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Original Research Article

An assessment of the performance evaluation of the salt industry in india with special reference to the state of Gujrat

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ABSTRACT

The purpose of this article is to examine the financing and production of the Indian salt industry. Studies have shown that salt is one of the oldest ingredients in food and has played an important role in the history of human civilization. It is an important component of food additives and is more important than food additives. Coastal areas of India, especially the states of Gujarat, Tamil Nadu, Maharashtra, Goa, Karnataka, Andhra Pradesh, Odisha and West Bengal, use seawater for salt production. The ocean is an inexhaustible source of salt. The three states, Gujarat, Tamil Nadu and Rajasthan account for 70%, 15% and 12% of the total salt production in the country. These states also meet the needs of the nation. India is self-sufficient in salt production. More than 95% of salt is produced by the private sector, making it a significant part of India's salt industry. The public sector accounts for only two to three per cent of the total. The mid-western state of Gujarat accounts for about three-quarters of India's annual salt production. The revenue from salt exports is more than the import price. This shows the financial advantage arising from the cost of importing and exporting Indian salt. The Indian salt industry faces many challenges including climate change and health and welfare issues for salt workers: unpredictable weather conditions such as floods and unseasonal rains, short salt seasons and reduced production needs. Therefore, policies need to be implemented properly to mitigate these problems.

1. Introduction

Salt is a widely used ingredient in the kitchen. It plays an important role in improving the flavour of our food. There are many types of state, such as Epsom salt, mineral salt beds, sea salt, lake salt, bamboo salt, fleur de Sel, Khar (alkaline salt), Sambhar salt, red salt, black salt (Kala Namak), rock salt (rock salt) and vegetable salt (sodium chloride). Sea salt is produced by collecting seawater in shallow lakes or basins and allowing it to evaporate in the presence of sunlight to form salt crystals. Goan salt has a special appeal in the culinary world. India is the world's third-largest producer of salt after China and the United States. After independence, India was dependent on imported salt from the United Kingdom. Currently, India is self-sufficient in salt production and also exports salt to many countries. Small producers are dominating the Indian salt market. There is much evidence that salt was produced during the Indus Valley Civilization that existed during 2500 BC. Gujarat and Rajasthan have a long history of salt production in India.[1–3]

Iodine is needed every day for brain growth and development. Diseases resulting from a lack of iodine in food and diet are called Iodine Deficiency Disorders. It is estimated that more than 200 million people in India are

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at risk of iodine deficiency. Dietary iodine supplementation in the form of iodized salt is cost-effective in controlling and eliminating such deficiency disorders. Since all humans consume salt daily, providing iodized salt will increase the iodine the body needs for proper functioning. Since salt was considered an important commodity, controlling the salt industry was seen as a major economic and political issue. The British sought to do this not only in Goa but throughout the country. The British Salt Act of 1882 prohibited Indians from collecting or selling salt.[4–9] In response to the act, Mahatma Gandhi led the Great March, a non-violent protest against apartheid law.

2. Objectives

The general objective of the paper is to study the financial status and production in the salt industry in India with a special focus on Gujarat State. The specific objectives of the paper are:

1. To study the trend of production, export and import volume of salt in India.
2. To examine the production of common salt in leading states of India.
3. To evaluate the port-wise export of salt and its value in India.
4. To examine the financial status through the export-import value of salt in India.
5. To study the role of Gujrat in salt production in India.
6. To study the relationship between production, export and import of salt in India.
7. To identify the challenges before the salt industry and policies government for mitigating such challenges.

3. Hypotheses

Based on the above objectives the following hypotheses have been built:

H_{01}: There is no relationship between the production of salt and the export of salt in India.
H_{1a}: There is a relationship between the production of salt and the export of salt in India.

H_{02}: There is no relationship between the production of salt and the import of salt in India.
H_{1b}: There is a relationship between the production of salt and the import of salt in India.

4. Materials and Methods

This study is descriptive in design and has utilized qualitative and quantitative approaches. Secondary data for the study has been collected from the website of the Salt Department, Ministry of Commerce and Industry, Government of India, and research papers. To reveal the trade of salt production in India in general and export/import perspectives in particular, descriptive analysis, content text analysis, and regression analysis have been performed. There are three variables in a simple regression study between production, export and import of salt in India.[10–13] The production of salt is the dependent variable. Export and import of salt are the independent variables. Regression analysis is calculated on information on the production, export and import of salt in India during 2008-09 to 2020-21.

