in the Saurashtra region.
- 1.385 For lignite mining, the Government acquires all the identified land and then leases it to a unit. Unlike this, in limestone mining, the government does not acquire the land, and therefore, the unit has to give proper compensation to the owners in case of private land besides facing the associated administrative challenges.

Suggestions moving forward

1.386 Gujarat has stated very forward looking objectives in its Mining Policy announced in 2003. The state needs to do the needful to implement the initiatives highlighted in the Policy.

³⁰ Primary interactions

Gujarat Mining Policy 2003 – Salient Points

- Thrust Areas: Lignite exploration, limestone, chalk, china clay, bentonite, and dimension stone like marble, granite etc
- Priority exploration for certain minerals
- Seeking private sector participation
- Preparation of Mineral Atlas and Data Bank
- To develop a system to mark mineral-bearing areas in village form 7/12 of revenue records in consultation with the Revenue Department.
- Introduce a system to ensure that mineral-rich areas are not transferred for any purposes other than mining, without a No Objection Certificate from the office of the Commissioner.
- Simplify the procedures for leaseholders, and to maintain a balance between the demand and supply of minor minerals.
- To make available facility of Chemical Analysis and testing of Physical properties at local level, Private Laboratories equipped with available equipments, facilities and technical competence will be accredited. Analysis & Study reports of such laboratories will be considered valid.
- A graduate course in Mining Engineering will be introduced in engineering colleges of Ahmedabad, Bhavnagar, Bhuj and Morbi. A post-graduate course in Geology will be introduced in the Gujarat University
- 2 high powered committees for implementation Empowered Committee & Mineral Advisory Committee
- Indicative timeframes for granting of license Major minerals: 12 months for mining lease; Minor minerals: 3 – 6 months

Source: Gujarat Mining Policy 2003

- 1.387 Gujarat would need to put special emphasis to curtail time delays in securing mining lease permissions. These time-delays and associated approval hurdles seem to be the biggest problems for potential investors. Annexure 1 gives the details of the list of clearances for starting an establishment in a state. It also highlights the list of clearances specific for mining industries.³¹ In order to provide better facilitation to the potential investors, the following measures could be undertaken:
 - (a) The government should focus on reducing the timeframes for clearances from current 3-6 months for minor minerals and upto 12 months for major minerals. Further, all efforts should be undertaken to completely process an application within the stipulated timeframe. Gujarat can consider appointment of Escort Executives for specific projects so as to ensure expeditious implementation.
 - (b) In order to overcome the problems of getting land for compensatory afforestation each time, Government should start a "Land Bank" from which it could allocate areas for afforestation based on requirements.

³¹ The list of clearances provided in the Annexure is for the state of Orissa. Hence, the limited purpose of listing the clearances is to enable the various stakeholders appreciate the complex and lengthy processes adopted by various states.

- (c) As far as possible, self-assessment by lessee should be encouraged e.g. royalty.
- (d) The initiative of accrediting private laboratories announced in Gujarat Mining Policy 2003 is a great step and should be implemented fast.
- (e) Gujarat Government should take all steps to develop the Mineral Atlas (as stated in its policy of 2003) and continuously update it. It should further initiate steps to clear land titles and associated formalities for high-potential areas. This would help a potential investor in taking up their project at a faster pace.
- 1.388 In order to help Saurashtra exploit its true mineral potential, it would be important to develop good connectivity infrastructure within Saurashtra and other parts of the country. For example, shortening the distance between Saurashtra with southern India could help Saurashtra based cement firms to tap the Southern markets. In order to promote infrastructure development for mining areas, a special fund can be created. This can be created out of existing mining revenues accruing through royalty income and rent. For example, AP Government is allocating 35% of the minor mineral revenues for infrastructure development.³² Orissa government has undertaken a similar initiative under the Orissa Rural Infrastructure and Socio Economic (ORISE) Act 2004.

Orissa Rural Infrastructure and Socio Economic (ORISE) Act 2004

As per the notification section 3 of the ORISE Act, the mining compaies are to pay cess at a rate varying from five to 20 per cent on different mineral bearing land.

According to the Act while the companies mining Bauxite have to pay a cess of 20 per cent, those mining coal, iron ore, chromite and manganese have to pay a cess of 15 per cent, lime stone and dolomite 10 per cent, fire clay, china clay, graphite and gem stone five per cent.

The state government notified about the Act last February and the tax collected through the cess would be used for infrastructure development of villages close to mines area.

Source: Various websites

1.389 The issue related to development of infrastructure in mining areas has been addressed in the Gujarat State Mineral Policy, 2003. Clause 4.6 of the policy provides for improvement of infrastructure facilites such as roads, water etc with the help of State governments decentralized District Development Fund in mining clusters. The scheme provides for development of required infrastructure in partnership with the lease holders. The cost of improvement is to be shared equally between the lease holder and the state government.

³² Andhra Pradesh Mining Policy

1.390 The progress made by the government on the said front is illustrated in Exhibit 65 below:

Year	Amount spent on Roads (Rs. in lacs)		Amount spent on Electrification (Rs. in lacs)		
	Vadodara	Surat	Vadodara	Rajkot	Kheda
03-04	-	-	-	-	6.00
04-05	12.00	-	4.50	-	-
05-06	-	5.70	2.10	2.62	2.76
Total	12.00	5.70	6.60	2.62	8.76

Exhibit 63: Infrastructure Improvement in Mining areas – Progress

(Source: Geology & Mining Department, GoG)

- 1.391 For the year 2005-06, Rs. 40 lacs have been allocated for improvement of infrastructure in mining areas.
- 1.392 The improvement in infrastructure by developing alternative transport modes would increase competition in transportation e.g. provision of rail services or development of ferry services between Saurashtra and southern Gujarat, would reduce dependence of industries on road transport. This could be useful in curbing the influence of the transporters' lobby that, according to our stakeholder discussions, seems to be posing considerable difficulties to investors.
- 1.393 Gujarat should support R&D and technological upgradation in the mining area through the creation of a special fund. A dedicated fund would provide the required focus and give the initiative a thrust in the right direction.
- 1.394 Specific courses for human resource development in the Saurashtra region need to be started. It has been mentioned in the policy that a graduate course in Mining Engineering would be started in Bhavnagar. We feel that this initiative should be taken up expeditiously. Also, vocational courses should be started for workers. With regard to indroduction of vocational courses, it would be pertinent to note that at present, Mechanic Mining Machinery trade is covered under the Apprentice Training Scheme (ATS). The course details are as follows:
 - (a) Course duration: 36 months
 - (b) Eligibility criteria: Should have passed 10th class examination with sciense (physics & chemistry) as subject under 10+2 system or its equivalent

- (c) No. of seats available: Nil
- (d) No of seats filled: Nil
- (e) Establishments offering the said trade: None
- 1.395 As can be seen from the above, although the ATS has provision for the trade, none of the ITI's is offering the same. This, based on our discussions with the Directorate of Employment & Training officials, is due to the fact that the syllabus of the trade is far more comprehensive and exhaustive than that required by the industry. We also gather that the technology and methodology currently followed in the mining industry in Guajart is very basic in nature. These techiques do not find use of learnings provided in the Apprentice Scheme of NCVT. Accordingly this particular trade is not being offered by any of the ITI's in Gujarat. At present only one institute in Kutch is offereing a Diploma in Mining. The course was started around 9 years back and offers 30 seats.
- 1.396 Adoption of new technologies like satellite imaginaries for location of mineralized zones, checking amount of possible extractions from mineral zones, number of illegal mines etc. would help in giving a boost to the mining and mineral-based industries.
- 1.397 Mining lease is issued based on extraction of a specific mineral only. Once the extraction is over then the land is handed over to the government. However, the government should allow mining of other minerals on the same plot by the operator. This provision would be useful when a particular tract of land has more than one mineral. The provision of a single licensee from a specific tract of land irrespective of the number of minerals present would promote efficiency in mining operations and suitable use of mineral resources.
- 1.398 Government should acquire the land and hand it over to units for undertaking mining in specific areas.
- 1.399 Royalty rates need to be relooked and the focus should be on aligning the rates of royalty both for industry and traders, as in case of limestone.
- 1.400 The Union Budget for the year 2005-06 has proposed to increase mining royalties for limestone and bauxite. With Saurashtra having significant presence of these minerals, this could be a setback for mineral-based industries. Government of Gujarat should identify means of overcoming this drawback, either by making a representation to Central Government for re-looking at the rates or by other incentives at the state level.

Tourism

Potential in India and Gujarat

- 1.401 It is widely acknowledged that India has considerable tourism potential that is not fully tapped. In the period 2005 2014, Indian travel & tourism economy is likely to grow annually at 8.8% against a global average of 4%.³³ Based on this growth, the following scenario is likely to emerge:
 - (a) Industry size would increase from US\$ 38.8 billion in 2004 to US\$ 90 billion in 2014.
 - (b) Employment would increase from 24 million jobs (5.6% of total employment) in 2004 to 28 million jobs (5.7% of total employment) in 2015.
 - (c) Indian personal travel and tourism is likely to increase from US\$ 19.5 billion (5% of total personal consumption) in 2004 to US\$ 46.5 billion (6.1% of total consumption) in 2014.
- 1.402 This scenario presents promising opportunities for leveraging the tourism potential of Gujarat. The state has a variety of attractions including renowned places of pilgrimage such as Somnath and Dwarka, various ancient Buddhist, Jain, Hindu and Muslim monuments, 24 national parks and sanctuaries having rare species including Asiatic Lion (Gir in Junagadh). The marine national park around Jamnagar could also be a major tourist attraction. Diu albeit a UT is also in this area.
- 1.403 Against these attractions, **Gujarat currently attracts only 1% of foreign tourists** visiting India and while only **2% of India's domestic tourists** visit Gujarat.³⁴ Also, an examination of the mix of tourists visiting Gujarat suggests that **most of these are business tourists**. Further, even **amongst the tourists that visit for pleasure, most of them are low-spending religious** tourists visiting Ambaji, Dwarka and Somnath. Clearly, increasing the visibility & diversity of offerings in the state combined with increasing per capital tourism spending would be the key to leveraging the potential of the state.
- 1.404 The current tourist statistics of Gujarat highlight both the opportunity for tourism in the state and the series of long-term measures that need to be undertaken to realize the full potential. We have also examined the possible tourism themes that could be promoted within Saurashtra. However, to achieve this, the connectivity bottlenecks would have to be removed and along with suitable marketing & promotion. These efforts would have to be supplemented by inducting trained workforce to run various tourist facilities, as explained further in this section.

³³ WTTC estimates

³⁴ Secondary sources

Promotion of varied tourism themes for leveraging Saurashtra's potential

- 1.405 Based on our review of the secondary reports and primary interactions, we feel that the following development themes for Saurashtra could be explored:
 - (a) Develop Porbandar as a central point for Dwarka Porbandar Somnath tourism circuit. This would primarily be positioned as a pilgrimage circuit.
 - (b) Develop Junagadh city as a central point for developing Sasan Junagadh Ahmedpur Mandvi tourism circuit. This would be primarily positioned as a heritage cum adventure circuit.
 - (c) Develop the Saurashtra Pilgrimage cum Eco-Tourism Circuit by including the above two circuits along with Palitana into the Vision 2020 being prepared by GIDB.
- 1.406 However, we feel it would be prudent to have smaller but focused initiatives at the two key tourism nodal centers, Porbandar and Junagadh. Based on the results achieved, Government of Gujarat could go ahead with the development of the overall circuit.
- 1.407 Presented herewith is a brief description of the rationale for suggesting the two tourism circuits centred around Porbandar and Junagadh city, along with the key developments that need to be undertaken to boost their tourism prospects.

Development of Dwarka – Porbandar – Somnath Pilgrimage circuit

1.408 Dwarka – Porbandar – Somnath circuit has considerable potential. A large number of tourists already visit Dwarka & Somnath because of their religious significance and Porbandar due to its historical importance (Mahatma Gandhi's birthplace). This existing tourism base it offers a ready potential to be further tapped. Details of the various locations within these circuits are presented in this section. We have then explained the justification for concerted focus on this circuit.

Dwarka

- 1.409 Dwarka is one of the major Hindu pilgrimages for devotees of Lord Krishna. Dwarkadhish temple is the main attraction for pilgrimages. Other major attractions near Dwarka are Nageshwar temple, Gopi Talav, Rukmani temple and Shardapith. Bet Dwarka, an island near Dwarka is covered with temples. The eastern tip of the island has a lovely white beach, coral reefs and extensive marine life. Dolphins and porpoise can be seen in near by-waters and sea turtles inhabit the beach. Octopus, starfish, sea urchins and other marine life abound in these waters.
- 1.410 The key characteristics of the tourists visiting Dwarka are explained as follows.

(a) Exhibit 64and Exhibit 65 highlight that even though a large number of tourists are visiting Dwarka, the total tourist expenditure per tourist is significantly low. This seems to indicate the absence of high-end tourists. Nearly 94% of the total tourists visiting Dwarka come for pilgrimage.³⁵ These are typically the low-spending tourists. Given the volume of the inflow of such tourists, there is an opportunity to tap their spending power by developing more facilities / avenues for tourists in Dwarka on the pilgrimage theme. A similar transformation is being attempted with some success at Tirupati in Andhra Pradesh. Further, lack of good connectivity of Dwarka with other parts of the country (Porbandar has limited number of flights each day) limits inflow of the high-end pilgrimage tourists. There are also not enough spending avenues for these tourists in the absence of which the per-capital spend is low.

Exhibit 64: Current Tourist profile in Dwarka

Category	Numbers
Total Tourists ³⁶	16 to 17 lakhs/annum
Overnight staying tourists	5 to 6 lakhs/annum

Source: Gujarat Tourism Perspective Plan, 2003

Exhibit 65: Spending Pattern of Tourists in rupees

Tourist Share	Accommodation	Food	Traveling	Miscellaneous
10%	600 - 1200	150-200	400-500	200.00
90%	100 - 400	50-150	30-200	100.00

Source: Gujarat Tourism Perspective Plan, 2003

1.411 With 16 –17 lakh tourists visting Dwaka annually, it is important to develop requisite hotel infrastructure to make the location suitable for all categories of tourists. The current hotel density in Dwarka is low. Budget hotels and 'dharamsalas' need to be developed, as most of the tourists seem to have a low budget. Also, there are no star-category hotels. At present, most of the tourists visiting Dwarka use Porbandar as their base location and do a one-day trip to Dwarka. In this scenario, it would be prudent to strengthen the hotel infrastructure in Porbandar as well. Due to the central location of Porbandar, we feel that it should be developed as the key centre for the development of the circuit. Given the mismatch between current demand and that required to sustain new tourism sector investments, government may have to consider interventions involving a mix of policy, infrastructure support, marketing support & incentives in the initial years for the creation of such facilities that in the long term would give considerable spin-offs. This is explained subsequently.

