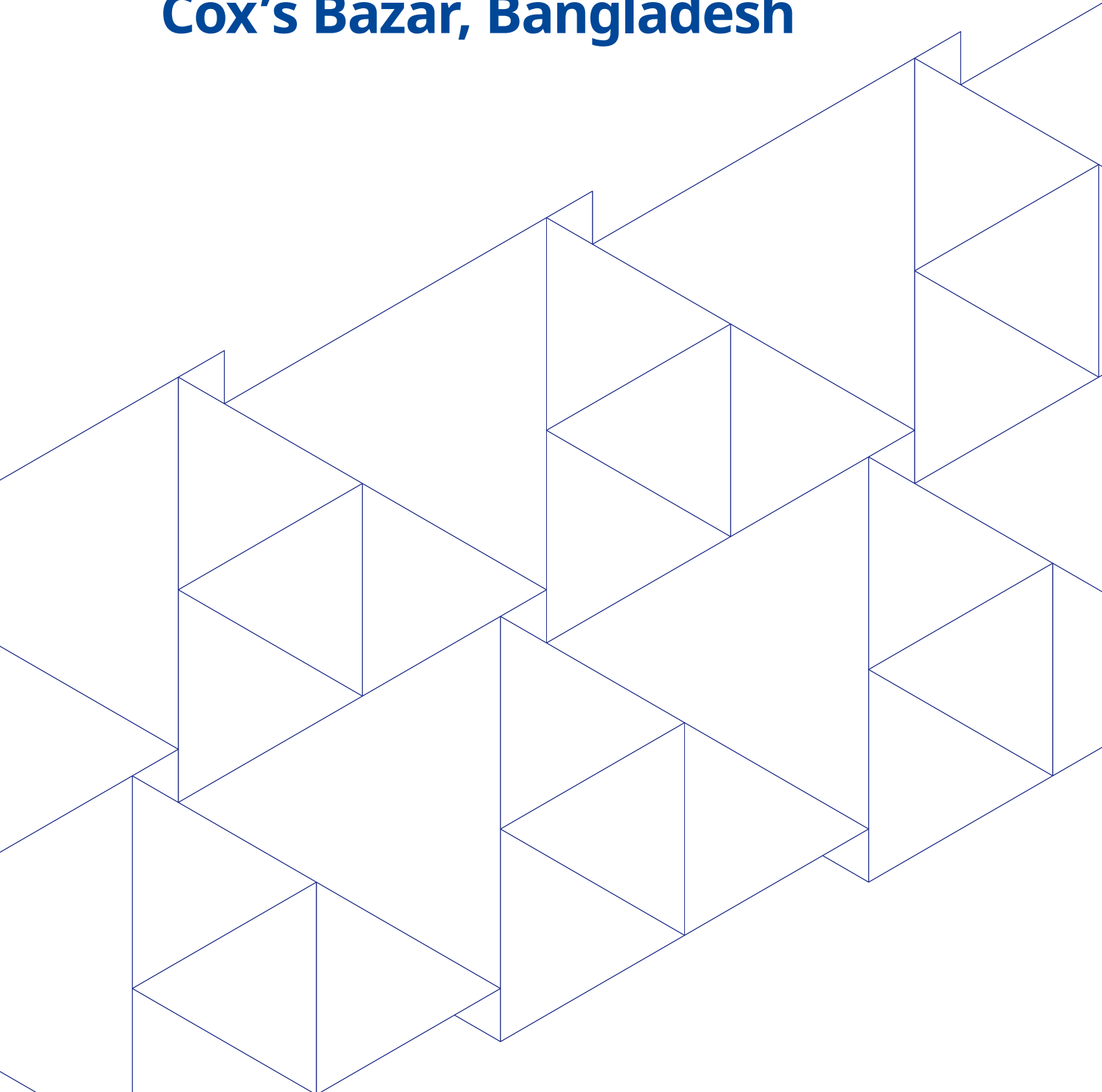


▶ **Rapid market analysis of the salt value chain in Cox's Bazar, Bangladesh**



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- ▶ **Rapid market analysis
of the salt value chain in
Cox's Bazar, Bangladesh**

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► Executive summary

Salt farming and processing offer strong potential to improve livelihoods in vulnerable communities in Cox’s Bazar, Bangladesh. With ideal geographic conditions, access to water with a suitable salinity level, and a long dry season with appropriate temperatures and sunlight, the district is well suited for developing the sector.

As part of the project “Leaving no one behind: Improving skills and economic opportunities for the Bangladeshi Community and Rohingya Women & Youth in Cox’s Bazar”, the ILO sought to better understand the challenges and opportunities within the salt production sector by conducting a value chain analysis. Through a blend of desk and field research, this report offers an updated account of a previous study conducted in 2018. It therefore draws on new qualitative and quantitative data to provide a mapping of the salt value chain; identify key market actors; and explore the major challenges in the sector as well as potential market solutions to address them. Throughout the research, Bangladeshi women and other vulnerable groups were maintained as the centre of focus, with the ultimate goal of boosting income and generating entrepreneurship and self-employment opportunities as a means of contributing to poverty reduction.

In Bangladesh, salt is primarily produced from sea water by the solar evaporation method. There are three main segments of salt consumption in the country: (i) salt for human consumption; (ii) salt for animal consumption; and (iii) salt for industrial consumption in the country’s bustling manufacturing sector. While the production process and technology for producing raw salt is the same for each of these segments of the market, the processing and supply chain characteristics vary to a greater extent.

Over the last decade, the overall volume of raw salt produced in Bangladesh has substantially increased, thanks largely to intensified government support, technological improvements and favourable weather

conditions. The sector is also a growing source of employment, with nearly 40,000 farming households involved in salt production in the Chittagong and Cox’s Bazar districts in 2022–23. Moreover, it is one of the largest labour-intensive sectors in Bangladesh, with more than 500,000 workers being directly involved in the value chain from production to industry-level processing. An estimated 2.5 million people are also indirectly dependent on the sector.

Nevertheless, despite its potential and recent growth, the salt sector is also marred by decent work deficits and other challenges that limit the market system’s functionality. For instance, workers in the salt mills mainly work on an informal basis, and women’s involvement at the farming level remains limited. Deeper analysis into these and other key challenges within the sector highlight the following root causes behind the market’s key shortcomings:

- Reliance on traditional farming practices results in low productivity which leads to higher production costs and reduced profits.
- The low quality of salt produced and stored at the farm level reduces sales price for farmers.
- There are low levels of innovation and product diversification, due in part to the presence of cartels in the value chain.
- There is inadequate value chain governance, which affects the sector’s overall performance.
- Poor employment conditions, due largely to the high degree of informality in the value chain, affect productivity and growth.

Using a market systems approach, which seeks to tackle these root causes through sustainable and systemic interventions, a number of recommendations are proposed, drawing on the incentives and capacities of actors already involved in the sector. These include:

- 1. Improving production and productivity**, for instance through supporting increased adoption of production and processing technologies based on Indian and Chinese experiences, exploring supplementary activities, and expanding the salt production zone.
- 2. Improving value chain governance and ensuring a fair share of value among value chain actors** through interventions such as: organizing producers' associations and cooperatives and developing their capacities for collective bargaining and negotiating; developing social dialogue mechanisms among value chain actors; developing an industry code of conduct and good labour practices; strengthening employers' and workers' organizations; and curbing unethical importation practices.
- 3. Effectively integrating with key value chain and industrial segments** by establishing linkages with and support for industrial segments that use salt as a critical ingredient in production processes, such as tanneries and animal feed producers. This might include the introduction of tax incentives and facilitating investment in modern production plants in Cox's Bazar district.
- 4. Promoting local product diversification**, including beauty products and products aimed at the local tourism market, to provide salt producers and traders with additional income-earning opportunities to engage in.

► 1. Introduction

► 1.1. Project introduction

Cox's Bazar is a district in south-eastern Bangladesh within the Chittagong Division, and bordering Myanmar. According to the United Nations Development Assistance Framework, Cox's Bazar district is considered one of 20 "lagging districts" in Bangladesh (out of 64 total), based on indicators concerning poverty, literacy, nutrition, and risks associated with environmental degradation (United Nations 2012). Difficult terrain, insufficient infrastructure and limited access to basic services have contributed to poor living conditions. In addition, trafficking and organized crime are also widespread in the area. Rohingya populations, in fluctuating numbers, have been present in Cox's Bazar since 1991. However, the arrival of hundreds of thousands of Rohingya refugees since August 2017 has added greatly to the pressures faced by host communities. As of 31 July 2023, the United Nations High Commissioner for Refugees (UNHCR) Bangladesh and the Government of Bangladesh had jointly registered 962,416 refugees in the country (UNHCR 2023).

In this context, a joint alliance of the ILO, UNHCR, and the BRAC, supported by Global Affairs Canada, launched the project **Leaving no one behind: Improving skills and economic opportunities for the Bangladeshi community and Rohingya women & youths in Cox's Bazar**. The project aims to enhance the economic empowerment of Bangladeshi host communities and Rohingya refugees in Cox's Bazar through gender-sensitive market-relevant skills development linked to: (a) self-reliance activities in refugee camps; and (b) employment and self-employment in growth sectors for host communities.

Ultimately, the project seeks to contribute to peace through the creation of meaningful economic opportunities and by emphasizing space for dialogue and interaction between communities.

The project adopts a leave no one behind strategy by:

- identifying the challenges all persons – particularly women, youth, ethnic and religious minorities, and persons with disabilities – are facing in regard to accessing and benefiting equally from services;
- adopting targeted measures to tackle these challenges; and
- involving beneficiaries in the design, implementation and review of these intervention measures.

As part of this effort, value chain analyses were carried out in various agriculture subsectors to identify key entry points for creating and strengthening market opportunities in host communities, thereby enabling them to leverage the rise in demand spurred by the influx of Rohingya refugees. These analyses are based on the market systems approach, which aims to address the root causes of why markets may not be meeting the needs of certain subsets of the population, including people living in poverty, youth, and other disadvantaged people. The approach builds on the capacities and incentives of market actors – both private and public – to increase the likelihood that positive results are sustained and even scaled up after intervention.

▶ 1.2. Study purpose and objectives

This value chain analysis was conducted to identify the key constraints to the salt value chain, along with the corresponding root causes that limit functionality within this market. For this study, the analysis looks into understanding the market around the project's target group: the

Bangladeshi community, particularly women, in Cox's Bazar, with a focus on boosting income and generating entrepreneurship and self-employment opportunities as a contribution towards poverty reduction.

Box 1. What is a market system?

A market system is the inter-connected network of actors and factors that interact to shape the outcomes of an economic exchange. These exchanges are governed by a range of:

- ▶ **Supporting functions:** The context- and sector-specific functions that inform, support and shape the quality of exchange, such as information, skills, infrastructure, finance and access to markets.
- ▶ **Rules and norms:** The legislative and regulatory environment, including policies, voluntary standards and social norms that guide day-to-day attitudes and conduct.