5. Results and Discussion

India is the world's largest salt producer and the third largest salt producer after China and the United States. India will produce approximately 21 million tonnes of sea salt, 320 tonnes of rock salt and 5.2 million tonnes of other types of salt in 2021. The major salt-producing states in India are Gujarat, Rajasthan, Tamil Nadu, Maharashtra, Andhra Pradesh and Orissa. Gujarat is India's largest salt producer. Salt is transported by road, rail and sea. Approximately 60 per cent of human consumption is transported by rail and 40 per cent by road. Nearly 88 per cent of trade is by road, 10 per cent by rail and 2 per cent by sea. India exports salt to many countries including Japan, Vietnam, United Arab Emirates, Qatar, South Korea, China, Malaysia, Nepal, Bangladesh, Indonesia, Bhutan, Hong Kong and Singapore. The salt industry produces by-products such as gypsum, bromine, magnesium chloride, magnesium sulphate, ammonium bicarbonate, soda ash, caustic soda and sodium bicarbonate. Air plays an important role in salt production. For example, as temperatures increase, more seawater evaporates, reducing the amount of salt that evaporates.

5.1. The trend of production, export and import of salt in India

Gujarat is located in the subtropical highlands of Western India. The coastal areas of the state remain dry for most of the year, resulting in large amounts of salt production. The state accounts for a large portion of India's total salt production. Kharaghoda, Bhavnagar, Porbandar and Rann of Kutch in Gujarat are the major salt-producing regions. The main sources of salt in India are sea brine, lake brine, groundwater brine and rock salt deposits. Most of the salt in Gujarat comes from the sea and ocean. Phalodi, Sambhar and Bidhannagar are known for their salt industry.

Table 1 discusses the quantity of salt production in India. It has been found that salt production has increased in the last two decades, but not steadily. Salt production was 17879.2 thousand metric tonnes in 2002-03 and 28058.3 thousand metric tonnes in 2019-220. It declined in 2020-21 and reached 26563.9 thousand metric tonnes. Finally, total production was 26009.0 thousand metric tonnes in 2022-23.

Table 1: Production of salt inIndia

Year	Production	Year	Production	Year	Production
2002-03	17879.2	2003-04	14882.4	2004-05	14761.2
2005-06	18969.0	2006-07	17898.2	2007-08	17845.2
2008-09	19151.2	2009-10	23951.3	2010-11	18610.1
2011-12	22179.1	2012-13	24546.9	2013-14	23019.3
2014-15	26887.1	2015-16	27643.7	2016-17	29191.6
2017-18	28949.4	2018-19	30033.3	2019-20	28058.3
2020-21	26563.9	2021-22	26599.0	2022-23	26009.0

Source: Annual report 2022-23, p.55, Salt Department, Ministry of Commerce and Industry. Note: Figure in '000 MT.

The leading producers with prominent marine salt works in Gujrat are Lavanpur, Maliya, Kandla, Gandhidham, Dahej, Rajula, Bhavnagar, Chira, Jhakhar, Mithapur and Jamnagar. The main sites of salt production in Tamil Nadu are Covelong, Vedaranyam, and Tuticorin. Naupada, Kakinada, Krishnapatnam, Iskapalli, and Chinnaganjam are the leading salt-producing sites in Andhra Pradesh. Palghar, Bhayandar and Bhandup are the main salt-producing areas in Maharashtra. Sumadi and Ganjam are the primary locations for salt production in Odisha.