 $^{^{35}}$ Gujarat Tourism Perspective Plan, 2003; Business Tourists – 1% and Leisure / Heritage tourists – 5%

³⁶ Foreign Tourist No.'s are not available as most of the non residents stay at their native place and do not use hotels

Category	No. of Hotels	Total Rooms
4 & 5 Star Hotels	0	0
2 & 3 Star Hotels	0	0
1 Star or Deluxe Hotel	15	300
Guest House	15	300
Dharamsala	30	900
Heritage Hotel	0	0
Total	60	1500

Exhibit 66: Accommodation Statistics in Dwaraka

Source: Gujarat Tourism Perspective Plan, 2003

Somnath

- 1.412 Somnath is one of the famous twelve jyothirlingas seven kms away from the fishing port of Veraval. Many devotees from all over the country visit the Somnath shrine. Somnath beach also has all the basic ingredients of a good tourism destination like a good beach stretch abutting the sea, historic temples in the town and an estuary.
- 1.413 Exhibit 67 shows that a large number of tourists come to Somnath and stay overnight. However, nearly 93% tourists come for pilgrimage purpose and are low spending tourists.

Exhibit 67: Current Tourist profile in Somnath

Category	Numbers
Total Tourists ³⁷	9 to 10 lakhs/annum
Overnight staying tourists	4 to 5 lakhs/annum

Source: 20-Year Perspective Plan for Development of Sustainable Tourism

 $^{^{\}rm 37}$ Foreign Tourist No.'s are not available as most of the non residents stay at their native place and do not use hotels

1.414 Somnath also lacks good facilities in terms of accommodation. However, since most tourists prefer to travel to Somnath from Porbandar / Junagadh, it might be prudent to develop these latter nodal centers as a priority.

Porbander

- 1.415 Porbander is situated on the west coast to the south of Dwarka and is the birthplace of Mahatma Gandhi. This port city houses the Kirti Mandir Memorial, which contains a library, a spinning hall, a nursery school and a prayer hall. The other religious spots frequented by pilgrims in Porbandar are Sudama Mandir, Harshad Mata temple and Kileshwar temple. The beach near Harshad Mataji appears to have potential for development. Madhavpura (45 km from Porbandar) has a beautiful beach (10-12 km) and it is on the National Highway. It could be explored from the point of view of medical tourism.
- 1.416 Exhibit 68 shows that majority of the tourists visiting Porbandar are staying overnight. Of these, 40% are business travelers, whereas 55% and 5% come for leisure / heritage and pilgrimage purposes.

Exhibit 68: Current Tourist profile in Porbandar

Category	Numbers
Total Tourists	1.5 to 1.75 lakhs/annum
Overnight staying tourists	1 to 1.2 lakhs/annum

Source: 20-Year Perspective Plan for Development of Sustainable Tourism

- 1.417 As mentioned earlier, the accommodation facilities in Porbandar need to be significantly improved. As it serves as a key centre for tourists between Dwarka and Somnath, it would be important to develop good star-category hotels in this city.
- 1.418 Tourism Corporation of Gujarat Limited (TCGL) could take a lead in improving the hotel infrastructure. Its resort enjoys a good location and, with suitable development, especially in boarding in lodging facilities, could emerge as an attractive holiday options. The details of the resort are mentioned below. Alternatively, TCGL could consider giving this property on a "management lease" or other such contracts to leading private sector hotel companies, who would then have a commercial incentive to "pull" tourists. We feel this would be an important step in leveraging the strengths of the private sector in awareness building as well as marketing the tourism potential of these circuits. The tourism privatization policy in Gujarat provides a sound foundation for such Public Private Partnership transaction to be effected.

TCGL Property at Porbandar

- 24 rooms; Very good location (on the beach front)
- 2-3 years ago, occupancy was 20-25%; now its nearly 50%; in December 2004, it was 70%; Occupancy has improved because of renovation of the

place, improved marketing efforts (Porbandar was a central point in last year's Navratri festival)

- Tourists usually stay for 1 night; Delhi and Kolkata tourists stay for 3 nights (visiting Dwarka and Somnath)
- Facilities desired include: cable TV, STD, good garden, restaurant
- Monthly budget is nearly Rs. 80,000 of which salary accounts for Rs 62,000;
 9 employees (In last 2 years, 4 people retired but no fresh recruits)
- Monthly income of Rs 100,000 income is needed for break even

Stakeholder Consultations

Development of Sasan – Junagadh – Ahmedpur Mandvi circuit

- 1.419 Sasan Junagadh Ahmedpur Mandvi circuit has immense potential to be developed into a heritage and adventure tourism circuit. Junagadh circuit provides a range of experiences to visitors such as coastline dotted with clean beaches, heritage and cultural sites, mountains, wildlife sanctuary and historical monuments. In essence, it offers a good mix of various attractions that enhance tourism potential. The large existing tourist flow combined with proximity to the pilgrimage centre of Somnath offers tremendous potential for this circuit to be exploited.
- 1.420 The major tourist destinations in the circuit are Ahmedpur Mandvi (sea beach destination), Sasan Gir (national forest park), Girnar / Junagadh (heritage destination) and Somnath (pilgrimage centre). The entire region can be developed as an integrated heritage and adventure circuit.
- 1.421 The key characteristics of tourists visiting Junagadh region as explained as follows.
 - (a) Besides attracting a large number of domestic tourists, Junagadh attracts a significant number of foreign tourists. The statistics are shown in Exhibit 69.

Category	Numbers	
Total Tourists	9 lakhs/annum	
Foreign Tourists	2500-3000 /annum	
Overnight staying tourists	0.9 to 1 lakhs/annum	
Tourists visiting Junagadh Fort	5 lakhs/annum	
Tourists visiting Junagadh Museum	2 lakhs/annum	

Exhibit 69: Current Tourist Profile in Junagadh

Source: Gujarat Tourism Perspective Plan, 2003

(b) Although 50% of the tourists visiting Junagadh are leisure tourists³⁸, the per tourist expenditure as shown in Exhibit 70 is low. This could be due to the lack of suitable spending avenues and limited stay in Junagadh. Thus, focus should be on enhancing the stay and providing varied avenues for the tourists to spend more.

³⁸ Gujarat Tourism Perspective Plan, 2003; Business – 5%, Pilgrimage – 45%

Tourist Share	Accommodation	Food	Travelling	Miscellaneous
5%	600 - 1500	150-200	400-700	200.00
35%	400 - 500	75-150	100-200	100.00
60%	15-200	50-75	30-50	50

Exhibit 70: Spending Pattern of Tourists in rupees	Exhibit 70: S	Spending	Pattern of	Tourists i	in rupees
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Source: Gujarat Tourism Perspective Plan, 2003

1.422 There seems to be no correlation between the volume of leisure tourists and the number of star hotels as shown in Exhibit 71. This infrastructure needs to be developed to increase the stay and spend of the leisure tourists. Also, Gir forest, if further promoted could attract high-end tourists as well. Understandably, we have to consider carrying capacity in mind before finally determining the scale of such new facility creation. It would be crucial to develop suitable accommodation facilities catering to these tourists.

Category	No. of Hotels	Total Rooms
4 & 5 Star Hotels ³⁹	0	0
2 & 3 Star Hotels	0	0
1 Star or Deluxe Hotel	12	213
Guest House	10	170
Dharamsala	10	90
Heritage Hotel	0	0
Total	32	473

Exhibit 71: Accommodation Statistics in the circuit

Source: Gujarat Tourism Perspective Plan, 2003

Key constraints

1.423 The principal constraint faced by various tourist locations is that of connectivity with other parts of the country. Broad gauge railway connectivity is missing for some tourist locations in Saurashtra such as Amreli, Porbandar and Junagadh. Therefore, tourists need to change trains at Ahmedabad and Rajkot. Against this backdrop, all efforts should be made to enhance the connectivity of the districts in Saurashtra with Ahmedabad and Rajkot. Further, Rajkot has limited number of trains running to other parts of the country. Thus, to promote Saurashtra, it would be essential to enhance Rajkot's connectivity with other parts of India.

³⁹ There is a 5-star hotel run by the Taj Group – The Gir Lodge

- 1.424 Lack of good quality hotels at most of the tourist locations in Saurashtra is the other major constraint. Considering the limited high-end tourists visiting various locations, such facilities could be developed at Junagadh and Porbandar to begin with while simultaneously developing hotels for the budget/low spend tourists.
- 1.425 Further, there is lack of varied spending avenues at these locations leading to limited tourist spending. Hence, based on the themes suggested above, these key locations in Saurashtra need to be developed to provide increased spending opportunities for tourists.
- 1.426 The key infrastructure issues at various locations in Saurashtra that impact tourism sector are presented below⁴⁰:
 - (a) Improvement in approach highway: Porbandar, Amreli, Sasan Gir
 - (b) Tourist accommodation: Bet Dwarka, Somnath
 - (c) Lack of beach activities: Porbandar
 - (d) Irregular power supply: Bet Dwarka, Palitana
 - (e) Drinking water & basic sanitation: Mostly all key destinations

Suggested Way Forward

- 1.427 For Dwarka Porbandar Somnath circuit, the following actions steps could be considered:
 - (a) Attract high spending tourists and increase the duration of stay for all categories of tourists. This would require development of suitable facilities and attractions at all the places. Further, good connectivity would need to be provided between Porbandar (the nucleus of the circuit) with other parts of the country.
 - (b) The key development that could be carried out at various locations in the circuit include:
 - Porbandar: Star-category hotel/resort (Madhavpur can be looked as a location for development of beach resort), tourist information centers at key tourist arrival points (airport, station, bus stand), development of TCGL Resort on Chowpatty, motels on the coastal highway (on either side to Dwarka and Somnath)
 - Dwarka: Besides the development of the beach, the key area of focus should be eco-tourism. With 23 uninhabited islands nearby and a good marine life comprising of dolphins, porpoise etc near Bet Dwarka, Dwarka

⁴⁰ CII Report, July 2003

offers an exciting proposition to be developed as a good eco-tourism destination. Other things that could be developed include possibilities for a sea cruise, a water sports complex along with facilities for scuba diving to showcase the submerged Dwarka city, Spiritual & Yoga centre, temple area development with a small religious theme park, garden development

 Somnath: Development of budget hotels, beach development, temple area development with a religious theme park, gardens and lighting during night time, development of good restaurants

During Vibrant Gujarat 2005, Government of Gujarat has signed a MOU with RF Gandhi - AKT Ltd., Mauritius for development of a Floating Restaurant & Beach Resort at a cost of Rs 4.5 crores at Somnath, Junagadh.

This is an initiative in the right direction and Government of Gujarat should make all attempts to see the fructification of this investment. It would provide a great boost to tourism in the region.

Source: <u>www.gidb.org</u>

- 1.428 For Sasan Junagadh Ahmedpur Mandvi circuit, the following actions steps could be considered:
 - (a) Attract high spending tourists and increase the duration of stay for all categories of tourists. This would require development of suitable facilities and alternative avenues for increasing tourism spend. As regards connectivity, Junagadh currently lacks an airport facility. The development of the Keshod airport has been talked about at various forums. However, we feel that considering the proximity of Junagadh to Rajkot and Porbandar, the improvement of air connectivity of these locations (by attracting low cost airlines) with other parts of the country would greatly benefit Junagadh. This would be able to give the desired results in the short time. However, good road connectivity needs to be ensured between Rajkot and Junagadh and Porbandar and Junagadh. Although Gujarat has a well-developed private bus transport network, Government can look at special tourist buses to pick up tourists from Rajkot and Porbandar airports and take them to Junagadh.
 - (b) The key development that could be carried out at various locations in the circuit include:
 - Junagadh city: Monument upgradation, development of star-category hotel and good restaurants, tourist information centres
 - Sasan Gir: Jungle resort
 - Ahmedpur Mandvi⁴¹: Beach development, water sports development, development of gardens and good restaurant

⁴¹ Ahmedpur Mandvi beach is considered better than Diu beach. However, due to prohibition in Gujarat, the tourists don't stay at Ahmedpur Mandvi and move to Diu, which is close to Ahmedpur Mandvi. Being a contentious issue, Government of Gujarat should carefully examine limited relaxation to give an impetus to tourism activities.

(c) It would be important to review Junagadh collector office's plans in order to develop a comprehensive programme for all-round development of Junagadh and in realization of its true tourism and other economic potential.

The collector's office has already prepared two development plans – Girnar Development Plan (cost Rs.36 crore) and Junagadh Development Plan (cost Rs.100 crore).

Stakeholder Consultations

- 1.429 Besides creation of infrastructure and various facilities at these locations, Government of Gujarat would need to focus on other aspects including:
 - (a) Marketing & promotion: Government would need to increasingly focus on marketing the various tourist attractions keeping in mind the target segment of the tourists. Suitable media including the Internet should be leveraged for showcasing the true treasures of Gujarat. An advertisement firm should be engaged to shape this campaign.
 - (b) It would be important to help the existing hotels and resorts improve and offer better facilities to tourists. This can be done by offering incentives to hotels / resorts for either remodeling or converting into star category, as is done in Mahrashtra. An example of such a incentive could include providing limited capital grant subject to a cap, as is typical in the industrial policy.
 - (c) Privatization of TCGL properties: We feel the TCGL resorts in Porbandar and Veraval are strategically located. However, these properties need suitable make-up to look better. This would also help in improving their perception. With this objective, Government should either infuse funds for improving these properties or explore other options including privatization to suitably leverage these properties and enhance the experience of visiting tourists. The list of facilities in Saurashtra and the accommodation facilities are shown in Exhibit 72.

TCGL Property	Details		
Locations			
Chorwad, Junagadh	24 rooms		
Dwarka	2 A/C DBL, 8 NON A/C DBL, 2 Triplebed, 2 Dorm-5 Beds, 2 Dorm- 9 Beds		
Hotel Girna, Junagadh	4 DLX, A/C DBL, 20 NON A/C DBL, 1 Dormitory, 1 Conference Hall		
Hotel Sumeru, Palitana, Bhavnagar	5 A/C DBL, 12 NON A/C DBL, 1 Dormitory (11 Beds), 1 Dormitory (5 Beds)		
Porbandar	A/C DBL, 16 NON A/C DBL, 4 Dormitory (6 Beds)		
Veraval	4 A/C DBL, 2 NON A/C DBL, 4 Four Beds, 1 Six Beds		

Exhibit 72: TCGL Properties in Saurashtra

Privatization of TCGL properties can be done through outright sale, BOT basis and management contracts. Considering the ease of implementation, BOT and management contracts are more likely to succeed.