Supporting functions and rules are carried out by a wide range of market actors, from businesses to financial institutions, trade associations, regulators and government agencies. When certain rules or functions do not operate well, a market system **constraint** is created that reduces the effectiveness of the system and reduces the value captured by the people and market actors involved in the transaction.

Market systems development programmes aim to create positive systemic changes. A systemic change takes place when there is a lasting improvement in one or more market system constraints that leads to improved outcomes for target groups, be they workers suffering from poor safety and health conditions, or young people excluded from the labour force. Such programmes discover why market actors have not addressed these constraints themselves, and then work on improving these actors' incentive and capacity to perform new or improved roles.

Source: Ripley 2016.

▶ 1.3. Data collection approach

This report updates the information from the study developed in 2018. To do so, it used both quantitative and qualitative methods for data/information collection and analysis. In principle, value chain analysis is largely qualitative and adopts a "snowballing" approach to gather information. Consequently, an exploratory (qualitative) approach was undertaken to identify the dynamics of the value chain and the market systems. The sampling method was purposive, and emerged from the "leads" gathered from primary and secondary sources. Quantitative

analysis was carried out to understand statistical data and trends, and to triangulate the information collected from primary sources and desk research. The research to update the study was carried out in two phases:

- ▶ **Desk research:** Available literature was gathered to provide a framework for the primary data collection process. This included reviews of national laws, sector data and market trends, as well as studies conducted by other development agencies.

► **Field research:** Primary research was conducted in Cox's Bazar during two weeks in July 2023. During this stage, a total of 32 businesses and organizations were interviewed. The interviews were semi-structured and conducted with government officials, producer associations, formal and informal business owners, community groups, non-governmental organizations, and key industry informants. The interviews provided an in-depth picture of the sector from a diverse set of actors and opinions. A detailed list of all the interviewed stakeholder organizations is included in Annex A.

The research is based on the methods of ILO's [Value Chain Development for Decent Work](#) guide and the Springfield Centre's [Operational Guide on the M4P Approach](#). Results were validated through triangulation of data and methodologies. This means the research uses different types of data (both primary and secondary) and multiple methods (such as observation and surveys).

The project validated the study findings at a validation workshop attended by the ILO's tripartite partners and relevant stakeholders. Here, participants, including the industry stakeholders, research organizations, and representatives from workers' and employers' organizations discussed the findings and suggested changes, which have been taken into consideration in the final revision of this report.

► 1.4. Limitations and relevance

The study did not intend to produce statistically significant results, but rather tried to provide an indicative picture of the most relevant dynamics. Sample sizes for the assessment are small and not collected randomly, but purposively. The intention was to collect information to the standard

required to inform the design of relevant and effective interventions that would promote livelihoods and generate employment. To achieve this aim, purposive sampling and exploratory enquiries were deemed sufficient.

▶ 2. The salt value chain

▶ 2.1. Industry overview

In Bangladesh, salt is produced from seawater by the solar evaporation method. The main production zones are situated in coastal areas, such as in the districts of Cox's Bazar and Chittagong. In most areas, production starts in December and runs until mid-May, though in areas with access to higher salinity water, production can start earlier.

Bangladesh has three main areas of salt consumption: (i) salt for human consumption; (ii) salt for animal consumption; and (iii) salt for industrial consumption by its bustling manufacturing sector. While the production process and technology used for the raw salt is the same for the different types of markets, the subsequent processing and supply chain characteristics vary to a greater extent.

2.1.1. Production and productivity

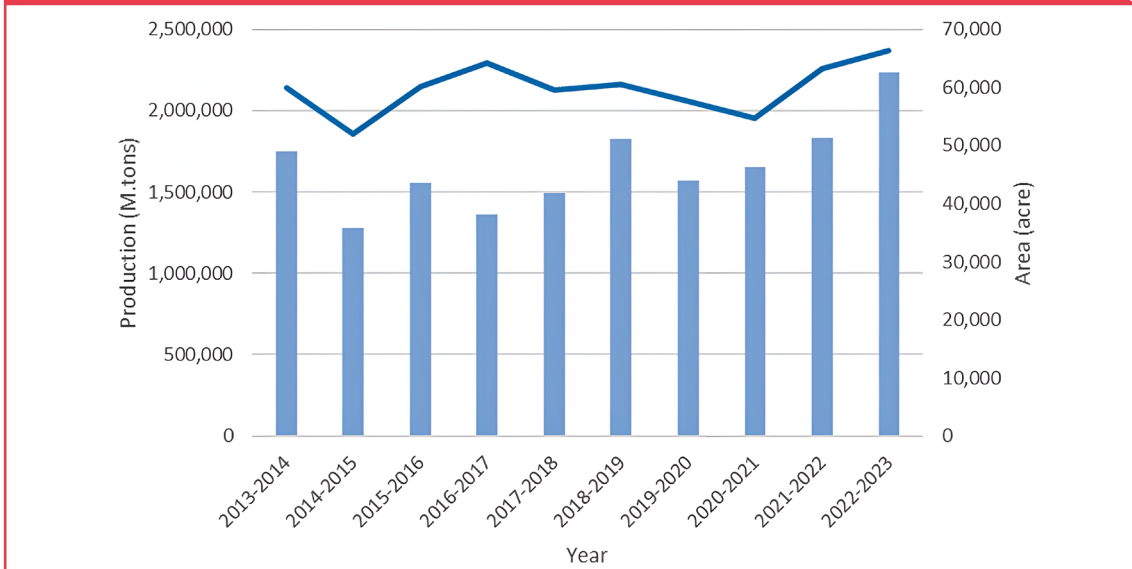
The overall volume of raw salt produced in Bangladesh has substantially increased in the last decade. However, there have been large fluctuations in production volumes between years, especially since 2013–14. According to the Bangladesh Small and Cottage Industries Corporation (BSCIC), several causes are responsible for these fluctuations:

- ▶ the Government's acquisition of land in salt cultivation areas for infrastructure projects, such as a LNG (liquified natural gas) terminal, power plants and economic zones;
- ▶ increased imports of salt in certain years, leading to drops in the price of locally produced salt and reduced interest among salt farmers;
- ▶ unfavourable weather conditions, such as cyclones and shifts in the timing of the dry and monsoon seasons; and
- ▶ lack of conducive technology for salt production and a related need for strengthened capacity-building and extension activities.

The adoption of polythene in salt pans in the early 2000s is believed to be a key factor behind increases in productivity, which reached 29.23 metric tons per acre in 2013–14. In 2022–23, the national productivity/yield of crude salt production reached a new high of 33.06 metric tons per acre. The high productivity in this year was mainly due to favourable weather conditions, a long salt production season and intensive government support.

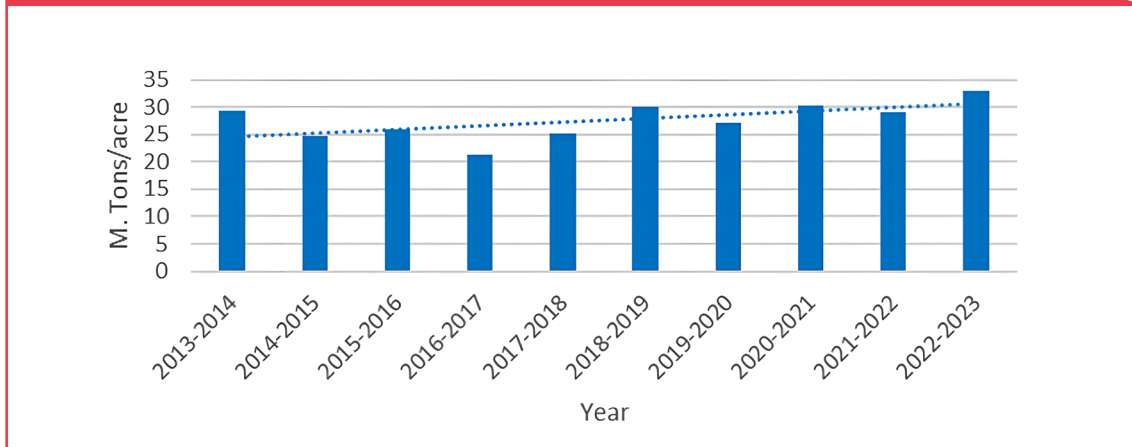
As can be seen from figures 1 and 2 below, the total land area under salt production has increased since 2020–21, with the production also increasing over that period. At the national level, the total area under production was 70,754 acres in 2006–07, but this had reduced to 59,844 acres in 2017–18. But the aforementioned growth since 2020–21 has led to salt production covering 66,424 acres in 2022–23 – the largest total area given over to salt production in the last decade.

Figure 1. Salt production and area coverage, 2013-14 to 2022-23



Source: BSCIC Cox's Bazar data.