Table 2 depicts the production of iodised salt in India. It has been found that the total production of Iodised salt in India was 36.89 lakh tonnes in 2002-03 and 78.58 lakh tonnes in 2020-21. It declined in 2021-22 and reached 71.98 lakh tonnes. Rajasthan is famous for its inland salt pans that utilize the salt water from the lakes and subsoils of the region such as Phalodi, Sujangarh, Kuchhaman, Rajas and Sambhar Lakes. Mandi salt deposits are the source of salt for Himachal Pradesh. Sambhar Salt Lake is the largest Salt Lake in India and is the source of most of the salt production in Rajasthan. It extends across Sikar, Ajmer, Jaipur and Nagaur districts. The salt is produced by evaporation of brine and is managed primarily by the state-owned Sambhar Salts Ltd. Kshar salt is a unique natural iodized alkaline salt. It is extracted from Sambhar Lake near the city of Jaipur in Rajasthan, India. It is the only salt in the world with a pH value of roughly 9.5. Pan, reshta and kyar are the major salt types in the state. Rajasthan's salt industry remains labour-intensive and most of the production comes from small and medium-sized salt producers who do not have access to modern technology.

Table 3 discusses the production of common salt in leading states of India. It has been found that Gujarat is the leading salt-producing state in India followed by Tamil Nadu, Rajasthan and Andhra Pradesh. Total production of salt was 237.11 lakh tonnes in 2016-17 and 244.20 lakh tonnes in 2018-19. Finally, it was 216.39 lakh tonnes in 2020-21. Total production of salt was 24 lakh tonnes in Tamil Nadu and 23.93 lakh tonnes in 2020-21. Rajasthan produced 24.88 lakh tonnes in 2016-17 and 21.56 lakh tonnes in 2020-21. Andhra Pradesh produced 4.01 lakh tonnes in 2016-17 and 2.85 lakh tonnes in 2020-21. Maharashtra produced 1.52 lakh tonnes in 2016-17 and 0.70 lakh tonnes in 2020-21. The total production of salt in Karnataka was 0.14 lakh tonnes in 2016-17 and 0.12 lakh tonnes in 2020-21. Therefore, salt production declined in 2020-21 in major salt-producing states of India. The Corona pandemic was the main cause of that.

Table 4 discusses the sources of salt production in India. There are two sources of salt in India, namely sea and inland. Sea water is the main source of salt in India. As Rajasthan is a landlocked country, inland is the best source of salt production. Gujarat is the main salt-producing nation in both sea and inland. The Salt production plant in West Bengal is one of the oldest salt places in India. The outstanding locations of manufacturing are Tamlook and Hijli inside the Midnapore district, and the Sunderbans in the 24 Parganas. Goa contributed to India's salt production for hundreds of years. Goa's salt is thought for its flavour, which comes from the minerals inside the sea. It's used for cooking, pickling, making sausages, keeping fish, and fertilizing plants. Currently simplest 25-30 salt pans closing in Goa. Changes in land use, non-availability of labour and a lack of maintenance of the bunds are some of the reasons. Salt pans are scattered across numerous talukas, with North Goa's Tiswadi and Pernem areas being outstanding gamers. The community that owns the salt pans goes by the surname Agarker. Goa's salt-making tradition, although dealing with demanding situations, nevertheless holds the ability to make its mark on the culinary landscape.

Table 5 discusses the export quantity of salt in India. It has been found that the quantity of exported salt is increasing continuously. The exported salt was 1365.90 thousand tonnes in 2002-03 and 8274.79 thousand tonnes in 2016-17. It finally reached 8424 thousand tonnes in 2021-22. Tamil Nadu is the second largest salt-producing state in India after Gujarat. The state contributes 12 per cent of salt production in the country. Thoothukudi, Kancheepuram, Viluppuram, Nagapattinam and Ramanathapuram are the major salt-producing districts. Tamil Nadu Salt Corporation is the leading salt manufacturer in the state and produces industrial salt and fortified edible salt. Thoothukudi district, which has a Salt Lake of nearly 3,000 acres at Vedaranyam, which is considered the second largest salt-producing district in the state, is the largest salt-producing district in Tamil Nadu. The potential for the development of the salt-based marine chemical industry is very high. Thoothukudi salt industry has the potential to improve productivity and quality. Thoothukudi is called the salt city of India. The quantity of salt produced in the state has decreased

Table 2: Production of iodised salt inIndia

Year	Quantity	Year	Quantity	Year	Quantity
2002-03	36.89	2003-04	42.53	2004-05	46.10
2005-06	49.83	2006-07	51.54	2007-08	49.61
2008-09	53.68	2009-10	58.23	2010-11	62.20
2011-12	62.00	2012-13	61.81	2013-14	58.47
2014-15	64.54	2015-16	64.76	2016-17	69.11
2017-18	68.29	2018-19	67.38	2019-20	67.02
2020-21	78.58	2021-22	71.98	2022-23*	50.39

Source: Annual report 2022-23, p.65, Salt Department, Ministry of Commerce and Industry. Note: Figures in Lakh Tonnes. * up to November 2022.