The principle that can be used to identify the BOT vs management contract is to assess the amount of capital expenditure required for improving the property. In case, the capital expenditure is large, BOT should be adopted else management contracts would be a better choice.

Also, a key to privatization would be the manner in which existing employees are protected keeping in mind the interests of the private party as well. It would be better to give a property on lease or management contract without making it binding for the private party to take over the employees associated with the party as well.

We feel this would be an important step in leveraging the strengths of the private sector in awareness building as well as marketing the tourism potential of these circuits. The tourism privatization policy in Gujarat also provides a sound foundation for such Public Private Partnership transaction to be effected.

- (d) Formation of a Tourism Portal: IT has revolutionized the manner in which business is being done today. TCGL should leverage the same to provide a one-stop shop for visiting tourists including information on tourist attractions, connectivity with other key centers, online hotel / resort booking, etc. The initial cost may be around Rs 5 crore, which could be justified by the boost it is likely to provide to the tourism sector in Gujarat.
- (e) Manpower development: The development of trained manpower to take care of tourism related activities would be important for promoting tourism in the country. Given the large amount of investments estimated in tourism in Gujarat, there is a need to make suitable arrangements for training of people across the tourism value chain including the hotel staff, guides and travel agents amongst others. The total manpower that needs to be trained for undertaking various tourism related activities in the whole of Gujarat by 2010 is 115,700.

Estimation of manpower requirements in tourism in Gujarat

- Amount of investment in tourism (2005-10): Rs 520 crore⁴²
- Number of tourism jobs created by investing Rs 1 crore: 890⁴³
- Number of new jobs to be created: 462,800
- Number of people having formal training requirements: 25% = 115,700

⁴³ Orissa State Development Report

⁴² Study Report on Preparation of 20 Years Perspective Plan for Development of Sustainable Tourism

In order to train these people, it would be important that the ITIs are geared up to provide customize courses. There needs to be a revision of the course curriculum and specialized courses for tourism related activities should be offered.

Given that tourism is a key activity in Porbandar and Junagadh, the ITIs specifically in these districts should be accorded high priority and thus, the desired focus to incorporate relevant courses.

Additionally, the government could also consider setting up such as hotel management institutes in Ahmedabad offering courses in hospitality industry, catering and other service sectors. Such institutes could also benefit other industries in the state.

Gems & Jewellery

Overview

- 1.430 Gems and Jewellery industry is the leading foreign exchange earner for the country. With a growth rate of 15% per annum, it is one of the fastest growing Industries in the country and employs over 1 million people.
- 1.431 India's cost competitiveness is its biggest advantage. Typical diamond jewellery, which is produced between \$ 60 and \$ 90, is sold in the overseas market for \$ 180, indicating a very high value-addition. India today occupies top position in importing, processing and exporting diamonds. Nine out of ten diamonds in the world are cut and polished in India. Further, 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.
- 1.432 Indian exports include diamonds, precious / semiprecious stones or colored gemstones, gold jewellery, pearls, non-gold jewellery, synthetic stones Costume / fashion jewellery amongst others. The buoyant growth in exports is highlighted in Exhibit 73.

Items	1971-72	1981-82	1991-92	2001-02	2003-04 (Provisional)
Cut & Pol Diamonds	48	797	2,500	5,971.91	8,626.27
Col Gemstones	13	41	104	182.69	177.90
Gold Jewellery	0	49	304	1,166.83	2,544.89
Others	4	10	17	92.52	103.20
Export of Rough Diamonds	0	2	10	142.15	534.37
Total Exports	65	899	2,935	7,556.10	11,986.63

Exhibit 73: Gems & Jewellery Exports Statistics

GJEPC

Value in US\$ in million

1.433 The US is the biggest export market for India in terms of value. The details on other export markets are given in Exhibit 74.



Exhibit 74: Export markets for gems & jewellery

GJEPC

- 1.434 Indian studded gold jewellery market is estimated at Rs 800 million. The current consumption of gold in India is estimated at over 900 tonnes used mostly in 20 / 22 carat jewellery. Between 1995-96 and 2000-01, exports of diamonds increased at a CAGR of 12 %, while that of gold and jewellery increased at a rate of 23%. Thus, overall market of studded gold jewellery seems to be fast expanding. Studded gold jewellery has a fast expanding market in Europe, USA, Canada, Japan, Gulf countries and Australia.
- 1.435 Out of the total global demand for silver of around 29,000 tons, India's demand for silver is around 3,800 tons. In India, close to 90% of silver consumption is in jewellery making. The demand for jewellery was higher by 7% in tonnage terms and 17% in rupee terms in the first half of 2004 compared to the same period in 2003. The total jewellery market size in India is estimated to be Rs. 450 billion and the branded jewellery market is approximately INR 8 billion (USD 0.17 billion). Studded silver jewellery has a fast expanding market in countries such as USA, Europe, Canada and Japan.
- 1.436 The significant rise in India's jewellery exports is shown in Exhibit 75.





GJEPC

1.437 India is uniquely positioned in relation to competition in the jewellery market. While China, Hong Kong, Italy and Thailand have their strengths in plain, diamond or gemstone jewellery, India has a presence across all these segments.

	Plain Jewellery	Diamond Jewellery	Gemstone Jewellery
China / Hong Kong		\checkmark	
Italy	✓		
Thailand			✓
India	~	\checkmark	\checkmark

The tick mark shows the country's presence in the particular segment

Opportunities for Saurashtra

- 1.438 Gujarat accounts for almost 80% of the diamonds processed in India. Of this, about 10,000 diamond units located in and around Surat alone process 90% of the diamonds. The rest of the diamond units are located at Ahmedabad, Palanpur, Bhavnagar, Valsad and Navsari. A large number of workers employed in Surat come from the districts of Amreli and Bhavnagar in Saurashtra.
- 1.439 Rajkot is internationally famous for its unique hand made golden and silver ornaments, which constitutes 85% of the total jewellery production in India.
- 1.440 The key factors contributing to Gujarat's success include:

- (a) Low cost, economic and skilled labour
- (b) Presence of communities which have traditional knowledge/domination of the business
- (c) Availability of large number of skilled labour
- (d) Easy availability of institutional and Bank finance
- (e) Relaxed government rules and regulations
- (f) Other competing centres like Hongkong, Thailand, Taiwan, Korea, U.S.A and Italy are becoming costlier with decreasing availability of skilled labour.
- 1.441 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. Hence, jewellery manufacturing should be an area of focus for capturing higher value-addition within the state.
- 1.442 Indian hand-made jewellery has a large ethnic demand in various countries with sizeable Indian population in countries such as the Middle East, South-East Asia, USA and Canada. Apart from jewellery made from gold, there is also an emerging up-market need for platinum jewellery, which is growing at the rate of 19%. Given that Rajkot has a majority share of hand-made jewellery in India, it would be prudent to undertake steps to help it leverage its true potential.
- 1.443 A large number of people working in Surat come from Bhavnagar and Amreli. If gainful employment opportunities were to be provided in Saurashtra, then these workers are more likely to get absorbed in the region than migrate to places such as Surat. Hence, the availability of the large talent pool provides Saurashtra with a key competitive advantage that needs to be leveraged.

Suggested way forward

- 1.444 In the context of the above factor advantages, Saurashtra' development prospects can get a significant boost with expansion of the gems & jewellery industry. Existing centers such as Rajkot, Bhavnagar and Amreli have significant presence of gems & jewellery industry. Further, there is a vast existing talent pool, which due to lack of opportunities in the region migrates to Surat and other areas. The continued migration is a big challenge for Saurashtra. Further, it also adds significant pressure to the other urban centers like Surat.
- 1.445 In order to promote the development of gems & jewellery sector, Government would need to play a key role and initiate a number of interventions. The critical interventions include:
 - (a) Establishment of Gems & Jewellery Parks at Rajkot, Bhavnagar and Amreli should be taken up. Besides the economic development aspects, it would

play a critical role in arresting increased migration from Saurashtra.⁴⁴ As per the Industries Department, GoG, the State Government has in principle approved the setting up of a Gems & Jewellery cluster in Bhavanagar on a priority basis. The decision to setup the cluster in Bhavanagar has been influenced to a certain extent by the following factors:

- Continued recession in the local economy of Bhavanagar. Moreover, Alang Ship breaking industry which is a major economic contributor to the local economy has also been reeling under recession for the last few years. Due to falling business in the ship breaking industry, various downstream industries have also been affected e.g. majority oxygen companies in Bhavanagar have closed down.
- Availability of necessary land required for setting up of the cluster. It is proposed to set up the cluster in the mill area of Jahangir Mills at Bhavanagar. Jahangir Mills is owned by Gujarat State Textile Corporation which is currently being liquidated. The High Court has issued its order in favour of liquidation and accordingly the mill land would be available for setting up the cluster.
- Availability of trained manpower in Bhavnagar and nearby regions

From our interaction with officials of the Industries Department, we gather that the State Government is willing to develop Gems & Jewellery clusters at Rajkot and Amreli subject to it receiving representations from the concerned industries e.g. Diamond Association of Amreli or Rajkot Jewellers Association. According to our discussions, the government is willing to undertake development of these clusters simultaneously also. The state government would be providing all the required support to these associations for developing the clusters.

- (b) In addition to Bhavnagar, Rajkot can also be given priority because of its dominant status in hand-made jewellery. Further, it is an urban centre and has reasonable connectivity with Mumbai and other areas. Over a period of time, Amreli could have a similar gems & jewellery park based on the success of the Rajkot and Bhavnagar parks.
- (c) Each gems & jewellery park should have a certification center, adequate quality testing labs and training centers. Tie-ups amongst education institutions, jewellery manufacturers and jewellery retailers could be forged for the success of such parks.

⁴⁴ GIDB's Vision 2020 indicates the development of gems & jewellery parks at Rajkot, Bhavnagar and Amreli during 2015-2020 timeframe. Considering both economic and social issues (migration), we feel it would be prudent to develop a Gems & Jewellery park at Rajkot in the near future. The other parks may be developed in future based on the success of the one proposed at Rajkot.

- (d) Additionally, Rajkot could also be proposed as a Gems & Jewellery cluster under the Industrial Infrastructure Upgradation Scheme (IIUS) of the Government of India. The IIUS scheme is aimed at facilitating the creation of common infrastructure in industrial areas dominated by small to medium industries. This would considerably boost the competitiveness of the industry because the scheme envisages 75% grant from the GoI for providing and/or upgrading common infrastructure, the balance 25% being the contribution of the local industries/association.
- (e) Trained manpower for gems & jewellery would be necessary to continue the growth momentum. Against this backdrop, to provide the right kind of training for people in Saurashtra, modern training institutions would need to be established that would focus on both gem processing and jewellery design and manufacturing.
 - The current share of high cartage diamonds in exports is around 8% and the Government of Gujarat believes that it has the potential to realize a share of 20% in total exports by 2010.⁴⁵ In order to cater to this export demand, it is estimated that nearly 1,000 highly skilled experts will be required every year in Gujarat to cater to manpower demand for this segment. Exhibit 78 shows the estimation of manpower requirements with the increase in segment size.

Exhibit 76: Estimation of manpower for high cartage processing

US\$ million

	2005	2007	2009	2010
Segment size	700	1150	1650	2000
Increase	200	450	500	350
Incremental workforce	900	1100	1375	1500

Source: Vibrant Gujarat 2005 – Gems & Jewellery Project Profile 4

The current share of jewellery in exports is very minuscule but is estimated that by 2010, the share of exports would be 25%. It is estimated that nearly 5000 workers with CAD/CAM skills will be required every year to cater to manpower demand for this growing segment. Exhibit 77 shows the estimation of manpower requirements in the jewellery manufacturing sector.

⁴⁵ Vibrant Gujarat 2005 – Gems & Jewellery Project Profile 4

	2005	2007	2009	2010
Segment size	300	1300	2500	3000
Increase	300	1000	1200	500
Incremental workforce	4000	7800	9000	6700

Exhibit 77: Estimation of manpower for Jewellery manufacture in Gujarat

Source: Vibrant Gujarat 2005 – Gems & Jewellery Project Profile 4

Given the significant manpower requirements of the sector, it would be important to link the ITIs with the existing and proposed training facilities. For example, in Saurashtra region, a gems & jewellery park is being proposed as part of this study. The park would have training facilities. Also, training centres should be opened up in Amreli and Bhavnagar.

There could an association of these training centres with existing ITIs. Also, the ITIs can themselves modify the curriculum and suffice as suitable training institutes for gems & jewellery. In order to pilot this process, the ITIs in Rajkot should be used as a starting point.

- (f) Moving forward, considerable value-capture is likely to happen with the right branding. The Government of Gujarat would need to focus on the branding issues to a great extent. We feel that different branding for different regions e.g. Rajkot, Surat, may not be the ideal scenario. Hence, we feel that a 'common Gujarat brand' should be evolved without any bias for a region. This would require marketing promotion efforts by the Gems & Jewellery Export Promotion Council and the various industry associations besides the state government. The manner in which the Indian IT industry has invested in marketing the strengths of India offers useful lessons on industry level cooperation in promoting a common brand.
- (g) One such intervention by the government would be to provide increased support for participation in international fairs & exhibitions. The state government, in partnership with industry associations could undertake sponsorship, road shows, putting up stalls and other such means of participation in international fares to help increase visibility of the industry in Gujarat. This would directly benefit the industrial prospects of Saurashtra.
- (h) Further, manufacturers and other stakeholders should be taken for study tours to know the best practices in the industry. This would help them learn and imbibe the same in their working. The state government could facilitate the tapping of funds from central government schemes such as Market Access Initiative Fund (MAIF) to help the industry/associations meet the initial development expenses involved in penetrating international markets.
- (i) Gems & Jewellery does not put high pressure on the transport infrastructure in terms of amount of goods to be transported. However, connectivity with

important centers (primarily air connectivity) would be of crucial importance. Hence, it would be important to improve the connectivity of important centers of Saurashtra e.g. Rajkot and Bhavnagar with Mumbai and Surat. The Government would need to look at innovative ways of attracting airlines (including low cost carriers) to operate from these locations. These could include assuring minimum traffic for a specified timeframe, reducing taxes & levies amongst others. It would be interesting note in this context that the Ministry of Civil Aviation is contemplating differential aeronautical charges across airports in India to better disperse the increasing air traffic and also ensure better utilization of existing airport capacity. Some of these strategies are explained further in the Section on Airports.

Chemicals

1.446 Chemical industries have the largest presence in terms of percentage by value of output in Saurashtra, contributing to 16% of the state's chemical sector ouput.⁴⁶. However, this may not reflect the true picture. The Reliance refinery at Jamnagar contributes a major chunk of the chemical industries output from Saurashtra. However, a number of plastic units providing large employment are also present in the region. Further, given India's low per capita plastic consumption, it is an area of high growth. Hence, we have focused on the plastics segment within the chemical industry as a potential area of growth in Saurashtra region.