Figure 2. Year-by-year salt productivity of Bangladesh, 2013-14 to 2022-23



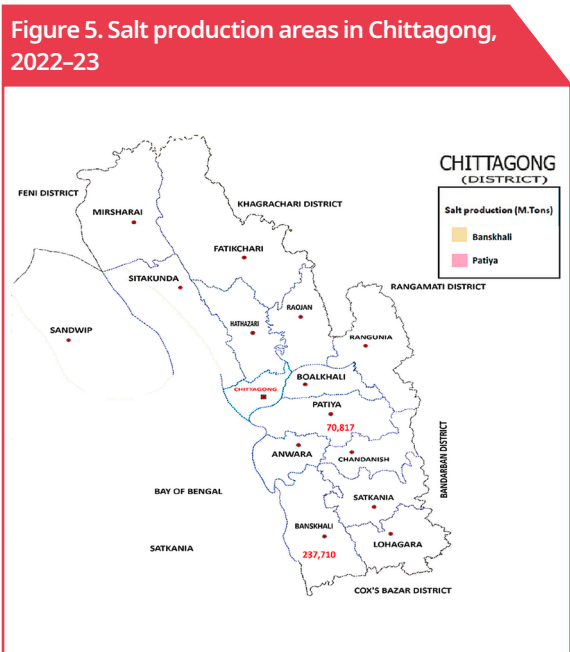
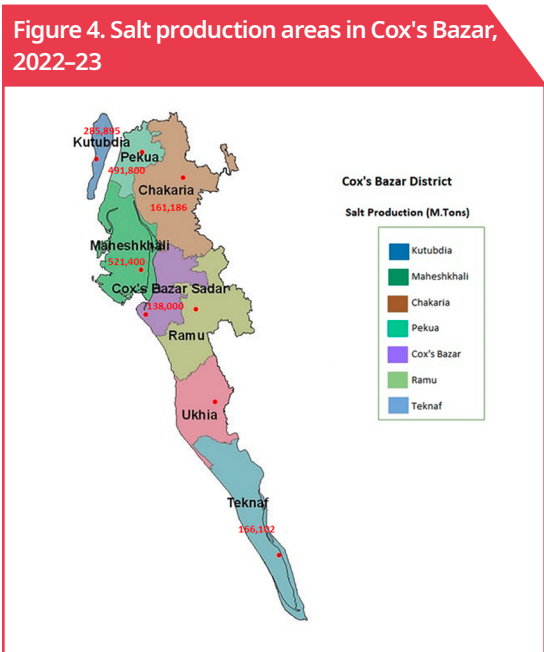
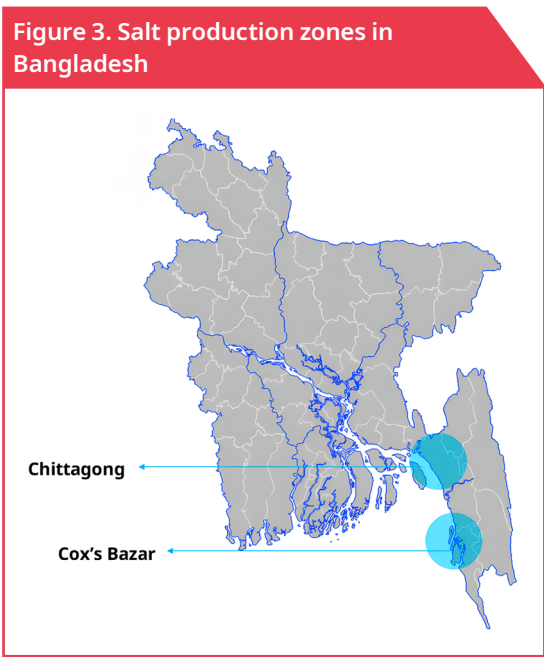
Source: BSCIC data.

2.1.2. Production zones

While Chittagong district has a few pockets of production in its southern subdistricts, the bulk of salt production in Bangladesh takes place in Cox's Bazar district.

Cox's Bazar district has good conditions for salt production, with access to water with a suitable salinity and a long dry season with appropriate

temperatures, sufficient sunlight and very low rainfall. Maheshkhali upazila is the central hub of salt production, meeting one-fourth of the total salt requirements of the country and boasting production of 30.6 mt/ acre¹. However, the highest production per acre is found in Kutubdia, at 42.24 mt/acre. The average production per acre across the district was 33.06 mt in 2022–23.



¹mt = metric tons.

2.1.3. Economic contribution and employment

According to the BSCIC census, more than 39,000 farming household were involved in salt production in Chittagong and Cox’s Bazar district in 2022–23. It is one of the largest labour-intensive sectors in Bangladesh, with more than 500,000 people directly involved in the value chain from production to the industry level, and an additional 2.5 million people are indirectly dependent on the salt value chain. The salt industry’s contribution to the national economy is around 3,500 crore taka (US\$350 million).

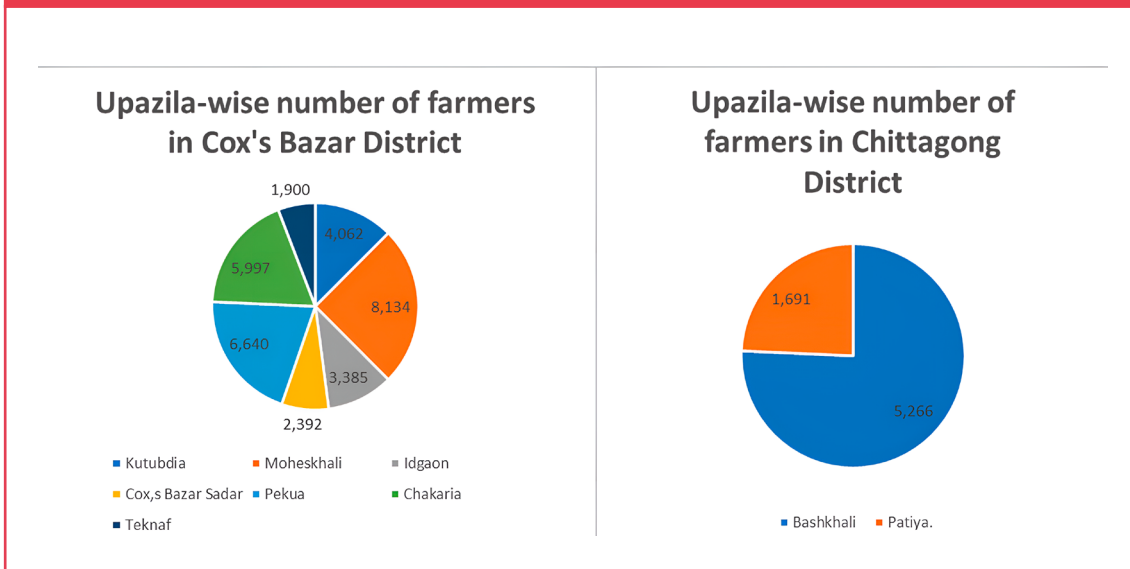
The contribution of salt as a critical industrial raw material is well established, with salt production indirectly creating a substantial impact within a majority of the priority sectors identified by the Government of Bangladesh. These include food processing, leather and leather goods, textile dyeing, pharmaceuticals for both human and animal consumption, building materials like

bricks and cement, and cosmetic/beautification products (Bangladesh, BIDA 2021). Such industrial usage of salt makes it a key contributor to employment creation and economic contribution.

While relevant stakeholder meetings and research publications have revealed key data on direct employment and economic returns for the producer groups within the salt sector, especially in Cox’s Bazar, it is rather a difficult task to measure the indirect economic contribution of the salt industry in other relevant sectors as a raw material input, as no formal standards or operational transaction procedures exist for trading in the local market.

Concerning the direct labour impact of salt production, figure 6 displays the number of salt producers in key upazilas in Cox’s Bazar district and Chittagong district.

Figure 6. Distribution of salt farmers by upazila in Cox’s Bazar and Chittagong, 2022–23 (no. of farmers)



2.1.4. Overall domestic demand and supply

Bangladesh was close to meeting its salt production target for fiscal year 2022–23. That target, as set by the Government's National Salt Policy 2022, was 2.38 million metric tons, and while actual production fell a bit short at 2.23

million metric tons, this was still the largest total tonnage of salt produced in last 60 years. Table 1 below presents the Government's salt production targets for the next three fiscal years, as per the National Salt Policy 2022.

Table 1. Projected demand for salt, by target consumers/sectors (in million metric tons)

Year	Demand for table salt/ cooking salt for consumption*	Demand for salt used in industrial sector	Demand for salt used in fisheries sector	Demand for salt used in livestock sector	Demand for processed salt (total)	Demand for crude salt production (inclusive of 17% loss)
2023–24	0.90	0.915	0.038	0.345	2.198	2.648
2024–25	0.912	1.052	0.039	0.350	2.353	2.835
2025–26	0.924	1.210	0.041	0.355	2.530	3.048

*Based on 14 grams per person/day. Source: National Salt Policy 2022

2.1.5. Market segments

Human consumption and industrial consumption (including livestock feed) are the two distinct markets for the salt produced in Bangladesh.

Human consumption

According to the BSCIC – a leading government authority in overseeing the salt industry – approximately 60 per cent of the salt sold in Bangladesh goes to the human consumption market, as opposed to the industrial market.

There are three different methods for refining salt for human consumption: (i) vacuum evaporation; (ii) centrifuge; and (iii) manual processing.

Descriptions of these methods are provided in section 2.3.1 below. The quality of the products produced by these methods varies, with vacuum evaporation producing the highest quality, the centrifuge method producing medium quality salt, and manual processing creating the lowest quality product. Salt quality, as perceived by refinery mills, is defined by colour², texture, and moisture content, with low moisture content being preferred. The prices of the salt produced by the different methods vary in line with the product quality, as shown in table 2.

² The whiter, the better – as this means less clay and dust in the salt.

Table 2. Retail price of salt for human consumption, by processing type

Type of processing	Quality	Retail price (taka/kg)	Retail price (US\$/kg)
Vacuum evaporation	High	38–40	0.48
Centrifuge	Medium	30–32	0.37
Manual	Low	22–25	0.28

Large Bangladeshi consumer salt brands only produce vacuum-processed salt and maintain strong nationwide distribution networks that enable them to reach urban retail channels. Nationwide distribution is generally beyond the capacity of the smaller producers that make centrifuge-processed or manually processed salt, leading to regional or local distribution of their products. By consequence, in urban areas and for high-income segments, vacuum-processed salt tends to dominate. In semi-urban areas, a mixture of centrifuge-processed and vacuum-processed salts are sold by retailers. In rural areas, the retailers usually sell manually processed and centrifuge-processed salts, though vacuum-processed salts are also sold by rural retailers. This underlines two separate points related to markets for human consumption:

1. The quality of the processed salt dictates its price, and salt of different prices is distributed in different areas, with the more expensive salt being sold predominantly in urban areas.
2. Although more expensive types of salt are predominantly sold to urban areas, there is

also clearly a segment of the rural market that is willing to pay more for good quality salt.

Salt for human consumption must undergo the iodization process, through which the salt is fortified with the element iodine, a key public health initiative that aims to prevent iodine deficiencies, which can lead to intellectual and developmental disabilities as well as thyroid problems. This process is largely controlled by the Government through the BSCIC. The import of iodine, quality inspection of the iodized salt, and quality monitoring of imported salt for human consumption is all managed by the BSCIC Salt Unit and Salt Monitoring Cell. Import of iodized salt happens at a limited scale; as such imports must undergo the quality testing required by the BSCIC.

Industrial market

Around 40 per cent of salt is sold to the industrial market. This market can be broken down into several different industries, which have different quality requirements for salt (table 3).

Table 3. Major segments of the industrial salt market

Industry type	Proportion of industrial salt purchased by industry type	Quality required	Price (taka/kg)	Price (US\$/kg)
Dyeing	40%	Medium	8.1	0.1
Sugar mills	15%	High	8.3	0.1
Tannery	35%	Low	7.9	0.09
Feed mills	5%	Medium	7.5	0.09
Iodized salt processors	5%	High	8.4	0.1

2.1.6. Potential for export

Although Bangladesh is already producing vacuum-processed salts, which are highly sought after by urban markets, salt produced and processed in Bangladesh is not yet exported to international markets. This is largely due to the Government's restriction on exports, as domestic production is not yet sufficient to

meet local demand. Similarly, salt production in countries like India and China are subsidized by the Government as an essential consumption product, presenting a significant challenge for Bangladeshi salt processors to be competitively priced.