Table 3: Production of common salt in the leading states of India

State	2016-17	2017-18	2018-19	2019-20	2020-21
Gujrat	237.11	233.00	244.20	239.60	216.39
Tamil Nadu	24.00	23.62	23.99	22.24	23.93
Rajasthan	24.88	27.18	25.75	13.29	21.56
Andhra Pradesh	4.01	4.19	4.77	3.97	2.85
Karnataka	0.14	0.10	0.12	0.15	0.12
Maharashtra	1.52	1.29	1.39	1.23	0.70
West Bengal	0.14	0.07	0.06	0.05	0.06
Odisha	0.09	0.03	0.05	0.04	0.02
Goa	0.03	0.01	0.01	0.01	0.01

Source: Annual report 2022-23, p.59, Salt Department, Ministry of Commerce and Industry. Note: Figures in Lakh Tonnes.

Table 4: Sources of salt production in India

Source	2017-18		2018-19		2019-20		2020-21	
	Sea	Inland	Sea	Inland	Sea	Inland	Sea	Inland
Gujarat	20922.8	2377.0	22085.0	2331.0	21382.8	2576.9	18582.7	3055.8
Rajasthan	0.0	2492.1	0.0	1999.3	0.0	1197.2	0.0	1954.6
Tamil Nadu	2361.7	0.0	2399.2	0.0	2223.9	0.0	2392.6	0.0
Andhra	419.2	0.0	477.6	0.0	397.2	0.0	285.3	0.0
Maharashtra	129.7	0.0	140.0	0.0	123.3	0.0	69.6	0.0
Karnataka	10.2	0.0	12.4	0.0	15.3	0.0	12.8	0.0
Odisha	3.2	0.0	5.1	0.0	3.9	0.0	1.7	0.0
West Bengal	6.8	0.0	6.7	0.0	4.7	0.0	6.4	0.0
Goa	1.0	0.0	1.3	0.0	1.3	0.0	1.1	0.0

Source: Annual report 2022-23, p.58, Salt Department, Ministry of Commerce and Industry. Note: Figures in '000 Tonnes.

Table 5: Export of salt of India

Year	Quantity	Year	Quantity	Year	Quantity
2002-03	1365.90	2003-04	1222.40	2004-05	2204.40
2005-06	2976.40	2006-07	1897.50	2007-08	1893.10
2008-09	2438.77	2009-10	2895.75	2010-11	3867.90
2011-12	3771.80	2012-13	5003.66	2013-14	5960.98
2014-15	5675.94	2015-16	6567.48	2016-17	8274.79
2017-18	9163.03	2018-19	10348.25	2019-20	10791.60
2020-21	6656.11	2021-22	8424.00	2022-23*	7301.00

Source: Annual report 2022-23, p.88, Salt Department, Ministry of Commerce and Industry. Note: Quantity in 000 Tonnes. * up to November 2022.

significantly in the last three years, leaving the producers with little stock to sell during the off-season. The salt produced in the state is used for industrial purposes and is also refined and used as edible salt.

Salt production takes place in Vedaranyam over an area of about 6,000 acres. Small-scale production is carried out in villages like Kodiyakarai, Kadinalvayal, Kailavanampettai, Kodiyakadu and Agasthiyampalli in Vedaranyam block over an area of about 3,000 acres. India is a major exporter of salt and some of its products are exported around the world. The largest exporters of Indian salt are the United States, Japan and the United Arab Emirates. The process of exporting salt from India involves many steps including transportation, quality control and customs. Salt companies in Gujarat and other parts of India work closely with shipping companies to transport the salt to its destination. Quality control is an important factor in Indian salt exports. Salt manufacturers in Gujarat and other parts of India ensure that their products meet international quality standards required for export. Before food distribution, salt is tested for purity, iodine content and other parameters. Customs clearance is another important step in the salt export process. Exporters have to comply with various rules and regulations set by the government of the importing country. This may require obtaining certifications, permits and licenses, which can be a long and complicated process.