Current Scenario

- 1.447 India has about 16 major raw material manufacturers and 23,000 SSI processing units in the plastics sector. The total turnover of the plastic industries is about Rs. 27,000 crores. More than 3 million people are employed in the plastics industries. -47
- 1.448 Despite global recession, plastics industries have achieved 4 to 5 percent growth rate per annum worldwide. Further, the Indian polymer industries are growing at the rate of 15%. By the end of this decade, India is likely to be amongst the top 3 plastic consumption countries from the present 9th rank in the world.⁴⁸

⁴⁶ Annual Survey of Industries, 2000-01

⁴⁷ Interview of Mr. Kishore Patel, President, Saurashtra Plastic Manufacturers' Association (SPMA) available on SPMA website

⁴⁸ Interview of Mr. Kishore Patel, President, Saurashtra Plastic Manufacturers' Association (SPMA) available on SPMA website

- 1.449 The overall growth of plastic industry is driven by a number of factors namely, versatility, lightweight, non- corrosive nature, energy efficient and user-friendly material, aesthetic appeal and easy availability. Also, with the advancements made in polypropylene compounds, plastic is the number one polymer used in automobiles and engineering. Teflon and ABS⁴⁹ have established their importance in high impact uses. New thermosetting and thermoplastics are also being developed.
- 1.450 "Specialty chemicals" is still a largely unexplored segment. Stabilizers, antioxidants, lubricants, fire retard dents, politicizes etc. offer an enormous scope for research and development.
 - Saurashtra has over 750 plastic units that provide employment to over 20,000 people.
 - Rajkot is the main centre in Saurashtra with over 400 plastic units. The number of units at other important places is: Bhavnagar – 175, Junagadh – 150, Surendranagar – 25, Amreli & Porbandar – 10 each

Stakeholder Consultations

Constraints

1.451 The key issues being faced by the plastics industry in Saurashtra include:

- (a) Shortage of raw materials
- (b) Due to the sharp increase in polymer prices, many units are finding it difficult to compete. For example, the polymer prices have risen to Rs 73,689 in August 2004 in comparison to Rs 48,970 per tonne in August 2003.⁵⁰
- (c) Since only 50-60 % of polymer demand is met domestically and the rest is imported, high import duties leading to higher polymer prices are increasing the difficulties.⁵¹
- (d) Industry representatives highlighted about administrative difficulties in dealing with different government departments, officers and inspectors.
- (e) There seems to be excessive legal formalities based on our discussions with stakeholders
- (f) Lack of exposure to latest technology

⁴⁹ Acrylonitrile butadiene styrene (ABS) is a common thermoplastic used to make light, rigid, moulded products such as pipes, automotive body parts, enclosures and toys

⁵⁰ Business Standard

⁵¹ Business Standard

- (g) There is no testing laboratory in Saurashtra region. Hence, the products have to be taken to Ahmedabad for laboratory testing.
- 1.452 Saurashtra plastic manufacturers have to further cope with water-shortage, energy crises and manpower unavailability.
- 1.453 Key problems highlighted during stakeholder consultations are shown below.
 - Lack of testing facilities in Saurashtra; Need to go to Ahmedabad currently
 - Power problems: fluctuations are high 2-3 times per month
 - Undue delays in approvals: China 1 month; India 6 months
 - Lack of good infrastructure in industrial estates and harassment by officials
 - Continuous price fluctuations make it difficult in keeping steady prices of their final products
 - China is making significant inroads in the plastics industry especially in toys, plastic films and clocks.

Stakeholder Consultations

Suggested way forward

- 1.454 Taking into account the industry demands, the following action steps may be considered to overcome the constraints faced by Plastic manufacturers in Saurashtra:
 - (a) A "Polymer Science Institute" having world-class facilities for training, testing, and R & D activities should be established in Saurashtra, especially in Rajkot. This will help entrepreneurs in acquiring greater self-sufficiency in technical aspects of products and raw materials. During our stakeholder consultations, we were given to understand that Saurashtra University is keen on undertaking this initiative. Efforts should be extended by the state government to support this initiative. One such effort could be to provide land at concessional rates for the proposed institute. Another specific intervention could be to provide capital grant or limited budgetary support for the institute to equip itself with modern testing and R&D equipments.

Saurashtra University is interested in opening up a facility on the lines of CIPET Ahmedabad in Rajkot for providing laboratory-testing facilities for plastics for Saurashtra region.

The cost of setting up such a laboratory would be in the range of Rs 10 - 15 lakhs.

Stakeholder Consultations

- (b) A "Product Design and Development Center" for plastics articles would help the industry.
- (c) There is also a need to develop skilled manpower for the chemicals industry in the state. The plastics industry's estimated requirement of skilled manpower is nearly 60,000 till 2010 as illustrated below. Given that Rajkot is the focal point for this industry the 15 ITIs and the 14 technical education institutes in Rajkot would need to

be strengthened appropriately in terms of courses and equipments to help produce the required number of skilled workforce to meet the future demands of the industry. Possibly, one of more of these institutes could be adopted by the local plastics industry / industry association to customize the curriculum to meet specific industry requirements. The state government in consultation with the industry representatives could work out the actual curriculum design and the specific upgradation.

(d) A proposal was made by Government of India to upgrade 500 Industrial Training Institutes (ITIs) in the country. Out of these, already 100 ITIs have been identified. Of them, 67 are in 15 states and Union territories. These will be upgraded at a cost of Rs 1.6 crore each, in the belief that they will meet the demand for specific skills⁵². Further, 67 ITIs that have been identified and proposed to be developed in association with the industry bodies, which is a step in the right direction. Government of Gujarat should leverage this opportunity and propose select ITIs (with a greater focus on plastics sector) in Rajkot for up-gradation as a priority measure. The government could involve the local industry associations, chambers and bodies to identify and upgrade of these institutes.

Estimation of manpower requirements for chemicals industry⁵³ in Gujarat

- Number of people employed in organized chemical industry (as on 30.1.2004): 190371⁵⁴
- Growth till 2010: 15% p.a.⁵⁵
- Employment elasticity (manufacturing sector): 0.33⁵⁶
- Number of additional jobs created: Chemicals 49413; Rubber & Plastics 8574; Total - 57987
- Assuming similar jobs are created in unorganized sector, total number of jobs created: 115974
- Number of people requiring training: 50% = 57987

Source: PwC Analysis and Secondary sources

(e) Industry has reiterated the demand for lowering electricity rates, import duties and excise duties. As regards electricity rates, the current HT tariff charged in Gujarat is

⁵² Business Standard, March 1, 2005

⁵³ The analysis is for the complete chemicals industry for the whole of Gujarat. This would include the requirements especially for the plastics industry in Saurashtra.

⁵⁴ This includes the following industries as per NIC code (given in brackets): Chemicals (24) and Rubber & Plastic products (25). These numbers are only for the organized sector in Gujarat taken from the Annual Survey of Industries 2002-03. We can assume the output share of organized industry to be 50% of the total industrial output.

⁵⁵ *The Indian Chemical Industry – New directions, new hope*, Chemtech Foundation Report

⁵⁶ Planning Commission Report on targeting Ten Million Employment, 2002
above the average cost of supply of power while the LT domestic and residential charges are below the average cost of supply of power. The Electricity Act, 2003 provides that the tariffs charged for the various categories of consumers over a period of time shall be in accordance with the cost of supply and cross subsidy would be removed in a phased manner. This would be decided by the State Electricity Regulatory Commissions. Hence, it may be reasonable to assume that in the long term, the HT tariffs are likely to fall in line with the average cost of supply. The state government, in consultation with the state level regulator could set a direction to accelerate the phasing out of such cross subsidies.

- (f) As regards import duties and excise, the state government can make representations to the Gol to consider relaxations, at least for a specific number of years⁵⁷.
- (g) Raw material should be made available at lowest possible and not-fluctuating rate from national level raw material manufacturers.⁵⁸

Analysis of clusters

Ship-breaking at Alang

Shipbreaking industry on the decline

- 1.455 Worldwide purchases of ships for breaking in 2003 were 26.3 million LDT, down from 28 million LDT in 2002, when freight markets were poor and the number of ships being offered to breakers was high.⁵⁹ In 2004, just 8.1 million LDT has been purchased worldwide.
- 1.456 India's was the world's largest ship breaking industry in '98-99, with ship import of 3.03 mt. The tonnage, however, slipped to 1.99 mt in 03-04 owing to the higher duty. It is feared that going by the current trend, imports in '04-05 would be just about 1.2 mt. Ship breaking industry is less capital-driven than most industries. It has so far seen an investment of just over Rs 300 crore. It also highlights the focus on manual labour in Indian ship breaking industry. Given that China is undertaking huge capital investments to develop its ship-breaking industry, it calls for a review of the state government's policy for this industry.

⁵⁷ Government of Gujarat has limited role in this. Hence, we would need to further explore the mechanisms by which such stabilization can be affected.

⁵⁸ Government of Gujarat has limited role in this. Hence, we would need to further explore the mechanisms by which such stabilization can be affected.

⁵⁹ Clarkson Research Studies

1.457 Alang, once the world's largest ship demolition yard, is on a steady decline. In 2004, India slipped to third position, below Bangladesh and China.⁶⁰

India was No. 1 in the ship breaking industry till 2001. However, Bangladesh and China are ahead of India now. This is because:

- Bangladesh has no steel plants and hence ship breaking is considered an important activity to meet the steel requirements.
- China developed because of large facilities being built funded by Government. Chinese shipyards can break ships in 2 months that otherwise take 6 months in India

Stakeholder Consultations

1.458 The number of ships beached has dropped from a high of 3.3m tonnes in 1998-99 (with a turnover of Rs 6,000 crores) to 0.7 MT in December '04. Many breakers have downed shutters in Alang-Sosiya. Breakers expect that total demolition in '04-05 will not go beyond 1m LDT, 50% down from last year.

Significant loss of business has happened. Earlier, Alang handled 300,000 tonnes per month, but now it is only handling 50,000 tonnes per month.

Mostly ships of 25,000 – 30,000 tonne capacity come to Alang. The largest ship handled at Alang is of 60,000 tonnes.

Stakeholder Consultations

- 1.459 Alang is apparently facing problems. Out of over 175 ship-breaking plots, hardly 40 are currently operational. Direct employment has come down to about 8,000 from 35,000.⁶¹
- 1.460 Further, out of the 300 re-rolling mills in Gujarat, only about 100 are operational. Similarly, of the 120 oxygen-manufacturing units, only 20 are functional. Transporters are finding it difficult to get a single trip during the week, whereas they did 4-5 trips earlier. Thus, indirect employment has come down to about 20,000 against over a lakh earlier.
- 1.461 The duty rates have contributed to the decline of the industry. At present such ships attract a 5% basic customs duty plus countervailing duty of 12%.

⁶⁰ Clarkson Research Studies

⁶¹ The labourers working in Alang primarily come from Orissa, Bihar, Eastern UP, Rajasthan, Gujarat and Maharashtra. (Source: Stakeholder consultations)

- 1.462 In an attempt to combat this shrinking of the Indian shipbreaking industry, Indian government recently cut the import duty on ships for demolition into India from 15 percent to 5 percent. The duty cut restored the rate for ships for demolition to the level it was before 2002. Currently, steel coming out of Alang is also given CST incentive, i.e. instead of 4%, only 2% CST is charged.
- 1.463 Re-rollable scrap is an output of the ship breakers, along with steel plates, aluminium and bronze structures. It is reckoned that by bringing down the cost of imports, the ship-breaking industry can be helped to make available cheaper re-rollable scrap to steel mills.

80-85% of total steel produced through ship breaking goes into re-rolling and rest into melting furnace. Major products out of ship breaking include:

- Steel: Even 0.5 kg piece goes into re-rolling (Other countries: minimum is 10 kg)
- Non-ferrous: Even 5 gm metal is extracted
- Machinery: Re-used (motors, pumps, water purifiers)

Stakeholder Consultations

- 1.464 The cost of conversion of ship to re-rollable scrap is just Rs 1,800 per tonne, rendering the activity substantially cost-competitive. As opposed to this, cost of imported steel is very high. The import price of HR coil for instance is around \$600 a tonne, while the domestic price is around \$580. Also, with consumers in Europe and the US with stronger financial muscle wanting to import steel, Indian consumers have little access to imported steel, even at the high price.
- Issues faced by the shipbreaking industry
- 1.465 Shipbreakers are paying record prices for ships for demolition as the acute shortage of fresh vessels being sold for scrap has hit the market. A number of factors have contributed to the decline in the number of ships available for shipbreaking including:
 - (a) The average demolition selling price for 2004 so far for vessels of 15,000 LDT⁶² is \$368 per LDT, up from \$229 in 2003.⁶³ The vessel *Chemcoal Trader* was sold for demolition to an intermediary in late August at \$430 per light displacement ton (LDT). So far this year, just four combination carriers have been sold for scrap and not a single Capesize has been sold for demolition compared with three, last year.⁶⁴
 - (b) With an average light displacement tonnage of around 22,000 ldt, a Capesize owner could realise up to \$9 million by selling a ship for scrap at current prices. This is

⁶² A measure of the actual weight of a ship

⁶³ Mark Jenkins, Analyst – Simpson, Spence & Young (London-based ship broker)s

⁶⁴ Fearnleys (brokerage firm)

slightly less than one-fifth of the cost of building a new ship. However, in today's freight market, \$9 million could easily be realized on just two or three voyages, or one full year, depending on the trades, which is why ship owners are so reluctant to scrap old ships.

- Since shipping industry is doing well, tonnage coming to Alang is very less. Earlier 20-year-old ships used to come to Alang, but now 26-27 year old ships are coming.
- Countries like Korea are making very huge ships that take long time to build; therefore, smaller ships are currently being used and thus lesser number of ships are available for shipbreaking industry
- Alang is facing problems due to the small-size plots. This is leading to low economies and capital investments are not happening. On the other hand, Bangladesh and China have succeeded in developing their ship-breaking industry (leveraging their big shorelines) through large mechanization. These countries are also not regarded as environmentally friendly.
- The new byelaws prohibit use of re-rolled wires in construction. These wires were made from the re-rolled steel produced using steel from shipbreaking industry.