2.1.7. Imports

The importation of salt into Bangladesh faces both tariff and non-tariff barriers. The Ministry of Industry receives the salt production figures from the BSCIC and informs the Ministry of Commerce of the gap between salt demand and supply in the local markets. After examining these figures, the Ministry permits eligible importers to import a specified amount of unrefined salt that will be

processed domestically for human consumption. High tariffs are imposed on importation of salt, with the rate currently set at approximately 90 per cent, and include customs duty, supplementary duty, value added tax (VAT) and others. The import requirement is calculated once the production season ends. Table 4 gives the salt importation scenario over the last decade.

Table 4. Imports of salt from 2013–14 to 2022–23 (in metric tons)

Salt season	Imports (metric tons)	
	By salt mills	By other industries
2013–14	–	–
2014–15	20 000	–
2015–16	25 000	181 100
2016–17	50 000	126 300
2017–18	–	225 200
2018–19	–	75 800
2019–20	–	112 100
2020–21	–	48 900
2021–22	15 000	–
2022–23	–	–

– = nil. Source: BSCIC, Salt Division.

Imports for industrial use

There has been significant growth in demand for industrial salt in recent years by processing businesses in various sectors, as mentioned above, and much of this demand must now be met through importation, especially as the use of salt expands to more industries. For instance, caustic

soda – that is, sodium hydroxide – is increasingly being used in large quantities by a multitude of industries (Shams 2022). However, this cannot be made from locally produced industrial salt. As a result of such gaps between supply and demand, Bangladesh imports approximately 2.5 to 4 lakh tons of industrial salt per year.

Imports for human consumption

While the importation of salt for human consumption has been banned by the Government of Bangladesh, certain conditions such as broad production shortages may lead to temporary exceptions, according to the Import Policy 2021–24 and the National Salt Policy 2022 (Dhaka Tribune 2022). In the 2019–20, for example, approximately 11.22 lakh tons of edible salt were imported based on these sanctioned “special permissions” (Abedin Khan 2021). These exceptions are often made when weather, spoilage at the storage level, and other factors limit the amount of edible salt produced domestically. For instance, in 2023 the Ministry of Commerce sought exemptions for a list of 264 traders to allow them to import 1 lakh ton

of salt. This came despite record high levels of production due to high quantities of locally produced salt spoiling while in storage, according to the Ministry (New Age 2023).

However, some salt producers suggest that additional edible salt is being imported using legal loopholes or under the guise of it being industrial salt, which does not share a similar import ban (Mala 2021). Doing so incurs losses for both local salt farmers and mill owners, thereby also affecting livelihoods as the imported salt can be sold at lower prices than locally produced varieties. This is compounded by additional allegations of traders cutting costs by selling a blend of industrial and edible salt, posing serious risks to public health (Ali 2020).

2.1.8. Inference in markets

As noted above, the domestic market remains the only viable market for salt produced in Bangladesh. Given that domestic production does not currently meet domestic demand, and that this gap is likely to grow due to increasing demand for salt for both industrial and human consumption, the industry could grow simply by producing and selling more to this market. But the viability of the domestic market is heavily reliant on the Government continuing their policy of restricting salt imports.

Within the domestic market, although salt for human consumption offers higher prices than salt for industrial use, producing salt for human consumption comes with additional costs related to adding iodine and refining processes. Bangladesh is still importing high-quality salt, such as table salt, for human consumption. With increasing income levels, demand for high quality salt like this is likely to go up. In this regard, the sector may benefit from investing in

the processing technologies required to produce such a high-quality product.

In addition to the two major market segments – human consumption and industrial use – there is also an emerging local market for diversified salt products. Two different kinds of markets stand out in this respect:

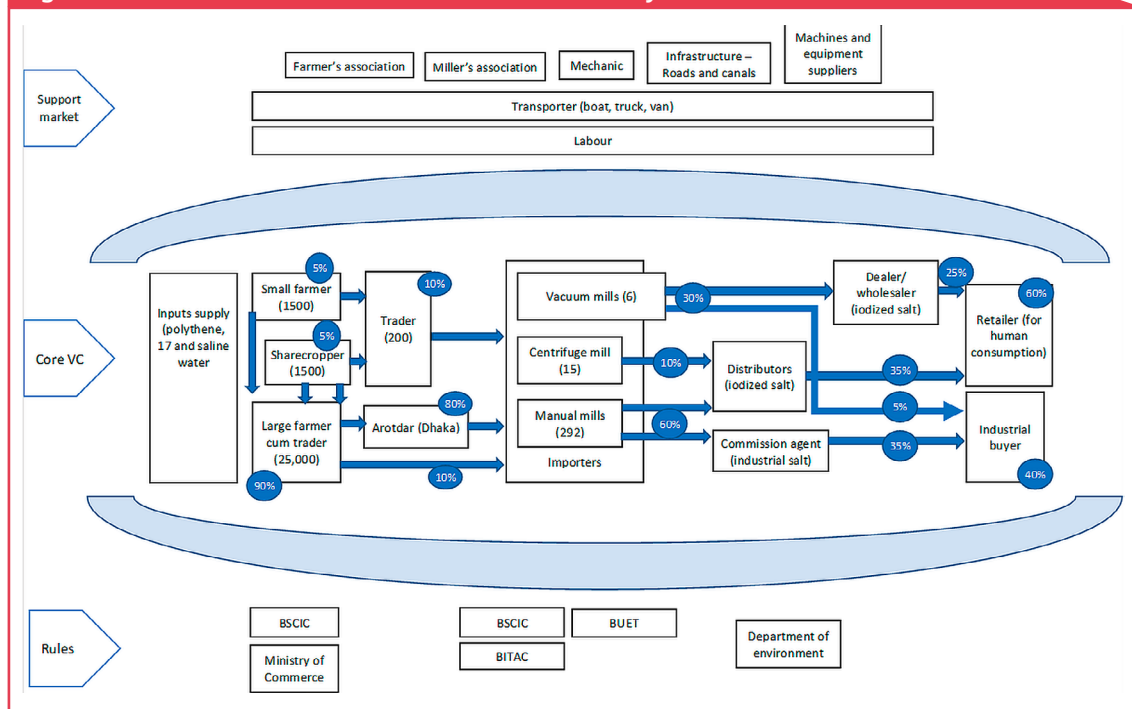
1. **Diversified cottage salt products:** These are typically flavoured, artisanal salt products produced in small amounts. Local entrepreneurs are venturing into this market, with products mostly targeted at tourists in Cox’s Bazar. Although relatively small in size at the moment, the market for such products represents low-hanging fruit for local entrepreneurs.
2. **Fish drying enterprises** are another local market for salt producers. Fish dryers use mostly unprocessed salt while drying fish.

► 2.2. Market systems

The diagram in figure 7 below presents a map of the salt market system. This includes the salt value chain, starting from producers in Cox’s Bazar district and ending with consumers in the industrial and human consumption markets

across the country. The diagram also presents the actors providing “supporting functions” and setting and enforcing “rules” related to this market system, following the definitions outlined in the methodology section above.

Figure 7. Overview of the salt value chain and market systems



2.2.1. Core value chain and channels

The diagram above shows the core value chain for salt, including the percentage of locally produced salt sold through various channels, as well as the actors in the broader market system. As shown, raw salt reaches the refinery plants through three different channels – traders, *arotdars*³ and directly from farmers. It is then processed in either vacuum, centrifuge or manual mills, before being sold to the human consumption and industrial markets. The sections below provide a description of the different actors in the core value chain.

Inputs

Seawater

Salt farmers make canals that carry seawater to reservoirs during high tide. The land used in salt production is usually located in coastal areas, so farmers do not have to transport the water over long distances to their land. However, some farmers also use pumps to carry seawater from the canal to their reservoir, in cases where

³ *Arotdar* is a Bangla term that refers to traders who either trade or work as a commission agent and possess a fixed place for trade to take place

the land is located at a distance from the canal. Seawater in some areas has a higher salinity compared to others, and this higher salinity water allows farmers to produce more salt using the same area of land in the same amount of time. For instance, water in the Maheshkhali and Kutubdia upazilas usually has a higher salinity, whereas the Teknaf and Cox's Bazar Sadar upazilas do not experience this advantage.

Brine by-product

On a limited scale, farmers around the Islampur refinery mill clusters in Cox's Bazar have started using the drain-out water from these mills, which has higher salinity than the available water from canals, in order to start the production season. However, this drain-out water is currently used only around this cluster, because no economically viable method has been found for transporting the water to other areas.

Polythene

Farmers buy polythene sheets of 0.06–0.10 mm thickness. The price paid for these sheets is determined by weight (in kilograms). These polythene sheets are widely available in the production zones, but the major market is the Boro Bazar in Cox's Bazar city. There are several such shops which sell polythene sheets, which they procure from factories located in Chittagong. Every year before the start of the season, farmers buy fresh polythene and scrap the polythene used at the end of the season for recycling or to reuse for other purposes. The old sheets can be sold to recycling factories for around 15 taka per kilogram. The sheets are then used to produce a variety of items, such as plastic rope, electrical wire covers, and so on.

In the National Salt Policy 2022 (section 6.12), the Government has instructed BSCIC to take the initiative in supplying eco-friendly/biodegradable polythene sheets to salt farmers vis-à-vis the drive for awareness campaign, with the help of the district administration.

Categories of farmers

In Bangladesh, farmers are categorized into five groups based on their land holdings:

- i. landless (up to 0.5 acres);
- ii. marginal (0.51 to 1.0 acres);

- iii. small (1.01 to 2.5 acres);
- iv. medium (2.51 to 5.0 acres); and
- v. large (5.01 acres and above).

In the context of salt production, a minimum of approximately 1.20 acres of land is required to engage in the production process. Consequently, there are essentially three distinct types of salt farmers differentiated by their operational scale – small, medium and large – in addition to a separate category referred to as sharecroppers. There are no major differences in the production process between small and large farmers.

Box 2. Salt production at the farmer level: A step-by-step process

Farmers use solar evaporation to produce salt, utilizing the hot, dry and sunny conditions that are prevalent in this area during the dry season. During the start of the salt farming season, it takes more than 1 week to complete a single cycle of production. But during the peak season, it only takes 3–4 days to complete a cycle, due to favourable conditions such as low humidity and ample sunlight.

Brine is collected into shallow ponds (reservoirs) and allowed to evaporate in the sun. Insoluble impurities (such as sand and clay) and slightly soluble impurities (such as calcium carbonate) settle to the bottom as evaporation begins. The brine is pumped or moved by gravity flow to another pond (condenser 1) where calcium sulphate settles out as evaporation continues. The remaining brine is moved to yet another pond (condenser 2) where the salt settles out as evaporation proceeds. The brine is then moved one more time (condenser 3) before evaporation is complete, to prevent highly soluble impurities, such as magnesium chloride, magnesium sulphate, potassium chloride and magnesium bromide, from settling out with the salt. Finally, the salt is collected from the last chamber (crystallization) from the top of polythene. It is normally harvested by using pullers to gather salt in one place and then using plastic or bamboo baskets to carry it to the traders.