Table 6 discusses the port-wise export of salt and its value in India. It has been found that the highest quantity of salt is exported through Kandla port followed by Jakhau, Mundra, Navlakhi, Tuticorin, and Pipavav. Nearly 5069.88 thousand tonnes of salt were exported through Kandla port in 2017-18, and 5733.60 thousand tonnes in 2019-20. It declined in 2020-21 and was 2616.01 thousand tonnes. 1888.32 thousand tonnes was exported through the Jakhau part in 2017-18, and 2258.70 thousand tonnes in 2019-20. It declined in 2020-21 and was 1221.79 thousand tonnes. Nearly 144648 thousand tonnes of salt was exported through Mundra part in 2017-18, whose value was 18913.98 lakh rupees. It was 31081.76 thousand tonnes in 2019-20. It declined in 2020-21 and was 2433.62 thousand tonnes. 270.45 thousand tonnes was exported through Navlakhi port in 2017-18, and 193.10 thousand tonnes in 2019-20. It declined in 2020-21 and was 154.54 thousand tonnes. Nearly 125.21 thousand tonnes of salt was exported through Tuticorin port in 2017-18, whose value was 4367.98 lakh rupees. It was 56.03 thousand tonnes in 2019-20. It declined in 2020-21 and was 22.6 thousand tonnes. Nearly 1.95 thousand tonnes were exported through Pipavav port in 2017-18, and 3.64 thousand tonnes in 2019-20. It declined in 2020-21 and was 1.87 thousand tonnes. Therefore, the export of salt quantities and its value declined in 2020-21 due to the coronavirus pandemic.

Table 7 depicts the import of salt in India. It has beenfound that the import quantity of salt has declined in the last 15 years. The total import of salt was 30645.0 tonnes in 2008-09, whose value was 522 lakh rupees. It declined further and was 5288.0 tonnes in 2018-19. The total quantity of salt imported was 3018.0 tonnes in 2020-21, whose value was 220.25 lakh. Therefore, the total import of salt has declined nearly 10 times in the last 15 years.

Table 8 depicts expenditure on development and labour welfare works. It has found that total expenditure on development and labour welfare works increased continuously, but declined in 2022-23. Total expenditure on development works was 2.58 lakhs in 2016-17, 5.14 lakh crores in 2020-21, and finally 0.09 lakh crore in 2022-23. Total expenditure on labour welfare works was 2.45 lakh rupees in 2016-17, 2.32 lakh rupees in 2019-20, and finally 1.46 lakh in 2022-23. Total expenditure on other works was 33.91 lakh and 41.01 lakh in 2020-21, and finally 32.06 lakh in 2022-23.

Let us analyse the regression analysis between the production, export and import of salt in India. Data of the concern variables are discussed in Tables 1, 5, and 7. The production of salt is the dependent variable. Export and import of salt are independent variables. Data has been analysed based on information from 2008-09 to 2020-21.

a) shows that R square is found to be 0.758138, showing, that the degree of relation between the independent variable X, and the dependent variable Y. Table (8-b) shows that thep-value (0.011) is lower than the critical value at 5% level of significance ($p< 0.05$), therefore we will reject the null hypothesis-1. The p-value (0.886) is higher than the critical value at a 5% level of significance ($p> 0.05$), therefore we will accept the null hypothesis 2. So, it is concluded that (a) there is a relation between the production of salt and the export of salt in India, and (b) there is no relation between the production of salt and the import of salt in India.

The export value of salt in India was 85007.03 lakh rupees in 2016-17 and reached 86881.77 lakh rupees in 2020-21. On the other hand, the import cost of salt in India was 543.93 lakh rupees in 2016-17 and 220.25 lakh rupees in 2020-21. Therefore, export revenue from salt is far higher than the cost of import. It implies the positive financial status through the export-import value of salt in India.