Stakeholder Consultations

- 1.466 Complex and disadvantageous duty structures have contributed to the decline. These include:
 - (a) Import duty of 5% on ships vis-a-vis 0% on scrap metal has made shipbreaking unviable. Also, the rate of duty on ships for recycling is on a par with the rate of finished steel. In this scenario, India cannot withstand competition, as Bangladesh and China have lower duty regimes.
 - (b) While the duty on finished steel in India has gradually been brought down from 40% to 5%, the 30% lower duty on ship imports for recycling that was available until '02 is no longer there.
 - (c) While the inputs for refractories attract duties of 15%, the finished non-alloy steel attracts just 5% duty. This discrepancy further hurts the shipbreaking industry.
- 1.467 Railway connectivity needs to improve significantly in the region. Currently, the train from Bhavnagar to Ahmedabad goes via Surendranagar. In order to give boost to the industry, direct connectivity needs to be ensured.
- 1.468 There are a number of issues that the ship breakers wish to be addressed by Gujarat Maritie Board (GMB). This has been summarized as follows.

Alang comes under the Gujarat Maritime Board. There is a perception of significant procedural delays in signing agreements by GMB. Also, the ship breakers feel that GMB has not done enough to develop Alang. For example, even though GMB earns about Rs 30 crore from Alang, there is no jetty there.

Also, the plots were given on a 10-year lease based on a policy that extended from 1994 – 2004. Even with the policy elapsing, GMB hasn't yet announced a new policy. This matter is already subjudice.

Shipbreakers believe that a host of charges levied onto them have made them uncompetitive. These include:

- Premium charges for permission to use land [Rs 60 lakh for 2,700 sqm plot for 10 years]. However, an opposite view that has been expressed is that the premium amount was a bid criterion.
- Minimum cargo charges 10,000 tonnes [LDT charges]: Rs 108 per tonne
- Annual rent (Rs 60 per sqm)

Stakeholder Consultations

Suggested way forward

1.469 Alang has unique advantages that helped it acquire its leadership position. Hence, concentrated efforts should be undertaken to help its regain its past status.

Alang has 30 feet tide difference making it an ideal place for shipbreaking

Stakeholder Consultations

- 1.470 Reduce import duty on ships brought for shipbreaking to nil to match duty rates for scrap metal. This would also help fight against competition that offers a more friendly tariff regime. While China offers a subsidy of 14%, Bangladesh maintains a duty difference of 10% between ships for recycling and finished steel. More recently, Pakistan too has announced support for ship-breaking activities with an eye on meeting 20% of the local demand for steel.
- 1.471 Provide better connectivity to Bhavnagar / Alang with other parts of the country. The direct connectivity between Bhavnagar and Mumbai without going through the circuitous route via Surendranagar would be important.
- 1.472 While the reduction to import duty may provide some additional impetus, only a significant reduction in global freight rates can provide a real boost to the shipbreaking industry.
- 1.473 Given the slump in the ship breaking industry at Alang and associated affects on the employment of the workers, it would be prudent to look at ways to help them. As the industry is likely to stabilize only to a certain extent and due to market dynamics, there are only limited chances of all the existing workers finding reasonable employment in the ship breaking and allied industry. To help these workers, Government of Gujarat can look at the Employment Guarantee Scheme, similar to the one in Maharashtra. This Scheme can be extended to cover the population in other areas, primarily the economically backward ones. Also, Gujarat can initiate a skill retraining programme for the workers associated with the ship breaking and associated industries in Bhavnagar.

Social Safety New Programme (SSNP) under the Early Retirement Scheme, West Bengal

SSNP comprises of the following:

- Counseling (psychological counseling, investment counseling, rehabilitation counseling)
- Re-skilling / training of applicants from among the employees or at their option a dependant son/daughter
- Tracer studies using baseline socio-economic data in respect of beneficiaries collected at the time of their joining the programme

The training courses under the SSNP and the Institutions that will impart this training shall be selected by the designated authorities. The training course shall be based on detailed syllabi, topic and time-tables and their methodology to be approved by the SSNP Group / PE Cell / Department. These would include periodic testing and certification process, field visits and market survey.

The Institutions selected to impart training courses under the SSNP will be required to provide a Certificate of Proficiency to SSNP trainees who successfully complete the programme and provide post-training escort services to facilitate their employment / self-employment.

The training shall be conducted over 6 days per week for a 14 to 16 week period. The remuneration to the Institutions selected by the authorities for imparting training under the SSNP will be Rs 5,000 per trainee to cover field visits, market surveys and post –training escort facilities to help the trainee secure gainful employment. The training fee will be paid to the Institutions upon the SSNP trainees achieving a sustained minimum attendance of 75%. Further, an incentive shall be payable to the training institutions @ Rs 500 and Rs 1,000 per trainee, for respective achievements of 50% and 60% of their trainees finding gainful employment within 6 months of conclusion of training.

The trainees would be provided a daily allowance of Rs 30 to meet cost of transportation and out-of-pocket expenses.

Source: GO, Government of West Bengal, March 12, 2004

Employment Guarantee Scheme (EGS), Government of Maharashtra

Description of Mechanism

- The Employment Guarantee Scheme (EGS) is a unique model of a public works program. It guarantees employment to all rural adults over 18 who are willing to do manual unskilled-work on a piece rate basis.
- Under the scheme the government is obliged to provide suitable work within 15 days of demand, otherwise it has to pay an unemployment benefit per day till such work is provided. Additionally if the job offered is beyond eight kilometers of the worker's village, the government has to provide a specified set of amenities (including housing and childcare facilities).

How is it financed/supported

- The Scheme is underpinned by two acts—The Maharashtra Employment Guarantee Act of 1977 that laid out details of how the scheme was to be implemented, and the Maharashtra State Tax on Professions, Trades, Callings and Emloyments Act of 1975 that detailed the financial mechanisms through which it was to be supported. The latter act provides a dedicated funding mechanism—a revenue stream that is dedicated solely to the scheme. There are five specific taxes under the act of which the most important is the 'professional tax' that is borne mainly by registered professionals and formal sector employees in the urban sector.
- The state government makes a contribution to the EGS Fund that matches the yield from these dedicated taxes.

Level of Governance

The scheme is run as a top down government program, implemented by the Revenue Department in conjunction with several line departments including irrigation, forestry, public works and agriculture. Planning for EGS projects is done at the district level. Implementation involves all levels of government, from the most local (the tehsildar of the revenue department who registers the workers) to the EGS minister at the state level.

Source: Bringing citizen voice and client focus into service delivery, Case Study – Employment Guarantee Scheme, Maharashtra, Institute of Development Studies, University of Sussex, UK

Brass parts in Jamnagar⁶⁵

- 1.474 Jamnagar is one of the largest manufacturers of brass parts and 70% of the machined brass components of India are manufactured here. Jamnagar has between 3,500 and 4,000 brass units with over 90% of them being unorganised and very small. The total turnover of these units is estimated at over Rs 1,000 crore. The products manufactured at Jamnagar can be classified as:
 - (a) Building Hardware Like Door & Window Hinges, Stoppers, Knobs, Studs, Handles
 - (b) Sanitary & Bathroom Fittings Like Venetian Blends, Hangers, Taps, Curtain Fittings
 - (c) Electronic & Electrical Accessories Like Socket Pin, Battery Terminal, Switches, Tester, Cable Glands, Computer Sockets
 - (d) Automobile & Cycle Tube Valves, Industrial Control Valves
 - (e) Agricultural Implements Like Tractor Accessories
 - (f) Brass Jewellery And Buttons Like Necklace, Ear Rings, Bracelet, Rings, Bangles

⁶⁵ Brass industry is up against prices, China; Business Standard, September 07, 2004 and Diagnostic Study on Brass Parts Cluster, UNIDO and EDI, 2002

- (g) Various Other Precision Machine Components As Per Customers Specification
- 1.475 About 10,000 varieties of brass parts are manufactured in this city. The products in terms of their weight range from 1 gm. to 10 kg and in terms of its length and diameter it varies from.05 mm. to 60 cm.
- 1.476 The brass parts manufactured in Jamnagar find their place in the overseas market. It is considered to be one of the largest automobile and cycle tube valve manufacturers in the world. Because of their precision and quality, these tube valves are mainly exported to European and North American markets. The products are marketed through various marketing channels to countries like U.K., USA, Canada, Middle East, Europe, Africa, Sri Lanka, Pakistan, Indonesia, Malaysia, Singapore, Japan and Bangladesh.
- 1.477 The value of products manufactured from this cluster is estimated around Rs 300 crores per annum. Out of this, Rs 30 crore worth of brass parts are exported and the rest are consumed in the domestic market. The product wise contribution of the output is as follows:
 - (a) Automobile and Cycle tube valves 35%
 - (b) Building hardware 25%
 - (c) Sanitary and bathroom fittings 15%
 - (d) Precision components 5%
 - (e) Other categories 20%
- 1.478 Moreover 50,000 workers are employed in this sector. The average employment in a unit is 9.

Year	No. of Units
1952	1
1954-55	15
1960-61	250
1967-68	700
1979-80	1500
1988	3000
1994	3500
1998	4500
2002	4000

Exhibit 78: Growth of brass part industry in Jamnagar

1.479 The value chain analysis of the Brass parts industry (representative) is shown in Exhibit 79.



Exhibit 79: Value-Chain of a representative brass part

Issues faced by the industry

- 1.480 Although the Centre lowered the import duty on brass scrap by 5%, from 20% to 15%, rising brass scrap prices, especially rising international prices of brass scrap, has offset the gains from this.
- 1.481 Around 1,500 brass parts units have been forced to close down in the wake of the industrial slowdown in the last two years and the tough competition in the market posed by Chinese brass parts. This is due to the following factors:
 - (a) Obsolete technology
 - The process of manufacturing has mostly remained traditional. The process of melting machining, polishing and plating did not change much for the last 50 years. There are no temperature recording and temperature controlling devices in the foundry, no automatic machines, pressure die-casting machine, and barreling and electro-polishing plant. As a result, the industry

is facing problems like coring and segregation, pinholes and blowholes, shrinkages, dimensional distortions, etc. As a result, rejection rate is higher.

- A number of machining operations are carried out which either could have been minimised or eliminated. For example, for manufacturing a 2-mm screw the casted rod that is of 5-6 mm. in diameter, is turned/ shaved repeatedly. This operation takes a lot of time and labour. The process can be completely eliminated if the technology of paste brazing is adopted.
- (b) Although, the manufacturers realize the need to upgrade their technology, it is difficult for these small firms as the required investments are approximately Rs 8-10 lakhs.
- (c) There is a lack of awareness amongst the small firms about various means of marketing e.g. selling through Internet.
- (d) Higher prices of brass scrap, which is entirely imported
- (e) Relatively high sales tax rates
- (f) Octroi duty

SWOT Analysis

1.482 In order to present a complete picture of the cluster and thereafter, take remedial steps, we have undertaken a SWOT analysis as shown in Exhibit 80.

Exhibit 80:	Jamnagar	Brass	Cluster -	- SWOT	Analysis
	ounnagu	Diado	0100101	0	/

STRENGTHS	WEAKNESS				
Markets	Markets				
 ✓ Strong presence in the domestic market ✓ Ancillary arrangement with large industries ✓ Developing trust and relationship in the long run ✓ Not much import of brass parts (till date) 	 Losing ground in the international market Lack of information on customer preferences in the international market Middlemen/ traders enjoying most of the profits in the value chain 				
Technology	Technology				
 ✓ Availability of customized machines ✓ Machines are available at low prices ✓ Demonstration effect 	 ✓ Traditional method of production ✓ Low level of technological development ✓ Manufacturing defects and high rejection 				
Inputs availability	 rate ✓ Problems with quality and productivity Inputs availability 				
 Raw material and other inputs available in sufficient quantity. 					
Innovation capability	 ✓ Most of the raw materials are imported ✓ High custom duties on raw material 				
machines	Innovation capabilities				
 ✓ Flexible operating practices Skills 	 Hardly any changes brought in design, technology, process and marketing 				
✓ Vast pool of skilled labourers	Skills				
	✓ Non-existence of technical training				

 ✓ On-the-job learning possible Business Environment ✓ Stable business environment till 1998 	institute ✓ No skill upgradation training for the workers
OPPORTUNITIES	THREATS
 Markets ✓ Globalization can usher tremendous market potential for the competitive firms ✓ Tariff and non-tariff barriers are coming down ✓ Enterprises can join hands together for international marketing & brand building Technology ✓ Advent of latest technology through intervention ✓ Increasing technological awareness among entrepreneurs ✓ Tremendous enthusiasm on the part of the cluster actors ✓ Brighter prospects of establishing Common Facility Centre ✓ Possibility of establishing R&D institutions or laboratory Inputs availability ✓ Competition is going to make availability of inputs cheaper and sufficient Innovation capability ✓ Exposure visits, participating in exhibitions making the entrepreneurs and technicians more innovative Demonstration effect Skills 	 Markets Competition is going to increase Overseas importers suddenly change their sourcing country Imports increasing in the coming years Technology Low level of technological development can cause a major threat unless it is changed/modernized Technology is an ever changing process Inputs availability Difficulty in encountering competition unless raw material imports are made cheaper Quality of raw material Innovation capability Innovation is required in every facet of business operations Skills Skill base of the workers needs upgradation to adopt latest technology Business Environment The changing business environment is always a problem for the less enterprising firms.
 ✓ Increased awareness is likely to improve the skill base of the workers 	

Suggested way forward

- 1.483 Currently, a number of brass units in Jamnagar have started contemplating migrating to either Rajasthan or the Union Territories near Gujarat. The Rajasthan government levies just 1% sales tax on brass, copper, zinc and lead components. Regions like Daman and Silvasa offer tax relief while Uttaranchal and Chhattishgarh give special relief. Under these circumstances, Gujarat needs to carefully undertake the corrective measures to facilitate the development of the industry.
- 1.484 Government of Gujarat is currently undertaking a programme for the development of the brass cluster. This is a welcome step and should be undertaken at a rapid pace. The focus should be on the following:

- (a) Technology upgradation & Training
 - The manufacturing process of brass parts has remained mostly traditional. There is hardly any change in technology for about the last 50 years. As a result, the quality and productivity of the cluster is very low. Moreover, there are problems like rat bites, blowholes, pin holes, shrinkages, dimensional distortions, coring & segregation, plating pill off, staining, etc.
 - In order to eradicate these problems, there is an urgent need to establish a Common Facility Centre (CFC) and install pressure die-casting machine, temperature recording and controlling devices in the furnace, electropolishing plant, barreling process, brazing paste etc.
 - Technology upgradation will help in minimising rejection rate, improving productivity and quality, saving of labour and time, eradicating dimensional distortions, producing precision parts & components and making the cluster competitive.
 - Another aspect, which is lacking in the cluster, is 'diversification'. For example, no unit in the cluster is manufacturing marine hardware, turbine parts, beryllium copper etc. These are the areas where the cluster can concentrate as demand of these products is going to increase in the coming years. Moreover competition in this product segment is also limited. The cluster can also concentrate on substitute products. For instance, the cycle tube valve can also be made of hard aluminium (alloy) with brass plating. The technical characteristics and the hardness of the valve can be maintained and the cost will reduce drastically.
 - Government should provide training support and create awareness about the new technology and the benefits of undergoing training programs. The training programs run by Entrepreneurship Development Institute in Jamnagar to educate the small firms on the use of new technology are witnessing good response from manufacturers. Also, the training facility to be opened in the cluster as part of Cluster Upgradation Program can have linkages with the local ITIs.