Small farmers

Small farmers produce salt on land that they own, rather than leased land, and the land area they cultivate is between 1 and 2.5 acres in size. Approximately 20 per cent of all salt producers in Cox's Bazar district fall under this category. A minimum of two people is required to farm salt on 1 acre of land. The labour required for land preparation is unskilled and needed only for short periods, whereas the labour demands for the rest of the season require workers to have certain production skills and who need to be engaged for longer periods. Because of this, only those households who can afford to bear the initial salt pan preparation cost, purchase polythene, deploy two family members as labourers, and wait until sales from first harvests are made (in 3–4 weeks) belong to this category.



Image of salt pans. © Khairul Islam.

Sharecroppers

Sharecroppers represent a segment of marginal farmers who lack land ownership or the financial means to lease land for agricultural activities. They establish contractual agreements with landowners or with intermediaries who have obtained leases from landowners. Under these arrangements, they engage in salt production on the land leased from the landowner or intermediary. The resulting salt harvest is then evenly divided between the sharecropper and the landowner or intermediary. Notably, the landowner or intermediary shoulders 50 per cent of the operational expenses, including the costs associated with pumping machinery and polythene materials. This category comprises approximately 5 per cent of the total salt farmer

population, with their landholding size typically ranging from 1 to 2 acres. Sharecroppers primarily rely on household labour for their agricultural activities.

Medium and large farmers cum traders/ middlemen

The medium category of farmers operates on land areas ranging from 2.51 acres to 5.0 acres, while those with holdings exceeding 5.0 acres fall into the large category. This large category comprises approximately 80 per cent of all salt farmers. Many of these farmers acquire land through lease agreements with landowners to create larger plots, although some also own land themselves. Additionally, these farmers often play the role of traders and intermediaries. They sublease land to other farmers, oversee production with hired labourers, and engage in purchasing from small-scale farmers and sharecroppers. Subsequently, they supply the salt to downstream buyers.

Labour profile on salt farms

Salt production is labour-intensive, with two people required for every acre, and there is a constant demand for this labour throughout the production season. Labourers, who are predominantly male, work from dawn to dusk in open salt pans under scorching sun. The average wage rate for salt labourers⁴ is therefore higher than for other forms of rural labour. Each labourer receives either a monthly wage or an amount based on the volume produced, as well as meals during the day. They are also provided with accommodation at the farmer's house, or the labourers arrange it themselves. Many farmers prefer to work as labourers on larger farms, because this minimizes their exposure to risk and ensures their salaries are paid on time.

Though not sophisticated, there are certain skills required for salt production. As noted above, the labour required for land preparation is unskilled and needed for short periods, whereas labour for the rest of the season involves skills⁵ and is needed for longer periods. Labourers in the salt pans not only come from Cox's Bazar district, but also from other parts of the country. For many landless labourers, working in salt pans provides stable employment in the dry season, while in other parts of the year they find labouring opportunities in the fisheries sector. There is

⁴ Labourers are also often referred to as "farmers". On larger salt farms, many labourers work on a contractual basis wherein for each 40kg of salt produced they receive a certain agreed upon amount of money. In those cases, the landowners oversee the operation less, as the labourers take on more of the responsibility for production.

⁵ For example, when to allow the saltwater to flow from one land segment to another, or during collection, when the salt needs to be collected skillfully.

very limited involvement of female farmers or labourers at the farm level, due to the perception among farmers that women are not suited to the hard, physical nature of the work.

Concerns over the middlemen in salt production

There are widespread concerns regarding the role middlemen play in salt production (Tashfiq 2021). The middlemen, often referred to as dalal, are the price setters for crude salt and often function as gatekeepers to the rest of the value chain. Oftentimes, the middlemen form a cartel and essentially force all the farmers to go through them to connect with processors, thereby monopolizing the market.

These middlemen also provide credit lines to smaller farmers, which is a common – albeit informal – practice across the whole of the country's agricultural sector. This enables these farmers to buy farm inputs and cover household expenses during the off-season, but these loans are often associated with high interest rates that result in a credit trap for farmers, who may lose their voice concerning what is to be done with their products.

Middlemen are also associated with disproportionate economic gain resulting in a low return on investment for salt producers and high

raw materials prices for salt processors. The strong cartel formed by middlemen is detrimental to the overall growth and performance of the salt sector in Bangladesh.

Cost of salt production

The cost of salt production on 1 acre of land over 6 months is summarized in box 3 below. As we can see, there are a variety of costs involved, but leasing land and labour account for the vast majority of the overall cost. There is little scope to reduce these costs, which suggests that increasing productivity is key to increasing profits for farmers. There may also be scope for improving the price that farmers receive by increasing the quality of the salt they produce, particularly by ensuring the salt is dust- and moisture-free. It should also be noted that changes in import policies have a big effect on price, and this can have a major impact on profitability for farmers. A comparative analysis on cost of production for 1.20 acres of land during 2021–22 and 2022–23 is given in the box below. While most cost categories saw only a modest increase in cost over the selected time period, the cost of leasing salt land nearly doubled. This may be linked to the increase in the salt price, partly due to government support and disallowing the importation of industrial salt.

Box 3. Overview of average salt production costs, outputs and profits for 2021–22 and 2022–23

Crude salt production costs: 2021–22 and 2022–23

Area: 1.20 acres

Expenditure items	Average cost in taka (and US\$)	
	2021–22 salt season	2022–23 salt season
Lease of salt land	40 000 (US\$400)	75 000 (US\$750)
Land preparation	8 000 (US\$80)	10 000 (US\$100)
Wages for one skilled labourer (for 6-month salt season)	90 000 (US\$900)	100 000 (US\$1 000)
Polythene sheet	15 000 (US\$150)	17 000 (US\$170)
Saline water pouring cost (using water pump)	12 000 (US\$120)	15 000 (US\$150)
Field materials	10 000 (US\$100)	12 000 US\$(120)
Other costs	5 000 (US\$50)	US\$5 000 (US\$50)
Total	180 000 (US\$1 800)	234 000 (US\$2 340)

Per acre production cost (2021–22) = 150,000 taka (US\$1,500)

Per acre production cost (2022–23) = 195,000 taka (US\$1,950)

Average market price per metric ton in 2021–22: 10,458 taka (US\$104.58)

Average market price per metric ton in 2022–23: 12,042 taka (US\$120.42)

Average production per acre in 2021–22: 29.95 metric tons

Average production per acre in 2022–23: 33.06 metric tons

Total gross revenue in around 6 months per acre in 2021–22: 313 217 taka (US\$3 132.17)

Total gross revenue in around 6 months per acre in 2022–23: 398 109 taka (US\$3 981.09)

Net profit per acre in 2021–22: 163 217 taka (US\$1 632.17)

Net profit per acre in 2022–23: 203 109 taka (US\$2 031.09)

Note: US\$1 = 100 taka. Source: BSCIC, Salt Industry Development Office, Cox's Bazar, 2023.

Salt storage

The salt storage techniques used are low cost and very simple from a technical standpoint. Farmers store their harvest in the salt field by digging a large hole in the ground and putting thick polythene sheets at the bottom; they then put the

salt in the hole and cover the top and sides with thick polythene sheets. Because these methods involve storing the salt in the field, it reduces costs for transport, labour and additional storage space. However, these storage methods can lead to the loss of salt due to rainy season runoff, as well as to reductions the quality of the salt due

to increased moisture levels or dirt and dust contamination. However, no alternative storage methods for farmers were identified during this study that could offer improved storage while also being cost-effective.

There are privatized storage facilities that are owned, rented or leased by local salt refining factories and large brands that buy crude salt directly from producers or first-level middlemen/traders. These storage facilities are used by the factories for storing both crude and semi-refined salts before they reach the large brands' factories for further vacuum refining and iodine infusion.

Traders

At the trader level, two types of actors were observed: traders and *arotdars*.

Trader

Traders are local businessmen who supply the raw salt from farmers to *arotdars* or local salt mills. There are about 150 traders in the Islampur cluster, whereas in Potiya and Chittagong, the number of traders is approximately 40–50. The traders usually take 7.5 per cent as commission from the millers for the salt, and they normally provide the transportation. Traders also provide pre-financing (commonly known as *dadon*) to salt farmers, with a reduction in the sales price from the current market price.

Arotdars

The difference between *arotdars* and traders is that *arotdars* have fixed warehouses near the processing mill clusters. They are urban traders who source salt directly from the large farmers and traders. Essentially, they act as traders, but on a bigger scale. Traders or large farmers prefer to sell to the *arotdars* instead of large processing

mills, due to the payment mechanism involved. Formal processors usually pay by cheque with a credit period (15–30 days) that traders and farmers do not feel comfortable with. On the other hand, *arotdars* pay in cash. Sometimes, they retain a commission of 10.00 taka (US\$0.10) per sack⁶ of salt if the transaction takes place between traders/farmers and mills. Most of these *arotdars* operate around Narayanganj, Dhaka, Chittagong and Potiya, where large numbers of processing mills are located.

Dynamics of trade

For farmers, pricing of crude salt varies based on over- or underproduction linked to weather variation. These prices, as well as demand for crude salt, are further affected by the demand for refined salt in retail markets as well as by unethical practices around the import of sodium sulfate. The salt that is typically used for human consumption is sodium chloride, and this accounts for the bulk of crude salt produced by salt farmers. Sodium sulfate is significantly cheaper than sodium chloride, but it is also highly risky for human consumption. Even so, many importers, including some large brands are using unethical import practices and illegal means to import sodium sulfate and use it as a raw material for human consumption salt production. A 2021 PRISM report found moneylenders and land leasers to be the main market actors who control the market price of crude salt, with the majority of farmers selling to these middlemen.

In addition, both traders and *arotdars* have a common practice of weighing only the first basket filled by farmers during purchase. Subsequent baskets are then filled based on visual estimation, potentially leading to farmers being underpaid for the salt they sell.

⁶ Each sack holds about 78kg of salt.

Refineries/Mills

Table 5. Number of operational salt mills, by zone and type of mill (2022–23)

Salt zone	Number of operational salt mills			
	Manual	Centrifuge	Vacuum	Total
Dhaka	1	1	1	3
Narayanganj	29	8	3	40
Chandpur	1	–	–	1
Chittagong	57	8	2	67
Patiya	30	7	–	37
Cox's Bazar	55	3	–	58
Khulna	1	7	–	8
Jhalokati	8	3	–	11
Total	182	37	6	225

– = nil. Source: BSCIC, Salt Division, Dhaka.