5.2. Role of Gujarat in Salt Production in India

India is one of the world's largest salt producers, with salt obtained from a variety of sources including salt pans, lakes, and mines. The most important salt mines in India are the salt flats in the coastal areas of Gujarat and Tamil Nadu. These salt pans cover an area of over 2.5 million hectares and produce over 70 per cent of India's salt. Gujarat's salt companies are India's largest salt producers. Gujarat's coastline makes it an ideal location for salt production. Gujarat's salt fields cover more than 1.3 million hectares and produce about 60 per cent of India's salt. The Kutch region of Gujarat is famous for its salt production and many

Table 6: Port-wise export of salt and its value in India

Port	2017-18		2018-19		2019-20		2020-21	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Kandla	5069.88	39654.18	5834.45	53002.43	5733.60	49774.34	2616.01	31240.15
Jakhau	1888.32	19469.64	2287.37	29434.69	2258.70	28511.72	1221.79	14731.12
Mundra	144648	18913.98	1508.02	26874.48	2331.47	31081.76	2433.62	35079.09
Navlakhi	270.45	2535.12	294.19	16814.84	193.10	1236.60	154.54	136.39
Tuticorin	125.21	4367.98	111.53	3011.21	56.03	1803.67	22.6	1163.83
Pipavav	1.95	108.77	53.80	769.11	3.64	299.88	1.87	187.76

Source: Annual report 2022-23, p.90, Salt Department, Ministry of Commerce and Industry. Note: Quantity in 000 Tonnes. Value in Lakh Rs.

Table 7: Volume and value of import of salt in India

Year	Quantity	Value	Year	Quantity	Value
2008-09	30645.0	552.00	2009-10	27864.0	549.78
2010-11	12298.0	600.00	2011-12	17242.6	422.98
2012-13	18105.6	523.81	2013-14	17273.0	677.61
2014-15	8953.0	491.00	2015-16	9745.0	586.48
2016-17	8450.0	543.93	2017-18	5485.0	364.74
2018-19	5288.0	399.23	2020-21	3018.0	220.25

Source: Annual report 2022-23, p.91, Salt Department, Ministry of Commerce and Industry. Note: Quantity in Tonnes, value in Lakh Rs.

Table 8: Expenditure on development and labour welfare works

Year	Development Works	Labour Welfare Works	Other Works	Total
2016-17	2.58	2.45	33.91	38.94
2017-18	2.12	9.35	18.98	30.45
2018-19	2.50	2.38	33.50	38.38
2019-20	2.30	2.32	32.13	36.75
2020-21	5.14	0.50	41.01	46.65
2021-22	1.66	3.49	65.16	70.31
2022-23	0.09	1.46	32.06	33.61

Source: Annual report 2022-23, p. 112. Department for the Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India. Note: Figures in Lakh Rs.

Table 9: Summary output

Regression Statistics	
Multiple R	0.870711627
R Square	0.758138737
Adjusted R Square	0.704391789
Standard Error	2071431.157
Observations	12

Source: Calculated by authors.

Table 10: ANOVAanalysis

	df	SS	MS	F	Significance F
Regression	2	1.2105E+14	6.05252E+13	14.10570782	0.001682862
Residual	9	3.86174E+13	4.29083E+12		
Total	11	1.59668E+14			
		Coefficients	Standard Error	t Stat	P-value
Intercept		16632751.31	4101050.056	4.055729894	0.002860217
Export		1.389924872	0.436054222	3.187504679	0.011050763
Import		18.10978204	122.8079704	0.147464224	0.886016328

Source: Calculated by authors.

salt producers in Kutch produce good salt for domestic and international markets. Gujarat is the largest salt-producing state in India. It is often built on coasts that are affected by unpredictable rains and cyclones. Prices are increasing due to the decline in sea salt production facilities and increasing demand for food, commercial salt and exports.

Table 9 Discusses the average yield of salt in different salt-producing places in Gujarat. It has been found that the average yield of salt in Dhrangadhra/Kharaghoda, Gandhidham/Chirai, and Halvad increased during the period. The average yield of salt in Halvad was 58 tonnes per acre and 155 tonnes per acre respectively in in 2016-17 and 2020-21. The average yield of salt in Dhrangadhra/Kharaghoda was 57 tonnes per acre in 2016-17, and 162 tonnes per acre in 2020-21. On the other hand, the average yield of salt in Jamnagar, South Gujarat and Bhavnagar/ Rajula declined. The average yield of salt in Jamnagar was 80 tonnes per acre in 2016-17, and 68 tonnes per acre in 2020-21. The average yield of salt in South Gujarat was 64 tonnes per acre in 2016-17, and 55 tonnes per acre in 2020-21. The average yield of salt in Bhavnagar/Rajula was 70 tonnes per acre in 2016-17, and 68 tonnes per acre in 2020-21. The maximum of India's salt production comes from the country of Gujarat. The major sources of salt in India are sea salt, lake salt, groundwater salt, and rock salt deposits. Most of Gujarat's salt comes from the ocean. The Gulf of Khambhat contributed to approximately 24 per cent of the nation's salt manufacturing. Bhav Nagar is a main manufacturer of sea salt near the Gulf of Khambhat.