Requirements of the Jamnagar Brass Cluster

The common facilities required to be developed in the cluster include:

- > Total common machinery: Rs 16 crores
- Inspection and quality control facilities: Rs 4-5 crores
- Common effluent plant: Rs 16-18 crores
- Other infrastructure like library, roads within cluster, building, IT center, consortium center, training center: Rs 65 crores

Jamnagar Brass Cluster has approached the Ministry of Commerce & Industry for funding support for cluster upgradation under IIUS. The proposal is currently under consideration.

Stakeholder consultations

(b) Export-led growth:

- The export of brass metal handicrafts of Moradabad is 2000 crore per annum against its turnover of 4000 crore, whereas only 30 crores of brass parts is exported annually given the fact that production of this cluster is 3000 crore. Steps should be taken to address this huge disparity.
- The industry in Jamnagar is mostly dependent on domestic market even though it is revealed that this market is becoming more or less stagnant. Also the products of this cluster are limited to cycle/ automobile tube vale, building hardware and sanitary fittings and no one in Jamnagar manufacturing beryllium copper, marine hardware, defense parts, brazing rod etc. Diversification in the above areas can improve the market potential and profit margin substantially. Import of some of these products can be reduced once these are available in the domestic market.
- A few years ago, Jamnagar was one of the largest exporters of cycle/ automobile tube valves in the world. These tube valves were exported in countries like USA, Russia, Canada, France, Germany, Indonesia, Singapore, Malaysia, Gulf Countries & Africa. However, after liberalisation they are facing stringent competition from Chinese manufacturers as the latter have adopted latest technologies to improve on quality and productivity. Moreover, due to economies of scale they are able to offer products at lower prices. As a result, importers in developing countries started procuring from countries like Japan, China, etc. The entrepreneurs in Jamnagar have suffered heavily because of this.
- An export-led-growth strategy has to be pursued in order to revive its reputation in the international market. Brand building, participating in international exhibitions, developing brochures, joint marketing, forming consortium are some of the instruments of doing it. Moreover, technology upgradation will enable them in improving quality and productivity and reducing the cost of manufacturing. They will be able to manufacture products of international standard. In addition to that, the entrepreneurs can be trained in 'Recession marketing'.
- Given the fact that middlemen/traders are enjoying most of the profit share, more efforts should be made to establish direct linkage between manufacturers and customers. Training on international marketing, brand building, exports procedures and documentation, and exposure visits (cluster to cluster visits), participating in international exhibition etc. should be organised.
- (c) Liberalising Government rules and regulations
 - The entrepreneurs are finding it difficult to comply with the rules and regulations of several Government departments. Most of their time is spent in filling up forms and submitting papers as per their requirements. According to the estimate, an entrepreneur needs to interact with 14 Government departments and fill up 154 different forms.
- 1.485 Also, the following interventions would further benefit the industry:
 - (a) Government should start a technology upgradation scheme for the brass units on lines similar to Textile Upgradation Fund (TUF). The total cost of such an initiative would be around Rs. 25 crores.

Funding Support for Jamnagar Brass Cluster

There are nearly 5,000 units in the cluster that need technological upgradation. As these units would need different machines, the upgradation cost of these would be varying significantly. For example, a spectrometer that gives the chemical composition of brass will be needed for all units to check if the brass is scrap or useful. This costs around 30 lakhs. Also, a special die-casting machine is used by most units and it costs around 1.3 crores.

Assuming that not all units would be purchasing the above-mentioned machines and taking an approximate expense of Rs 10 lakh per unit as the cost of upgradation, the total cost of upgradation is Rs 500 crores.

Assuming a 5% interest subsidy to be provided by the Government of Gujarat (similar to TUF), the total cost of the intervention is Rs 25 crores. This funding would be required during the overall timeframe when the units undergo technological upgradation. Hence, annual budget allocations can be less.

Source: Stakeholder consultations and PwC Analysis

Technology Upgradation Fund Scheme (TUFS)

In order to provide impetus to the modernization of textile and jute industry, Government of India, Ministry of Textiles has launched a Technology Upgradation Fund Scheme (TUFS), which is in operation from I.4.1999 to 31.03.2007.

The Government funding is limited to reimbursement of 5% interest charged by the financial institutions / banks for Rupee Term Loan (RTL) or exchange rate fluctuation/forward cover premium limited to 5% for Foreign Currency Loan (FCL) on a project of technology Upgradation in conformity with the scheme. There is no cap on funding under the scheme.

With effect from 1.1.2002, an option has been provided to small scale textile and jute industry to avail of either 12% credit link capital subsidy or the existing 5% interest reimbursement.

For small scale powerloom units, with effect from 6.11.2003 an additional option of credit linked upfront 20% capital subsidy for powerloom and weaving preparatory machinery has been allowed, upto a cost of Rs. 60 lakh, with a facility to obtain credit from a enlarged credit network that includes all cooperative banks and other genuine non-banking financial companies (NBFCs) recognized by the RBI.

Source: <u>www.dipp.nic.in</u>

- (b) Rationalize sales tax on brass components as sales tax ranges from 4 per cent (brass components for engines) to 12 per cent (brass components for electrical and electronic goods)
- (c) Abolition of octroi in the state

2 ANNEXURE I: REVIEW OF AGRO POLICIES⁶⁶

S. No.	Policy/Incentive/concessi on	States which have already given this incentive
1	Capital subsidy for cold chains	Punjab, Andhra Pradesh, Karnataka, Madhya Pradesh, Uttranchal, Himachal Pradesh
2	Capital subsidy on processing unit	Himachal Pradesh, Uttranchal, J&K
	Interest subsidy to agro industrial units	Gujarat, Uttranchal
4	Assistance for preparation of project report	Gujarat, Madhya Pradesh
5	Assistance for setting up of centre of excellence/specific crop development institute	Madhya Pradesh (financial grant for information centers to be set up in the state regarding agricultural marketing, export avenues etc)
6	Concessionary Electricity Tariffs	Maharashtra (electricity to cold stores and green house at concessional rate), Andhra Pradesh (25% rebate on power for 3 years),
		Punjab and Haryana (exemption from payment of electricity duty for 5-7 years)
7	Assistance for quality certification	Madhya Pradesh (capital subsidy on cost incurred for setting up analytical laboratories of international standard)
		Maharashtra Registration of export oriented farms
8	Exemption for bringing the commodities to be purchased by processors to the market yards for auctioning	MP (exemption from bringing the entire produce into market yards and sale through samples), Punjab (processors can make direct purchase in their own procurement centers notified under APMA)
9	Market fee exemption	Punjab, for procurement under contract farming arrangement (market fee applicable is 0.25% in place of 2%)
10	Soil Health Card scheme	Himachal Pradesh, the department of agriculture in association with SAUs has launched a scheme under which farmers are registered and soil test conducted from time to time and database is maintained
11	Airfreight subsidy for export of the states' produce	UP, Punjab, Madhya Pradesh
12	Sea freight subsidy for export of states produce	Punjab, UP, North

⁶⁶ Based on compilation and review of various state policies

S. No.	Policy/Incentive/concessi on	States which have already given this incentive
13	Inland freight subsidy for export of states produce	North Eastern states, UP
14	Assistance for research & development	Gujarat, Punjab

3 ANNEXURE II: GROUNDNUT – STATE-WISE PRODUCTION & AREA

Selected State-wise Area for Groundnut in India (2001-2002 to 2003-2004)

Area: ' 000 Hectare

States/UTs	2001-02	2002-03	2003-04
Andhra Pradesh	1690.7	1470.0	1493.0
Goa	1.6	2.4	3.3
Gujarat	1887.7	2029.4	2003.4
Karnataka	854.7	843.9	822.0
Maharashtra	429.4	419.0	390.0
Orissa	61.9	56.1	77.2
Tamil Nadu	663.0	502.1	591.7
Tripura	0.6	1.0	0.8
West Bengal	36.9	31.0	45.9
India	6238.1	5935.5	5998.2

Source : Ministry of Agriculture, Govt. of India.

Selected State-wise Production of Groundnut in India (1991-1992 to 2003-2004)

States/UTs	1991- 92	1992- 93	1993- 94	1994- 95	1995- 96	1996- 97	1997- 98	1998- 99	1999- 00	2000- 01	2001- 02	2002- 03	2003- 04
Andhra Pradesh	2151.9	2071	2546	1671	2626	2046	1182	2155	1089	2142.9	1249.6	820	986.0
Bihar	3.7	3.3	-	-	-	-	-	6.1	6.4	0.2	-	-	-
Jharkhand	-	-	-	-	-	-	-	-	-	6.3	-	-	-
Gujarat	699.7	2068.4	677	2380	1028	2449	2616	2577.8	717.5	688.6	2646.6	1094.5	4477.6
Haryana	1.7	1.3	-	-	-	-	-	1.1	0.5	0.4	-	-	-
Himachal Pradesh	0.5	0.4	-	-	-	-	-	0.4	0.4	0.2	-	-	-
Jammu & Kashmir	0.2	0.2	-	-	-	-	-	0	0	0	-	-	-
Karnataka	1110	1098.2	1199	946	1139	1147	754	1192.1	768.6	1081.1	585.8	539.0	479.0
Kerala	9.5	10	-	-	-	-	-	7	5.1	2.7	1.8	1.1	1.1
Madhya Pradesh	205.5	307.2	275	214	260	253	258	267.5	221.9	227.5	243.6	131.5	255.3
Chhatisgarh	-	-	-	-	-	-	-	-	-	32	41.7	38.1	33.1
Maharashtra	564.1	755.1	769	629	576	756	618	633.6	572	470	492.2	450.0	453.0
Nagaland	1.9	1.2	-	-	-	-	-	3	3.6	4	-	-	-
Orissa	497.1	497.1	114	98	92	79	90	72.2	72.6	57.5	61	48.8	93.2
Punjab	12	12	9	8	8	9	9	5	5	4	-	-	-
Rajasthan	198.2	268.2	209	198	165	273	365	362	265.2	180.8	-	-	-
Sikkim	-	-	-	-	-	-	-	-	-	-	-	-	-
Tamil Nadu	1517.6	1575	1866	1762	1520	1438	1762	1569.8	1384.6	1358.4	1250	717.4	918.4
Tripura	1.9	2.4	-	-	-	-	-	1.7	1.1	1.3	0.5	1.0	0.7
Uttar Pradesh	102.3	148	119	102	100	129	128	84.8	94	96.4	-	-	-
Uttaranchal	-	-	-	-	-	-	-	-	-	1.5	-	-	-
West Bengal	29	29	-	-	-	-	-	37.9	45.8	53.4	55.7	47.3	75.8
Goa, Daman & Diu	1.5	2.2	-	-	-	-	-	2.5	2.3	3.2	2.5	4.3	5.7
Pondicherry	4.3	4.2	-	-	-	-	-	2.1	2.5	2.2	-	-	-
India	7094.6	8854.4	7829	8062	7579	8643	7845	8981.6	5258.1	6408.3	7027.5	4121.1	8182.2

(Production: '000 Tonne)

Source: Ministry of Agriculture, Govt. of India

Selected State-wise Area for Groundnut in India (2001-2002 to 2003-2004)

			Area: ' 000 Hee
States/UTs	2001-02	2002-03	2003-04
Andhra Pradesh	1690.7	1470.0	1493.0
Goa	1.6	2.4	3.3
Gujarat	1887.7	2029.4	2003.4
Karnataka	854.7	843.9	822.0
Maharashtra	429.4	419.0	390.0
Orissa	61.9	56.1	77.2
Tamil Nadu	663.0	502.1	591.7
Tripura	0.6	1.0	0.8
West Bengal	36.9	31.0	45.9
India	6238.1	5935.5	5998.2

Source : Ministry of Agriculture, Govt. of India.

Selected State-wise Production of Groundnut in India (1991-1992 to 2003-2004)

	1991-	1992-	1993-	1994-	1995-	1996-	1997-	1998-	1999-	2000-	2001-	2002-	2003-
States/UTS	92	93	94	95	96	97	98	99	00	01	02	03	04
Andhra Pradesh	2151.9	2071	2546	1671	2626	2046	1182	2155	1089	2142.9	1249.6	820	986.0
Bihar	3.7	3.3	-	-	-	-	-	6.1	6.4	0.2	-	-	-
Jharkhand	-	-	-	-	-	-	-	-	-	6.3	-	-	-
Gujarat	699.7	2068.4	677	2380	1028	2449	2616	2577.8	717.5	688.6	2646.6	1094.5	4477.6
Haryana	1.7	1.3	-	-	-	-	-	1.1	0.5	0.4	-	-	-
Himachal Pradesh	0.5	0.4	-	-	-	-	-	0.4	0.4	0.2	-	-	-
Jammu & Kashmir	0.2	0.2	-	-	-	-	-	0	0	0	-	-	-
Karnataka	1110	1098.2	1199	946	1139	1147	754	1192.1	768.6	1081.1	585.8	539.0	479.0
Kerala	9.5	10	-	-	-	-	-	7	5.1	2.7	1.8	1.1	1.1
Madhya Pradesh	205.5	307.2	275	214	260	253	258	267.5	221.9	227.5	243.6	131.5	255.3
Chhatisgarh	-	-	-	-	-	-	-	-	-	32	41.7	38.1	33.1
Maharashtra	564.1	755.1	769	629	576	756	618	633.6	572	470	492.2	450.0	453.0
Nagaland	1.9	1.2	-	-	-	-	-	3	3.6	4	-	-	-
Orissa	497.1	497.1	114	98	92	79	90	72.2	72.6	57.5	61	48.8	93.2
Punjab	12	12	9	8	8	9	9	5	5	4	-	-	-
Rajasthan	198.2	268.2	209	198	165	273	365	362	265.2	180.8	-	-	-
Sikkim	-	-	-	-	-	-	-	-	-	-	-	-	-
Tamil Nadu	1517.6	1575	1866	1762	1520	1438	1762	1569.8	1384.6	1358.4	1250	717.4	918.4
Tripura	1.9	2.4	-	-	-	-	-	1.7	1.1	1.3	0.5	1.0	0.7
Uttar Pradesh	102.3	148	119	102	100	129	128	84.8	94	96.4		-	-
Uttaranchal	-	-	-	-	-	-	-	-	-	1.5	-	-	-
West Bengal	29	29	-	-	-	-	-	37.9	45.8	53.4	55.7	47.3	75.8
Goa, Daman & Diu	1.5	2.2	-	-	-	-	-	2.5	2.3	3.2	2.5	4.3	5.7
Pondicherry	4.3	4.2	-	-	-	-	-	2.1	2.5	2.2	-	-	-
India	7094.6	8854.4	7829	8062	7579	8643	7845	8981.6	5258.1	6408.3	7027.5	4121.1	8182.2