Vacuum mills

Vacuum mills dissolve unprocessed salt in water, which is then treated to remove impurities before the water is evaporated using a vacuum machine to make 100 per cent pure salt. Six vacuum mills are currently in operation in Bangladesh. These companies produce the majority of their salt for human consumption, having established their plants to produce iodized edible salt and using their existing distribution channels to reach consumers. The major vacuum mills (such as ACI, Confidence, Molla Salt, Fresh and IFAD) are located in Narayanganj and Chittagong.

The main reason these factories are located away from the salt production zone in Cox's Bazar district is that vacuum processing needs a supply of natural gas. Because Narayanganj and

Chittagong are Bangladesh's two major industrial hubs, they enjoy a level of access to natural gas that Cox's Bazar district does not have. These are fully automated factories, which require a huge capital machinery investment of around 300-400 million taka (US\$3-4 million). Almost half of the iodized salt (human consumption) is processed by these six companies. Some of them also sell to industrial buyers (non-iodized salt).

Centrifuge mills

There are about 37 centrifuge mills currently operating in Bangladesh, but only three of these are located in Cox's Bazar district. The process follows a filtration technique that offers continuous operation to de-water and wash materials such as relatively in-compressible salts. It consists of a constant-speed rotor and is fixed

to one of several baskets. This assembly applies centrifugal force that is generated mechanically for smaller units and hydraulically for larger units to enable the separation of water and impurities from the salt.



Image of a centrifuge machine in a salt refinery mill. © Khairul Islam.

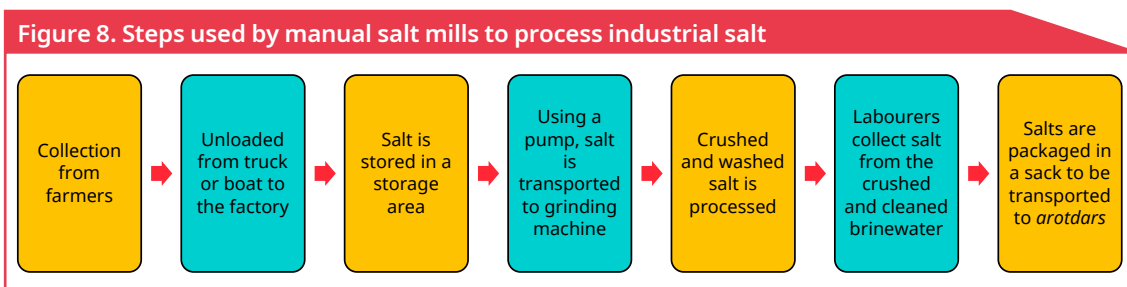
The cost of salt processed through centrifuge mills is 30 per cent more expensive than salt processed through manual mills. However, the salt from centrifuge mills has a moisture content of less than 6 per cent, whereas salt from manual mills has a moisture content of more

than 8 per cent. Salt processed in centrifuge mills goes through 11 washes in total, whereas salt processed in manual mills goes through fewer washes, so the quality is comparatively inferior. The cost of a centrifuge machine is about 2-3 million taka (US\$20,000-30,000). In addition there are costs involved to set up the foundation for a machine capable of processing 80 metric tons per day, which brings the total cost to around 10-11 million taka (US\$100,000-110,000) for the housing⁷ and the machinery alone.

Manual mills

At the salt cluster of Islampur in Cox’s Bazar, there are currently about 55 manual mills in operation. They usually operate a salt grinding crusher machine to process the raw salts. To set up the foundation for a machine with a daily processing capacity of 40-50 metric tons, it would cost around 4-5 million taka (US\$40,000-50,000) for the housing and the machinery alone. But to buy the land and set the factory there, the cost may rise to 15 million taka (US\$150,000).

The steps that manual mills use to process industrial salt are detailed in figure 8 below.



⁷ Housing is used here as a construction term referring to the cost of buying land and building a structure on top of it to place the salt processing machinery.

These manual mills are mostly suppliers of industrial salt. Although almost all have registration to process iodized salt, they choose not to. It is understood that registering as an iodized salt production facility enables them to

become eligible for imports and hence, almost all retain the license to make iodized salt. The industries who source salt from the manual mills are mostly tanneries, dyeing facilities, feed mills and sugar mills.



Image of salt being transported from a boat to the processing mill at Islampur, Cox's Bazar. © Sadeque.



Image of women packing iodized salt in a mill in Teknaf. © Khairul Islam.



Image of salt packaging by women at Islampur. © Sadeque.

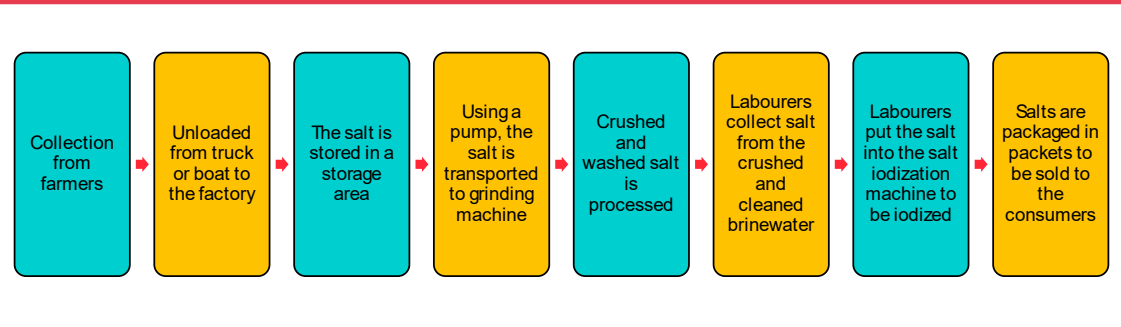


Activities in a manual mill. © Khairul Islam.

Refineries regard clean and white salt as being of the highest quality. Only a few mills in Cox’s Bazar district produce iodized salt regularly and supply

it to the retail market. The steps that manual mills use to process iodized salt are detailed in figure 9 below.

Figure 9. Steps used by manual salt mills to process iodized salt



Manual mills are usually very labour-intensive. If the labour needed for crushing, loading/unloading, and other in-house tasks is included, then roughly 100–150 people are employed by each manual mill. In total, there are approximately 6,000–7,000 workers working at manual mills in Islampur alone. The work attracts labourers from nearby districts. However, for employees at the middle management level, owners usually hire workers from outside of Cox’s Bazar district, because they find it difficult to recruit people with the necessary skills and experience locally.

roles are normally carried out by men. However, women are engaged in the packaging process, particularly the packaging of iodized salt for human consumption, which uses small packets of 1 kg or 0.5 kg. The packaging of industrial salt – which involves packing salt into 70–80 kg sacks – is usually carried out by men. As such, if more iodized salt production was carried out at manual mills, this would presumably generate more jobs for women.

Labour profile in salt mills

Importers

Due to a perception that women are not suited to very physical tasks such as loading/unloading and jobs involved in crushing, these

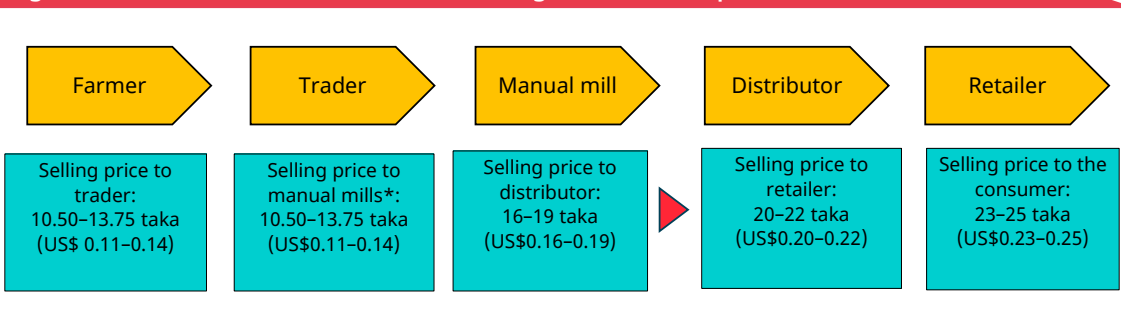
Imports of salts are strictly regulated. No individual can import salts without having a salt iodization plant (SIP)⁸, and the government import policy only permits the importation of salt in certain quantities (see section 2.2.5 above).

2.2.2. Value distribution and gross profit (2022-23)

Figure 10 presets a flow chart for the production of 1 kg iodized salt by a manual mill, with the

selling price detailed at each level of the value chain.

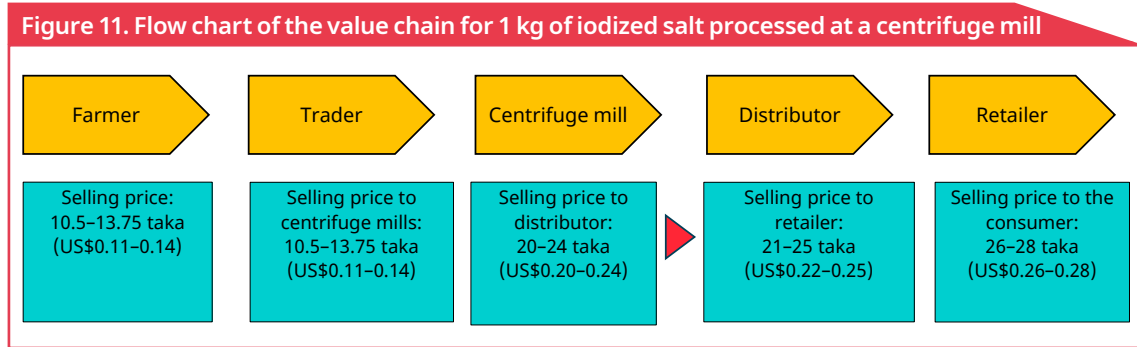
Figure 10. Flow chart of the value chain for 1 kg of iodized salt processed at a manual mill



*Traders sell salt at the same price they purchase from farmers, but they receive a 7.5 per cent commission on the total prices from the mills.

⁸ An SIP do not refer to a separate dedicated mill, but rather to a machine within the facility that mixes iodine with salt.

Figure 11 shows the selling price at each level of the value chain for 1 kg of salt processed by a centrifuge mill.



*Traders selling salt at the same price they purchase from farmers, , but they receive a 7.5 per cent commission on the total prices from the mills.
 Note: The transportation cost is on an average 2.0 taka/kg (US\$0.02/kg)

2.2.3. Supporting functions

Production inputs

While land and labour account for the primary expenditures and factors for salt production, other inputs include polythene, instruments, and in some cases insecticides. These contribute to an overall high cost of production, which is a key challenge in the sector that is exacerbated by input supplies being controlled by intermediaries selling at high prices. This is then further constrained by the general lack of modernization, particularly at the cultivation level, and a lack of financial support for farmers to access key production inputs. Based on consultations with sector stakeholders, improved technologies and inputs could result in increased production and quality, which would allow farmers to fetch higher prices for their salt.