Table 12 depicts particulars of cooperative societies engaged in salt manufacture in Gujarat. It has been found that the area inland under cooperative societies slightly declined from 2018-19 to 2020-21., but the total production of salt was increased during the period. Total production increased nearly three times during the period. The actual area worked inland was also increased. The number of cooperative societies and its members declined during the period. The total area and actual working areas of marine under cooperative societies for salt production increased in Gujarat during the period. Total production of salt was increased nearly 15 times during the period. The number of cooperative societies and its members increased during the period.

The major salt-producing districts of Gujarat include Bhavnagar, Kala Ghoda, Porbandar and Rann of Kutch. Salt companies in Gujarat tie up with shipping companies to transport the salt to its destination. Salt production in Gujarat has declined in recent years due to climate change, including cyclones, unseasonal rains and unpredictable weather. Salt workers in Gujarat face harsh conditions, including extreme temperatures, long working hours and health problems. About 45,000 Agariyas produce salt in the Kutch grasslands of Gujarat, which are shared by five districts of the triangular desert of Morbi, Kutch, Surendra Nagar, Patan and Banaskantha.

Table 13 discusses the status of leading salt-producing districts in Gujarat. Kutch, Dwarka, Bhavnagar, and Surendranagar are the major salt-producing districts in Gujarat. An estimated 45,000 Agariyas make salt in Gujarat's Little Rann of Kutch. This area falls under the Banaskantha, Patan, Surendranagar, Kutch, and Morbi districts. The state produced 228 lakh tonnes in 2022. The produced salt is processed for human consumption, but also as raw material for other products, like caustic soda, fertilisers, and paints. Of the total salt produced in Gujarat, 31 per cent comes from Agariyas in the Little Rann of Kutch. However, in the last few years, the production of salt has seen a decline across all salt-producing states. In Gujarat, it fell by four per cent in just six years between 2016 and 2022. The major reasons are the extension of monsoons and increasing cyclones on the coast.

5.3. Challenges before salt industry and government policies

India's salt export industry faces many challenges, including stiff competition from other salt-producing countries, changes in global demand and prices, and logistical challenges related to transportation and customs. However, there are still many growth opportunities for the salt export sector. The demand for salt is expected to increase in the coming years due to the growing food industry and the advancement of processed foods. This provides an opportunity for salt companies in Gujarat and other parts of India to expand their operations and increase their business. Indian salt companies are also exploring new markets for salt exports, such as Africa, where the demand for quality salt is increasing.[14–18] India has also signed several trade agreements with countries around the world, opening up new opportunities for salt exporters. Another source of opportunity for Indian salt companies is the increasing demand for speciality salts such as Himalayan red salt and sea salt. This salt has become popular among health-conscious consumers looking for a healthier alternative to vegetable salt.

India's salt industry faces many challenges, including climate change and health and welfare issues for salt workers: unpredictable weather conditions such as floods and unseasonal rains, shortened salt season and reduced production demand. Salt workers are seasonal migrant workers who face hazardous working conditions and adverse weather conditions. They often lack adequate sanitation and hygiene protection and may lack access to basic amenities such as drinking water and toilets. Without a guaranteed minimum price, farmers face low prices and workers face economic stagnation due to lack of good wages. The salt industry faces the challenge of meeting demand. The salt industry also faces transportation

Table 11: Average yield of salt in different salt producing places in Gujarat

Place	2016-17	2017-18	2018-19	2019-20	2020-21
Dhrangadhra/Kharaghoda	57	108	152	167	162
Gandhidham/Chirai	122	119	139	137	122
Jamnagar	80	85	86	82	68
South Gujarat	64	59	63	55	55
Bhavnagar/Rajula	70	77	77	68	0
Halvad	58	82	81	155	0

Source: Annual report- 2020-21, Salt department, Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India, Note: Tones per Acre.