(Production: '000 Tonne)

Source: Ministry of Agriculture, Govt. of India

4 ANNEXURE III: A CASE STUDY ON INTEGRATED DEVELOPMENT OF COASTAL FISHERIES IN ANDHRA PRADESH⁶⁷

- 4.1 Andhra Pradesh is having a coastline of 974 Kms. with Bay of Bengal providing extensive coastal zone with rich natural resources of marine and brackish water fisheries. The two main rivers Godavari and Krishna and at their confluence points with Bay of Bengal forms estuarine environment which stands for major resources of exploitable fishery resource apart from other brackish water sources of creeks, canals, swamps, etc., in the coastal zone. Pulikate Lake, the salt lake which is situated between the sates of Andhra Pradesh and Tamil Nadu, occupies prominent place in the fishery resources both ecologically and commercially. The vast area of continental shelf of 33,227 Sq. Kms. in Bay of Bengal with rich pelagic and demersel fishery resources keep the state in prominent place among all the maritime states in India.
- 4.2 The fishermen population in the state is 8.71 Lakhs. There are 1.42 Lakh active fishermen, 1.35 Lakh part time fishermen engaged in capture fishery and there are 4.50 Lakh engaged in allied activities of fishing industry. There are about 0.90 Lakh fresh water fish farmers and 0.73 Lakh farmers engaged in brackish water culture activity. At present, Andhra Pradesh producing 1.50 Lakh tones of fish from marine sector, against the potential of 4.00 Lakh tones. The value of marine product exports from the state is Rs. 890 crores, which is 27% of the total export of the country. The export industry is mainly depending on a single species i.e. Tiger shrimp, which constitutes 99% of the value.
- 4.3 The Department of Fisheries is implementing various schemes of development in coastal zone keeping in view of the productive potential. Andhra Pradesh Marine Fishing Regulation Act is being implemented to regulate the fishing on sea, whereas the Aquaculture Authority rules are in force to regularize the coastal Aquaculture. In order to achieve over all development of coastal zone, the vision document 2020 prepared after eliciting the views of scientists, farmers fishermen, and their associations has well defined the strategies for the development, management and sustenance of resources and livelihood of people living on these resources directly and indirectly. The following are some of the aspects, which are related to the improvement of coastal zone.

Rationalization of fishing effort

⁶⁷ D.S. Murty, IAS, Commissioner of fisheries, Hyderabad, Andhra Pradesh

- 4.4 Though fishing effort in inshore waters has been increased over the years by the Mechanized and Non-mechanized Fishing Boats, the yield per unit effort has not been improved which is the clear indication of the exploitation of the resources to the full extent and need to check the over fishing. In order to reduce the concentration of fishing in near-shore waters, the implementation of MFR Act envisages the fishing zones for mechanized and traditional fishing and prohibits the operation of mechanized fishing in the traditional fishing zone of 8 KMs from the shore. Mesh Regulation and ban on fishing during the period of breeding and spawning of commercially important species have been found to be useful measures for sustainability. Closed season for 45 days implemented during the year 1999 has found improving the catches in post ban created necessity to continue the ban on fishing in successive years. These efforts will not only sustain the marine fishery resources but also sustain the economy of traditional fishermen who are exclusively depending on capture fishery.
- 4.5 Apart from the above efforts there is a need to explore the unexploited and under exploited pelagic resources by introducing improved craft the gear suitable. The information on potential fishing zones through satellite imageries would become essential in future to make the fishing an economical proposition. Through organization of rational fishery is not an easy task, proper statistics and knowledge of the exploited stocks with reference to the population abundance, recruitment, mortality and other population studies of stock composition would facilities to assess the resources and to prepare pragmatic plans for management.

Enrichment of Coastal Waters

- 4.6 Apart from protecting the marine living resources from over exploitation, installation of artificial reefs, sea ranching and marine culture practices are need to be introduced not only enrich the near shore waters but also to generate income as well as employment to the poor fishermen living in the areas. Community based development of fish aggregating devices in the form of artificial reefs are taken up in five selected place in Vizianagaram, Visakhapatnam. East Godavari, Prakasam and Nellore Districts. Further studies on these fishing habits will be carried out on varieties of fish population developed. Non Governmental Organization, community based organizations and fishermen organizations are being involved from the various stages of fabrication and laying of artificial reefs on seabed. The concept of sea ranching with juveniles of most vulnerable species such as tiger prawn is considered as a valuable activity to undertake the recruitment of natural stocks as the particular fishery has been over exploited in the past few decades.
- 4.7 Though the culture of marine organisms is near shore waters is innovative, the success of marine culture practices in other countries will be the driving factor to explore the culture of oyster, pearl oyster, mussel, clam, sea weed etc., are to be conducted by concerned ICAR Institutes and disseminate the availability of indigenous and cost effective technology by establishing the pilot forms for each of these species. The attempts on introducing marine culture practices would certainly change the socio economic life of fishermen living in coastal zone.

Regularization of Brackish Water culture practices

- 4.8 Though the earlier unplanned development of shrimp farming has created some adverse impact on coastal environment. This sector is still to be promising one to high profile economy of the coastal zone Regularization of farms out side the Coastal Regulation Zon (CRZ) for the culture practices in improved traditional methods are suggested to be taken up in order to sustain the sector by which the country earns valuable foreign exchange. The outbreak of dreadful has crippled the economy of many of farmers and industrialist who established hatcheries and feed mills with huge investments.
- 4.9 Farms with proper intake and outgoing water system and avoidance of crowded farming practices with high stocking densities are recommended practices for sustainable shrimp farming. Establishment of diagnostic laboratories with PCR test machine to test the quality of seed and hygienic maintenance of pond conditions is stated to be the preventive measures. Where there is recurrent problem of diseases, introduction of secondary cultures and alternative species is a known solution to over come the losses. Culture of mud crab through fattening techniques is already established and production of hatchery seed for commercially important species is an immediate requirement for large scale practice.

Hygienic handling of catches

- 4.10 One of the reasons for poor state of fish consumption in the state is identified to be the lack of proper care in handling the fish catches in hygienic manner right from the period of catching till the fish brought to the consumer market. The need is to improved in order to fetch good price to the production. The rejection of marine production exported from this country in the recent years finds the need for taking necessary steps to improve the quality control measures. Further, it is noticed that most of the low value fish caught by the trawlers is being dried on beaches without maintenance of hygienic condition. This low value fish can be made use of preparing value-added products in order to arrange valuable fish protein at cheaper rate.
- 4.11 In this direction, there is an immense need to bring out suitable mechanism to improve the quality of fish by creating awareness to the fish catchers and to the people involved in the processing of fish. Using of synthetic ice boxes, hygienic maintenance of the fish handling, and proper icing are the items to be popularised immediately. Construction of fish drying racks and dryers by using solar air heating systems and various machinery to produce value added product are the import aspects of improving the fish quality in the years to come.

Conservation of ecologically important places

4.12 Coastal zone is known to be most vulnerable area for pollution. All the flora and fauna existing in the areas are being affected by the growing human activity. The discharge of un-treated pollutants from industries, oil exploration, sewage lines, solid dumping contaminates the coastal waters and causes threat to the living organisms incidentally, due to bio accumulation process.

- 4.13 The gradual eroding of mangroves by the encroaches send the signals for the danger of destruction of the special type of environment which inhabits the nursery grounds for variety of species that are important both ecologically and commercially. Catching of fishes like Hilsa, during their breeding migration into the upstream of river is another important aspect of protecting the species and declaring the areas as sanctuaries for survival in the Eco-system. Poaching of the Turtles and their eges is known for causing serious threat in the northern coastal districts of the State, which requires concerted efforts to control the activity by imposing regulatory measures
- 4.14 In order to protect and ensure these vulnerable and endangered species of ecological importance, the plan of action envisaged in the vision document will be hopefully implemented by enactment of regulatory measures.

Management of Coastal environment

- 4.15 Due to the natural land slope towards coastal areas, all the discharge like industrial affluent domestic sewage, agricultural discharges are creating great impact on the different natural water bodies of coastal environment. Further the high density human population and its activity through various means has been taken even though the rules restricts any development within the area of 500m from the shore. The different types of pollution causing factor in aquatic environment results into mangrove area and productive costal belts is need to be checked in order to conserve the natural resources.
- 4.16 The indiscriminate Brackish water Aquaculture with out much control on feed, seed and other inputs and water management practices has brought out a serious threat to the environment and ecology. Consequently, being a part of the environment the shrimp farming itself has faced various problems resulting into uncertainly. The necessary has arisen to think seriously about the impact of Aquaculture on environment and vice versa.
- 4.17 In view of the above, monitoring studies in the most vulnerable areas to evaluate the positive and negative interaction of environment in coastal zone should be carried out. Based on the studies Aquaculture management plans for each of these areas have to be prepares and accord the shrimp farms by fixing the levels of sustainable production with deference to the carrying capacity of the environment.

Sea safety measures to Coastal fishermen

- 4.18 Lake of proper and efficient communication system for sea going fishermen is identified as the main shortfall for the loss of lives and properties during the cyclone and other disasters. The development of shore to vessels communication system by establishing radio stations and use of VHF sets is found to be more useful to safeguard the fishermen when they are on fishing amidst sea. In this way the crew will always be in the touch with the land to receive the instant weather bulletins, prevailing of depressions and likely formation of cyclones with intensities and direction of movements. The dissemination of information on potential fishing zones to the fishing vessels on sea would facilitate to maximize the catches and to reduce the operational costs substantially.
- 4.19 The tackle this problem it is planned to establish radio stations all along the coast at regular intervals and arrange the VHF mobile sets to the mechanized fishing boats and hand held sets to the non mechanized boats by the development of communication net work.

Creation of infrastructure facilities

- 4.20 Since the fishermen are living in remotest corners of the coastal zone and stay away from the main stream of civilization the socio economic life of these population have become miserable miserable without any basic amenities such as road, electricity, drinking water, housing etc. The frequent occurrences of cyclones will throw them into deep hardships with disruption of communication facilities quite frequently.
- 4.21 Keeping in view of the vulnerability of this zone, there is a need for strategic development of villages by creating suitable cost-effective infrastructure. To reduce the loss of lives and properties during cyclones, the fishermen are to be acquired with disaster preparedness measures. Further, relief and welfare schemes with specific objective to provide social and economic security to the fishermen population in the form of Group Accident Insurance Scheme, for eventual death of fishermen Relief Cum Saving Scheme for subsistence livelihood during non fishing days, supply of subsidized HSD oil to reduce the operational cost of motorized and small mechanized fishing boats, residential schools to fishermen children, are some of the programme to be continued.

Conclusions

4.22 To ensure the long-term sustainability of coastal zone fisheries in harmony with the environment, the concept of responsible fisheries will be the immediate need. In this direction there is need for formulation of code of conduct for responsible fisheries by making principles and standards applicable to conservation, management and development in pragmatic way where human activity makes impact on the capture, processing, trade of fish and fishery products, fishing operations, aquaculture, fisheries research and integration of fisheries coastal area management.

5 ANNEXURE IV: SOCIAL SECURITY AND RESOURCE MANAGEMENT MEASURES IN THE MARINE FISHERIES SECTOR OF KERALA⁶⁸

Social security / welfare measures⁶⁹

S. No.	Name of the scheme/measure	Agency	Other details
1	Subsidized housing scheme	MATSYAFED	Total Rs 15000 (Rs. 12500 as loan from HUDCO Rs 1500 from state government Rs 1000 beneficiary contribution BC)
	Full grant scheme		
		Dept of Fisheries	
2	Sanitation and health		Latrines-Rs. 2500 (Rs 1200 as HUDCO loan, Rs 750 as BC
			Achievement –6190 (2000)
		Marketing Deerd	Rs 2500
	Latrines	Dept. of fishers	Rs 2500 each selected fisherman
3	Women vendor's bus services	Mfed	TVm, Alpy, Kollam and Ekm 96 buses in 9 routes 450 women beneficiaries, nominal charge form passengers.
4	Community Peeling centres	Do	Neendakara, Sakthikulangara
5	Women vendor's subsidy scheme	Do	Rs 250 for purchase of vessels to carry fish (N-2000)
6	Education training	Do	SSLC in each district
	 Training programme for fisherman youth (OBM service and repair 		SSLC (highest, second highest Rs 3000 and Rs 2000) in three regions Rs
	 Cash award for students 		Sebelerabio De 100/month for
	 Cash incentives 		two years for higher studies

⁶⁸ Compiled by C Ramachandran (2005) from various articles published in the October 2000 issue of the journal of the Dept of Public relations, Govt of Kerala, namely Kerala Calling

⁶⁹ The figures regarding the target achievement are provisional. Matsyafed= Kerala State Cooperative Federation for Fisheries Development 1984. Matsyaboard= Kerala Fishermen Welfare Fund Board 1986

S. No.	Name of the scheme/measure	Agency	Other details
		Matsyaboard	(highest and second highest)
7	Life insurance	Do	Insurance amount Rs. 0.1 million for
8	Group insurance (due to accident)	M. board	All fisherman between 15-75 age group: 50;50 sponsored scheme Rs 50,000 each (death, found missing, permanent total disablement) Rs 25,000 for temporary or partial disablement
9	Compensation for death of fishermen (during or immediately after fishing not due to accident)	do	Rs 15000 to dependents (any registered fisherman)
10	Input insurance scheme	do	Premium 4.25% of the estimated cost of the inputs for three years
11	Matsyafed chairman relief fund	do	Emergency help to natural catastrophe-chairman's discretion
12	Subsidy for OBM (10HP)	do	Rs 10000 as subsidy (Centrally sponsored scheme 50:50)
13	Subsidized loans for inputs (banks)	do	Upto 25% of the loan amount
14	Fin. Assistance for marriage of fisherman's daughters	M.board	Rs 1500 as fuu grant/marriage
15	Funeral expenses	do	Rs 300 for the death of his dependants
16	Family planning scheme	do	Rs 500 for post operational care after sterilization
17	Old age pension	do	Those above 60, Rs 100/month (-fishing activity for livelihood not less than 10 years prior to date of application, live in a Kerala fishing village at least one year, Annual income less than Rs 1500)
18	Fin assistance for temp. disability due to accident	do	Unable to go for fishing at least for seven days-Rs 100 for first seven days and Rs 25/day for the following days upto a ceiling of Rs 500)

S. No.	Name of the scheme/measure	Agency	Other details
19	Fin assistance to the dependants at death of fishermen	do	If not entitled under group insurance /any other scheme Rs5000/-at the death of an active fisherman below 60 years
20	Fin assistance for fatal diseases(heart surgery, kidney transplant, brain tumor, cancer, paralysis etc)	do	Age group 23-60 whose 15000/ (Rs 5000 to 40,000)
21	Chairman of relief fund	do	Rs 100 to 2000
22	Eye ailments scheme("Netra jyothi")	do	Free treatment
23	Maternity assistance	do	Rs 500 each for first two births
24	Savings cum relief scheme	Dept of Fisheries	50:50 scheme, age group 18- 60 for four lean season months (March to June) Rs 45 / fisherman during 8 months = Rs 360+360 so a grand total of Rs 1080 / in four monthly instalment of Rs 270 /
25	Coastal electrification ("Theera jyothi")	do	Rs 1000/ to selected fisherman household

Resource management

Kerala Marine Fisheries Regulation Act (1980) - Restrictions / prohibitions

- No persons shall carry out fishing in any specified area using a fishing vessel, which is not licensed under the act.
- The use of purse seine, ring seine, pelagic trawl and mid water trawl is prohibited in territorial waters.
- The use of bottom trawl gears having less than 35mm mesh size in stretched conditions is prohibited in the territorial waters.
- The use of bottom trawl gears from sunrise to sunset is prohibited in the territorial waters.
- The use of fishing vessel fitted with mechanical means of propulsion except crafts is prohibited in the area of the sea upto 30 m depth line form Kollengode to Paravoor Poshikkara having a length of 78 km and

upto 20 m depth line in the sea along the coastline from Paravoor Pozhikkara to Manjeswaram having a length of 512 km.