Coordination

The BSCIC is the main government body with the mandate and authority to govern and promote the salt industry in Bangladesh. The BSCIC also coordinates with different related authorities, mainly the district administration office. Currently, the BSCIC is running a project called CIDD (Control Iodine Deficiency Disorder) supported from the revenue budget of the Government of Bangladesh. The United Nations Children’s Fund (UNICEF), the Global Alliance for Improved Nutrition (GAIN) and Nutrition Initiative have also provided support to this project. For example,

the Nutrition Initiative has been supporting the CIDD project to increase household coverage of adequately iodized salt. This collaboration will remain in effect for a period of five years.

There is a salt farmers’ association (engaging both farmers and labourers) as well as a millers’ association in the Islampur cluster in Cox’s Bazar. The salt farmers’ association’s main functions are to act as arbitrator if any conflict arises among its members, to negotiate with millers on salt prices, and to raise issues concerning salt production with relevant government authorities. The millers’ association in Islampur is comparatively new and acts as a conduit for development agencies to reach mills and farmers. The main responsibility of the association is to preserve the rights of the salt millers. In addition, millers work together to fix the salt prices.

Training

Previously, the Canadian Government implemented a project called the Micronutrient Initiative, which is now called the Nutrition Initiative. Under this project, salt farmers were trained on improved salt production techniques, and small manual refinery mills were supported to improve their SIPs. SIPs had been previously distributed for free by UNICEF. In 2022, the BSCIC conducted a training with more than 2,000 salt farmers on improving production quality and quantity. These trainings were done with the

support of the local representative. According to the 2021 PRISM study on salt farmers, nearly one-third of farmers surveyed belonged to some form of association or group for salt farming. These were primarily either through an NGO or an “unknown group”. The most common reasons cited for their membership in these groups and associations include access to loans or technology, or trainings on advanced salt cultivation techniques.

However, there are no private sector technical training and consulting services available to salt farmers, either as stand-alone services or as embedded services within the value chain. In addition, no vocational training is offered that directly caters to the needs of salt farmers.

Infrastructure

In terms of infrastructure, the main road that most of the salt farmers and traders in Teknaf use is the Cox’s Bazar-Teknaf road (around 58 km long). Farmers and traders in other upazilas mainly use rivers to transport their salt from farms to processors. More specifically, the main river channel that they use is called the Matamuhuri. This river also flows north-west in the Hill Tracts and enters Cox’s Bazar district from the east. Traders and farmers based on the Maheshkhali and Kutubdia islands transport their products through the Maheshkhali and Kutubdia channel on engine-based trawlers.

Farmers and millers in Islampur mentioned the possibility of creating a pipeline or building canals to gain access to higher salinity water from Maheshkhali or Kutubdia. Using higher salinity water would increase the productivity of their salt farming.

Additionally, an alternative solution put forth involves the exploration of deep tube wells within the salt fields, enabling access to higher salinity water. This approach would eliminate the need to depend on high tide for seawater intrusion, thus facilitating a more consistent supply of saline water with a higher salt content. Some localized testing has already occurred on a small scale at the private level, yielding favourable results. Nonetheless, further comprehensive assessment of the potential environmental consequences of these proposed deep tube wells is still lacking.

Transportation

As mentioned above, salt from salt pans is transported either by road or by river. Teknaf is well connected by road, and hence, most salt from Teknaf is transported by trucks to different mills in Chittagong, Narayanganj and Dhaka. By contrast, salt from most other production areas is transported by river using large boats. In some places, rickshaw vans are used to transfer the salt from salt pans to trucks or engine boats. Transporting from Cox’s Bazar to Narayanganj is cheaper via riverway than it is via road. On average, the transportation cost is not more than 2.00 taka/kg of salt.

Finance

Pre-financing plays a prominent role within the value chain, particularly in its upstream segment. Almost all farmers (more than 90 per cent) receive pre-financing from their immediate buyers (whether a larger farmer trader, a regular trader or an *arotdar*). The people who are providing the pre-financing usually then apply a reduction of around 5–10 per cent to their purchase price. As opined by the farmers, salt production requires large amounts of credit, which micro-finance institutions do not provide. Instead of accessing finance from formal channels, farmers see buyers as more convenient financiers because they can adjust their debt by selling salt to them. It may be mentioned that as part of an attempt to break this potentially vicious circle, the Government’s National Salt Policy 2022 (item 6.14) notes that the BSCIC will provide necessary instructions to Bangladesh Bank, scheduled banks and microcredit authorities to extend loans to marginal salt farmers, sharecroppers and salt mill owners.

The BSCIC continues to provide salt loans to the growers from its fund, a special loan fund for salt farmers, and a loan through SMCME to the salt farmers. The credit policy made by Bangladesh Bank on Agriculture and Rural Credit has given the privilege to salt farmers to get credits from the country’s scheduled banks.

As salt falls under the priority items of the government, small farmers can get credit at a subsidized rate of interest, which is 5 per cent now. However, it is not widely publicized to the farmers. In addition, there are some projects focused on

the salt value chain offering loans and grants directly to salt farmers, however this is limited, and therefore it is still challenging for farmers to access credit without the intermediation of the traders or *arotdars*.

Research

Research is imperative in the salt sector of Bangladesh in order to diversify its products and technology, and to facilitate the capacity-building of labourers engaged in salt production and processing. The salt sector is one of the most labour-intensive sectors in the country. Sporadic research work has been conducted on the sector,

but to date these have not resulted in any tangible outputs within the sector.

Some projects, such as the “Strengthening Environment-Friendly Micro-Enterprises in Salt Processing & Trade” programme funded by the World Bank and implemented by PKSF, are supporting exploratory research to enhance salt yield and improve the quality of sea salt production, such as the introduction of the zigzag method of cultivation. But while the BSCIC is aware of many of the potential methods to increase productivity, they have limited capacity to implement these methods at scale.

2.2.4. Rules and regulations

Processor registration, certification and standards

As previously noted, two types of salt are produced in refinery plants: edible salt (for human consumption) and industrial salt. Edible salt must be iodized through the use of a properly installed salt iodization plant (SIP). For refineries with an SIP, the BSCIC gives a licence/registration to produce both edible and industrial salt once the refinery mill passes an audit. For industrial salt processing only, there is no such audit required.

Once a refinery mill has set up an SIP, either the Bangladesh University of Engineering and Technology (BUET) or the Bangladesh Industrial and Technical Assistance Centre (BITAC) will audit the factory and provide a certificate. The certificate is essentially an approval that the SIP is set within the factory and is in good condition. Based on the certificate, the mill applies to the BSCIC to get registration. In addition, the Bangladesh Standards and Testing Institution (BSTI) gives the marketing license for iodized salt meant for human consumption. The salt packets must mention the contents, the production and expiry dates, and the maximum retail price.

A variety of private voluntary standards exist that refineries can also gain certification against. These include certifications for:

- OSH management systems (for example, OHSAS 18001:2007);

- food safety systems (ISO 22000 Food Safety Management Systems; FSSC Food Safety System; Hazard Analysis Critical Control Points (HACCP)); and
- quality management systems (for example, Good Manufacturing Practices).

For each of these standards, there are consultants in Bangladesh that can train refineries, as well as certification bodies that can carry out audits and provide certification.

Access to iodine

Only the BSCIC can import iodine for salt and sell it to refinery mills who have an SIP. To purchase iodine, the mills provide a requisition to the BSCIC and the BSCIC team visits the processing plant and supplies the plant based on their observations. The BSCIC also carries out audits of the mills to check whether the correct mixture of iodine is being used or not.

Targets and gap estimations

The BSCIC monitors and sets salt production targets every year based on estimated market demand. Following actual production, it measures the demand–supply gap and informs its respective ministry, which is the Ministry of Industry. The Ministry of Industry then informs the Ministry of Commerce about the gap and the latter sets the import target for the year.

Import rules

Salt imports are strictly regulated and both tariff and non-tariff barriers exist. Refineries can only import raw salt if it is to be processed for human

consumption. Once the Ministry of Commerce declares the volume of unrefined salt to be imported, all the active refinery plants with an SIP are eligible to import salt. The total import volume is equally divided among all the active SIPs.

► 2.3. Cross-cutting considerations

2.3.1. Gender

At present, the involvement of women at the farming level is very limited because social norms in the target area generally do not allow women to work in the field and there is a perception that the work is not suitable for women because it involves physical labour in high temperatures and getting wet by standing in the salt pans. However, within the salt processing mills, women find roles in the packaging process under a contract system. Typically, a group of six women labourers

collaborates to package salt, achieving an average daily output of 500 cardboard boxes. Each box contains 25 1 kg packets. The group earns 12.00 taka per cardboard box, totalling 6,000 taka (US\$60.00) for the entire group. Consequently, each woman receives roughly 1,000 taka (US\$10) per day for their contribution. It is important to note that they are typically able to work for about 20 days each month, resulting in an average monthly salary of 20,000 taka (US\$200).

2.3.2. Employment and working conditions.

Employment and working conditions in salt production

Close to 40,000 farm households are directly involved in salt production processes. In addition, around 55,000 skilled labourers are engaged (as a rule of thumb, 1.2 acres of salt land will require one worker). Most of these skills are inherited, so the sector has a high degree of child labour incidence, with children accounting for 5 per cent of workers. Also, family workers – mainly women – are generally not accounted for in the sector.

The daily wage is generally tagged to production volume, and ranges from 500–700 taka (US\$5–7), depending on the skill and physical strength of the worker. Salt farmers/labourers work from 8:00 a.m. to 6:00 p.m. The wage rate and the price of the raw salt are determined by the traders, who limit any form of direct interaction between producers and industrial buyers (processors). Producers and workers have hardly any say in the pricing process.

Occupational safety and health (OSH) remains an unattended issue in the production process. Although food is generally provided by traders,

other issues including personal protective equipment and other safety tools and practices are rarely found.

Salt production work is seasonal in nature, so farmers rely on the trader's credit line for survival during the off season. As a result, they have almost no say in anything the traders propose. There is no organization of small-scale salt producers and workers, which means there is no means for them to engage in collective bargaining. Labourers hired to work in salt production are all engaged in informal employment without any written employment contract, and consequently are not covered by any social security provisions.

Employment and working conditions in salt processing and transportation

Workers in the salt mills are mainly employed as informal workers. Although the work goes on throughout the year, the millers prefer to employ workers on a piece work basis, tagging their wages to the outputs.