Table 12: Particulars of co-operative societies engaged in salt manufacture in Gujarat

Year	Area	Production	Actual area worked	Members	Co-op Societies
		Inland			
2018-19	6014	1060.0	8982	14297	84
2019-20	6014	1680.0	8982	14297	84
2020-21	5769	2977.8	9062	1800	80
		Marine			
2018-19	14912	163.6	3314	5761	26
2019-20	14912	114.7	3496	5761	26
2020-21	17530	2361.0	3455	600	30

Source: Annual report- 2020-21, Salt department, Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India, p. 63, Note: Area in Acres; Production in '000 Tonnes.

Table 13: Salt producing districts ingujarat

Districts	2018-19	2020-21	Districts	2018-19	2020-21
Surendranagar	1410000	1952880	Amreli	811173	0
Patan	783960	0	Junagarh	58670	0
Jamnagar	1421398	829152	Valsad	16600	130254
Kutch	11241402	10847009	Surat	145523	0
Bharuch	2492174	1782920	Dwarka	2957166	2480972
Bhavnagar	3077577	3614559	TOTAL	24415642	21637746

Source: Annual report- 2020-21, p. 52, Salt department, Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India, Note: Tones per Acre.

problems. The wages of salt workers, who often have no minimum wage or social security, are determined by the company. The salt industry faces major challenges in meeting the needs of salt farmers and workers and responding to the crisis. The biggest problem in the salt industry is the timely transportation of salt collected from the home states of Gujarat or Tamil Nadu to other regions. Tractors and trucks carry salt for short distances, while trains carry salt for long distances. During the autumn salt season, the railways could not provide enough rakes. In recent years, climate change has accelerated, causing the salt season to decrease.

The use of salt treatment equipment to reduce all costs varies with salt production and leads to good results. The government has many policies to promote the salt industry, including the health scheme, the Office of Intelligent Work and Quality Management, and the Scientific Research 1963. The Central Salt Operations Department also works with state governments to improve salt farming standards. The state government has implemented welfare programs such as life insurance, road construction, and safety packages for salt workers. The Office of the Salt Commissioner also provides financial assistance to support these efforts. The government aims to make all salt iodized. Iodized salt is now available for public distribution in many states. A tax is paid on salt to finance the salt industry, and the government imposes measures to regulate salt production, supply, and export. The Quality Control and Research Act of 1963 specifies quality standards for salt, including the percentage of sodium chloride, the percentage of moisture, and soluble and insoluble matter.

6. Conclusion

The major salt-producing states in India are Gujarat, Rajasthan, Tamil Nadu, Maharashtra, Andhra Pradesh and Orissa. Gujarat is India's largest salt producer. The most important salt mines in India are the salt flats in the coastal

areas of Gujarat and Tamil Nadu. The main sources of salt in India are sea brine, lake brine, groundwater brine and rock salt deposits. Most of the salt in Gujarat comes from the sea and ocean. The major salt-producing districts of Gujarat include Bhavnagar, Kala Ghoda, Porbandar and Rann of Kutch. Sambhar Salt Lake is the largest Salt Lake in India and is the source of most of the salt production in Rajasthan. Goa contributed to India's salt production for hundreds of years. The Salt production plant in West Bengal is one of the oldest salt places in India. Inland is the best source of salt production. Salt manufacturers in Gujarat and other parts of India ensure that their products meet international quality standards required for export. Export revenue from salt is far higher than the cost of import. It implies the positive financial status through the export-import value of salt in India. There is a relation between the production of salt and the export of salt in India. There is no relation between the production of salt and the import of salt in India.

Salt production in Gujarat has declined in recent years due to climate change, including cyclones, unseasonal rains and unpredictable weather. Salt workers in Gujarat face harsh conditions, including extreme temperatures, long working hours and health problems. The salt industry also faces transportation problems. The wages of salt workers, who often have no minimum wage or social security, are determined by the company. The government has many policies to promote the salt industry, including the health scheme, the Office of Intelligent Work and Quality Management, and the Scientific Research 1963.

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8. Conflict of Interest

None.

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