• Prohibition of bottom trawling during Monsoon season.

Penalties

• For breach of any provisions of the Act or orders or notifications made thereafter the owners of the vessels are liable to be punished with a minimum fine of Rs 25000 and may be extended upto Rs 50000 as may be adjusted by the adjudicating officer.

6 ANNEXURE V: FISHERY SCHEMES

Scheme on Development of Marine Fisheries, Infrastructure and Post Harvest Operations

INTERMEDIATE CRAFT OF IMPROVED DESIGN

This component on multi-day intermediate class of resource specific fishing vessels in the length range of about 18 meters is proposed to be implemented with a unit cost of Rs.40 lakhs on which a back ended subsidy equivalent to 10% of the cost restricted to Rs.4 lakhs would be provided. Only cooperatives/group of beneficiaries would be eligible for the assistance.

MOTORISATION OF TRADITIONAL CRAFT

The subsidy benefit will be extended to only kerosene driven OBM of 8-10 HP. The input cost has been revised to Rs.60,000/- per unit and a subsidy of Rs.20,000/- would be extended. Subsidy will be shared equally between the Centre and beneficiary states. Subsidy will be given to only existing boats and those constructed in placement of existing ones.

SAFETY OF FISHERMEN AT SEA

This component envisages installing one Global Positioning System (GPS) and a wireless set on the small-mechanized fishing vessels of below 20m length. The unit cost of these equipments together works out to about Rs.1.50 lakhs, 20% of which but not exceeding Rs.30,000 (Rupees thirty thousand only) would be provided as back-ended subsidy. Only registered boats would qualify for the assistance.

RESOURCE SPECIFIC DEEP SEA FISHING VESSELS

The programme envisages converting existing trawlers for resource specific fishing for which a back-ended subsidy of Rs.15 lakh per vessel would be provided. The component would be implemented through the Fishery Survey of India by suitably modifying the imported technology through the ICAR Institute of Central Institute of Fisheries Technology (CIFT). Subsidy will be 50% cost of conversion with a ceiling of Rs.15 lakh per vessel.

Establishment of Fishing Harbours and Fish Landing Centres

Objectives

- *a)* Providing infrastructure facilities for safe landing, berthing and unloading of fish catches of mechanised fishing vessels, traditional fishing craft and deep sea fishing vessels.
- b) Repair and renovation including improvement of hygienic conditions of the existing facilities created so far under the Central Sector and Centrally Sponsored Schemes.

Funding Pattern

The central assistance under this component of the CSS as below:

- a) 50% of project cost to the coastal State Governments and 100% to Union Territories for construction of minor fishing harbours and fish landing centres;
- b) 100% assistance to the coastal States, Union Territories & Port Trusts and Fishermen Associations and organization for construction of major fishing harbours;
- c) 50% assistance for construction of minor fishing harbours and fish landing centres on Build, Operate & Transfer (BOT) basis;
- d) 50% assistance to the coastal State Governments and Port Trusts for repair and renovation/ modernization of existing fishing harbours and fish landing centres and 100% to the Union Territories.

DEVELOPMENT OF POST HARVEST INFRASTRUCTURE

Objectives

- e) Developing fish preservation & storage infrastructure.
- f) Developing marketing infrastructure such as retail vending kiosks, aquashops, insulated/refrigerated vehicles, mini-trucks, auto rickshaws with icebox, motor-cycles/bi-cycles with ice-box, fish display cabinets, visi-coolers, weighing scales, computer units and allied equipments.

Funding patterns

- a) 100% grant (limited to Rs.1.00 crore) to Govt. Undertakings/ Corporations/Federations;
- b) 75% grant (limited to Rs.0.75 crore) to NGOs/Cooperatives/Joint Sector/Group of fisher-women in NE Region/Hilly/Tribal areas and 50% grant(limited to Rs 0.50 crore) in general areas

c) 50% grant (limited to Rs 0.40 crore) to Assisted Sector/Private Sector in NE Region/Hilly/Tribal areas and 25% grant (limited to Rs.0.25 crore) in general areas.

Scheme for Subsidy on modern equipment

- a) Purpose: To provide subsidy on modern equipments like fish finder, GPS navigator, VHF radio set, life saving appliances etc.
- b) Quantum of assistance: 50 % Subsidy with Maximum assistance of Rs. 40,000/=

Scheme for Mechanisation of Fishing Crafts

- a) Purpose: To provide subsidy on procurement of FRP and Non-mechanised wooden boats
- b) Quantum of assistance
 - ✓ FRP below 7 Mtrs OAL: 50 % of Total cost of the boat with a limit of Rs. 12,000/=
 - ✓ FRP above 7 Mtrs OAL: 1/3 of Total cost of the boat with a limit of Rs. 20,000/=
 - Non-Mechanised wooden up to 11 Mtrs OAL: 30 % of total cost of the boat with a limit of Rs. 20,000/=

Scheme for Mechanisation of Traditional Fishing crafts [50 % Centrally Sponsored]

- a) Purpose: Mechanisation of traditional fishing crafts by installation of In Board Machine [IBM] or Out Board Machine [OBM]
- b) Quantum of assistance
 - ✓ IBM: 50 % of Total cost of the machine; Limited to Rs. 12,000/=
 - ✓ OBM: 50 % of Total cost of the machine;Limited to Rs. 20,000/=

Scheme for fishermen welfare - Accidental Insurance [Centrally Sponsored]

- a) Purpose: To cover fishermen under accidental insurance shelter
- b) Quantum of assistance: Rs. 14/= per fishermen insurance premium is being paid by the Government. While in the case of accident:
 - \checkmark Rs.50,000/=being paid to the family of the victim.
 - \checkmark Rs.25,000/= being paid to the victim for permanent disability caused by an accident.

Scheme for housing to the fishermen [Centrally Sponsored]

- a) Purpose: To provide Pakka shelter to the fishermen
- b) Quantum of assistance
 - ✓ Rs. 40,000 /= per each unit of Pakka Makan
 - \checkmark Rs. 35,000/= for One bore well per 20 Nos. of houses
 - ✓ Rs. 1,75,000/= for Community Hall per 75 Nos. of houses

7 ANNEXURE VI: LIST OF MINING CLEARANCES

Representative list of Acts / Rules applicable to enterprises in Orissa

- The Orissa Industrial Infrastructure Development Corporation Act, 1980 (IDCO)
- The Orissa Industrial Infrastructure Development Corporation Rules,
- The Environment (Protection) Act, 1986
- The Environment (Protection) Rules, 1986
- The Air (Prevention and Control of Pollution) Act, 1981
- The Orissa Air (Prevention and Control of Pollution) Rules
- The Water (Prevention and Control of Pollution) Act, 1974
- The Orissa Water (Prevention and Control of Pollution) Rules
- The Water (Prevention and Control of Pollution) Cess Act, 1977
- The Water (Prevention and Control of Pollution) Cess Rules, 1978
- The Hazardous Wastes (Management and Handling) Rules, 1989
- The Bio- Medical Waste (Mgmt. and Handling) Rules, 1998
- The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- The Recycled Plastics Hazardous Manufacture and Usage Rules, 1999
- The Factories Act, 1948
- The Orissa Factories Rules, 1950
- The Orissa Factories (Defining the Persons Holding Position of Supervision or Management) Rules
- The Orissa Welfare Officers (Duties, Qualifications and Conditions of Service) Rules
- The Boilers Act, 1923
- The Orissa Boilers Rules
- The Orissa Boiler Operation Engineer's Rules
- The Orissa Boiler Attendants Rules
- The Orissa Economisers Rules
- The Atomic Energy (Factories) Rules, 1996
- The Orissa Control of Industrial Major Accident Hazards Rules
- The Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996
- The Public Liability Insurance Act, 1991
- The Public Liability Insurance Rules, 1991
- The Child Labour (Prohibition and Regulation) Act, 1986
- The Orissa Child Labour (Prohibition and Regulation) Rules
- The District Child Labour Rehabilitation Cum Welfare Fund Scheme

- The Maternity Benefit Act, 1961
- The Orissa Maternity Benefit Rules
- The Orissa Grama Panchayat Raj Act, 1993
- The Orissa Grama Panchyat Raj Rules, 1968
- The Orissa Grama Panchayat Raj (Grama Panchayats Control Over Erection of Buildings) Rules
- The Orissa Grama Panchayat Raj (Grama Panchayats Taxes and Fees) Rules
- The Orissa Municipal Act, 1950
- The Orissa Municipal Rules, 1953
- The Orissa Shops and Commercial Establishment Act, 1956
- The Orissa Shops and Commercial Establishment Rules, 1958
- The Weekly Holidays Act, 1948
- The Contract Labour (Regulation & Abolition) Act, 1970
- The Orissa Contract Labour (Regulation & Abolition) Rules, 1975
- The Minimum Wages Act, 1948
- The Orissa Minimum Wages Rules, 1954
- The Equal Remuneration Act, 1976
- The Equal Remuneration Rules, 1976
- The Payment of Wages Act, 1936
- The Orissa Payment of Wages Rules, 1936
- The Payment of Bonus Act, 1965
- The Payment of Bonus Rules, 1975
- The Payment of Gratuity Act, 1972
- The Orissa Payment of Gratuity Rules, 1974
- The Workmen's Compensation Act, 1923
- The Workmen's Compensation Rules, 1924
- The Karn.Workmen's Compensation (Occupational Diseases) Rules, 1968
- The Employers Liability Act, 1938
- The Orissa Industrial Establishments (National and Festival Holidays) Act
- The Orissa Industrial Establishments (National and Festival Holidays) Rules
- The Orissa Labour Welfare Fund Act
- The Orissa Labour Welfare Fund Rules
- The Persons with Disability (Equal Opportunities Protection of Rights and full Participation) Act, 1995
- The Industrial Employment(Standing Orders) Act, 1946
- The Industrial Employment (Standing Orders) (Orissa) Rules, 1946

- The Trade Unions Act, 1926
- The Orissa Trade Unions Regulation 1941
- The Industrial Disputes Act, 1947
- The Orissa Industrial Disputes Rules- 1954
- The Collection of Statistics Act, 1953
- The Orissa Collection of Statistics Rules
- The Apprentices Act, 1961
- The Apprenticeship Rules, 1991
- The Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959
- The Employment Exchanges (Compulsory Notification of Vacancies) Rule, 1960.
- The Employees State Insurance Act, 1948. ESIC
- The Employees State Insurance (General) Regulations, 1950
- The Employees Provident Funds and Miscellaneous Provisions Act, 1952
- The Employees Provident Fund Scheme 1952
- The Employees Pension Scheme 1995
- The Employees Deposit Linked Insurance Scheme 1976
- The Indian Electricity Act, 1910
- The Indian Electricity Rules, 1956
- The Orissa State Electricity Board (General Conditions of Supply) Regulations, 1981
- The Standards of Weights and Measures(Enforcement) Act, 1958 / 1985
- The Orissa Standards of Weights and Measures (Enforcement) Rules, 1993
- The Orissa State Tax on Professions, Trades, Callings and Employments Act, 2000
- The Orissa Tax on Professions, Trades, Callings and Employments Rules, 2000
- The Orissa Entry Tax Act, 1999
- The Orissa Entry Tax Rules, 1999
- The Orissa Sales Tax Act, 1947
- The Orissa Sales Tax Rules, 1947
- The Central Sales Tax Act, 1956
- The Central Sales Tax (Regn. and Turnover) Rules, 1957
- The Central Sales Tax (Orissa) Rules, 1957
- The Central Excise Act, 1944
- The Central Excise Rules, 1944
- Central Excise Valuation (Determination of Price of Exercisable Goods) Rules, 2000
- Customs and Central Excise Duties Draw Back Rules, 1995
- The Income Tax Act, 1961
- The Income Tax Rule, 1962
- The Companies Act, 1956
- The Companies Regulations, 1956
- The Company Secretaries Act, 1980
- The Securities Contracts (Regulations) Act, 1956
- The Preference Shares (Regulation of Dividends) Act, 1960
- The Securities and Exchange Board of India Act, 1992
- The SEBI (Disclosure and Investor Protection) Guidelines, 2000
- The SEBI (Substantial Acquisition of Shares and Takeover's) Regulations, 2002
- The emblems and names (Prevention of Improper use) Act, 1950
- The Industries (Development & Regulation) Act, 1951
- The Foreign Exchange Management Act, 1999
- The Foreign Contribution (Regulation) Act, 1976
- The Foreign Trade (Development and Regulation) Act, 1992
- The Sick Industrial Companies (Special Provisions) Act, 1985
- The Consumer Protection Act, 1986
- The Depositories Act, 1996

Mining Industry Specific Acts / Rules / Regulations

- The Mines Act, 1952
- The Mines Rules, 1955
- The Orissa Minor Mineral Concession Rules, 1990
- The Mines & Minerals (Regulation and Development) Act, 1957
- The Indian Explosive Act, 1884
- The Indian Explosive Rules, 1983
- The Oil Mines Regulations, 1984