The traditional system of hiring labourers using labour contractors known as majhi is practiced

by millers in Cox's Bazar. Mill owners only contact the majhi to supply the labourers. The majhi divides the labourers they send to the mills into two groups, one for working inside the salt mills and another to handle loading/unloading and inventory handling. The latter work starts in the morning when the boat or truck arrives to load/unload the salt. It continues even up to 10.00 p.m. Since payment is tagged to the outputs, labourers oftentimes work very long hours (16–18 hours per day) to accumulate more wages, which later will be divided among the labourers. The average wage per day ranges from 500–1,000 taka, depending on how quickly salt sacks are unloaded or loaded. Usually, they get 6 taka (US\$0.06) per sack/basket. However, in the lean season, wages fall.

Currently, there are approximately 3,000 workers in the 58 salt mills in Cox's Bazar. On average, each mill employs 60 workers. However, the number of workers can vary greatly during the lean and peak seasons.

Women labourers are employed to package the iodized salt into 1 kg and 0.5 kg packets for sale to consumers. Six women make a group, and one woman worker can pack an average of 4,000 packets per day. For 400 packets, the group gets 10 taka (US\$0.10), which translates to around 600 taka (US\$6) per group per day. Each month they can work for 20 days only.

It has been found that the working conditions in the salt mills are not hygienic, particularly for women. There are no separate drinking water, canteen and toilet facilities in most of the factories. The use of safety measures like gloves and safety gears for mechanical workers is lacking.

The working conditions are the worst among the workers who handle the crude salt, which is corrosive, as they often do so with bare hands and work in the factory in bare feet.

The most crucial health risk is loading/unloading sacks/baskets filled with crude salt that weigh 50–75 kg, with most weighing in well above 50⁹. Since most of the wage payments are calculated by how many sacks are loaded or unloaded, heavier bags benefit the mill owners by enabling them to move more salt for less money – which is an unethical practice that comes at the cost

of labourers' health and pay. In salt mills, child labourers are mostly absent.

There is a Salt Labour Union in the Islampur subdistrict of Cox's Bazar district which was formed locally by mill workers and is formally registered. So far, this trade union is not affiliated with any trade union federation, and as a result their effectiveness to ensure workers' rights through collective bargaining mechanism appears to be low. The salt trade union in Chattogram is rather active, but has its impact limited only to Chattogram district.

The informal nature of much of the employment in the production and processing of salt and the absence of active workers' voices has resulted in the poor and improper working conditions witnessed in the salt sector. The weak presence of trade unions, the traditional practice of hiring of labourers through contractors, and control over resources and markets exercised by the traders have all contributed to making the employment and working conditions across the entire salt value chain among the worst in Bangladesh.

Environment

Salt farming can elevate soil salinity in and around the production area, rendering it challenging to convert the land back to agricultural production, as most crops struggle to thrive in highly saline soil. Notably, salt farming tends to coincide with regions where the groundwater carries elevated salinity levels, which further limits agricultural potential due to the unsuitability of crops in highly saline groundwater conditions.

Furthermore, salt production processes can potentially lead to the leaching of highly saline water into the groundwater, potentially impacting agricultural production in neighbouring farms. However, the concentration of salt pans within specific areas, often surrounded by other salt pans, tends to confine these impacts.

In addition, the process of pumping water for salt production typically involves the use of diesel, which not only contributes to air pollution but also carries other environmental and health implications.

Additionally, the use of black polyethylene sheets in salt production, when exposed to the sun's

⁹ Only 20 per cent of sacks/baskets were found to weigh in at 50 kg.

heat, poses health hazards to workers and is environmentally unsustainable. These sheets, often used for containment purposes, deteriorate after a single season of use, necessitating their

disposal and replacement. This underscores the need for sustainable and environmentally conscious practices in salt farming to mitigate its impact on both land and labourers.

► 2.4. Key constraints

A SWOT analysis of the current salt value chain in Cox’s Bazar district is presented below.

Table 6. SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> ▶ Good conditions for salt production (access to saline water; suitable temperature, rainfall, soil type) ▶ Large number of skilled/semi-skilled labourers engaged and familiar with salt production/processing. ▶ Well-developed value chain both for human and industrial consumption. ▶ Good infrastructure provides easy access to domestic markets. ▶ The possibility of expansion of production to other coastal areas of Cox’s Bazar district and increased productivity. 	<ul style="list-style-type: none"> ▶ Low adoption of proper salt harvesting techniques, resulting in low productivity, high production costs and low quality salt. ▶ Processing methods used by manual mills are inefficient and produce low quality salt. ▶ Very limited training and extension services available for farmers. ▶ Poor employment and working conditions, with most of workers employed informally. ▶ Poor occupational safety and health (OSH) practices leading to possibility of occupational injuries. ▶ High dependence on government policies and import restrictions to stay competitive in the industry.
Opportunities	Threats
<ul style="list-style-type: none"> ▶ Growing domestic market demand for both iodized and industrial salt. ▶ Potential to improve productivity and quality all along the value chain through adoption of technologies and processes. ▶ One of the most promising economic sectors for entrepreneurship and employment in Cox’s Bazar. ▶ Potential for expansion of production zones. 	<ul style="list-style-type: none"> ▶ Competition from and feasibility of salt production compared to neighbouring countries. ▶ The salt production pan shrinking due to rising sea levels. ▶ Disruption in the salt production due to erratic weather conditions. ▶ Dependency on international suppliers for edible iodine – a major ingredient for salt meant for human consumption. ▶ Shrinking space for salt production due to the Government's acquiring land suitable for salt production for use by other economic activities.

1. Low productivity at the farm level leads to higher production costs and reduced profits.

As outlined in the sections above, productivity remains a constraint for crude salt production. This is mostly due to the fact that the production practices used are often traditional, with limited use of production materials like good quality plastics and limited attempts to minimize post-harvest loss through proper storage facilities. Additionally, the low salinity of the water being used in production sometimes affects production and productivity.

Furthermore, the low return on investment associated with the control of the market by the middlemen cartel is resulting in poor employment conditions at the production and processing levels, which in turn results in lower productivity workers. This in turn leads to a high cost of production and reduced profits, making the overall sector less competitive. As such, if the Government allows more salt to be imported, it could mean that Bangladeshi salt producers would find it difficult to sell their salt.

2. Low quality of the salt produced and stored at the farm level reduces sales price for farmers

As mentioned above, salt quality, as perceived by the refinery mills, is defined by its colour, texture and dryness. The price of salt varies by these quality parameters. Though farmers are aware of this, a chicken-and-egg situation restricts farmers from putting efforts into improving salt quality. That is, buyers (trader or mills) demand to pay a lower price (for example, paying for 40 kg when they purchase 47 kg of salt), with the excuse that there is high moisture content and dust in the salt. Because buyers always make this claim to drive down prices, farmers don't concern themselves with drying the salt to the best level possible and keeping the salt free of with dust, because the water and dust add extra weight. As a result, all parties lose out from this arrangement, with the farmer receiving a lower sale price and the mills having to pay higher costs to clean the salt.

3. Low levels of innovation and product diversification

Despite possessing huge potential, there is relatively low uptake of product diversification at the local market level. This is in part due to the capturing of salt production and processing by local elites that have developed cartels and thus discouraged innovation and entrepreneurship that can add further value to salt production and post-harvest processing at the local level.

4. Value chain governance remains a key constraint affecting overall sector performance

The cartel of intermediaries dealing in raw salt and its associated impact on the value generated at the producer and processor level is a major concern among salt value chain actors. Artificial shortages, price hikes and the exploitation of producers – particularly small-scale producers – are some of the manifestations of this business practice.

5. Poor employment conditions in the value chain affect productivity and growth

Despite being one of the major employers for coastal communities in the region, employment in the sector is mostly informal. The lack of appropriate working mechanisms, OSH provisions and social security measures impacts the performance and productivity of the workers, and thereby impacts the overall productivity and growth of the sector as a whole. The traditional transgenerational method of skills transfer is likely to be impacted, as the sector no longer stands competitive and is therefore less appealing to the children of salt producers, which may ultimately result in shortages of skilled workers.

The lack of coverage of the sector under the auspice of the prevailing labour law and the absence of platforms to raise the voices of workers are further worsening the situation. Businesses seem less wary of the situation, however, as most of them are unaware of the productivity losses they are likely enduring due to such hazardous employment conditions.

▶ 3. Key recommendations for sector development

▶ 3.1. Measures to improve production and productivity

As the sector suffers from low levels of production and productivity, various measures can be put in place to address these constraints. Some of these include:

- ▶ Increased adoption of technologies and processes at the producers' end to address the issue of low production and productivity. Learning from Indian and Chinese experiences with such technologies and processes could be developed and implemented in the emerging salt production pans with support from the Government. Reductions in post-harvest losses, production losses, and contamination and damage during the production process are some of the key issues to address.
- ▶ Similarly, moving away from manual processing to other forms of processing could lead to lower processing losses, efficiency gains and gains in overall productivity.
- ▶ Considering the seasonal nature of salt production, supplementary activities could be explored, including shrimp farming, farming salt-tolerant varieties of rice, and so on.
- ▶ Expanding the salt production zone could be another measure to increase production. However, such an expansion should be based on the utilization of competitive production and processing facilities, rather than relying on government support to remain commercially viable.

▶ 3.2. Improving value chain governance and ensuring a fair share of value among actors in the salt value chain

Value chain governance has been identified as a key constraint affecting the salt sector's performance. The unfair share of value among the actors involved, unhealthy business practices like cartels, and exploitative relationships between producers and middlemen/traders need to be addressed to ensure the effective functioning of the sector. For this to be achieved, the following measures should be considered:

- ▶ Organize producers in the form of producers' organizations – such as associations or cooperatives – and develop their capacity to bargain collectively, negotiate, and diversify income sources on the salt production pans.
- ▶ Develop social dialogue mechanisms to foster coordination and communication among the actors in the value chain – namely, producers, middlemen, traders and processors – in regard to ensuring that all parties receive a fair share of value for their contributions across the value chain. Such dialogue mechanisms should include workers as key parties.
- ▶ Develop an industry code of conduct and adopt good labour practices derived from established practices in Bangladesh and beyond. Develop a mechanism to monitor and enforce such practices. Workers' organizations and employers/entrepreneurs at various nodes of the value chain should participate in such practices. Industry associations, including chambers of commerce and industry and the BSCIC, should be involved in implementing and monitoring such practices.

- ▶ Strengthen employers' and workers' organizations in salt producing areas so that their collective voices can – in partnership with the national and district-level federations and trade unions – advocate for their rights and secure new and improved opportunities in the value chain. This may include better social and health protection measures for salt producing households, and yearlong food security support through different government mechanisms for extremely vulnerable workers whose earnings significantly drop during the salt production off-season (mid-May to mid-December every year).
- ▶ Collaboration with key industry players, such as private sector businesses with consumer brands, that are processing, packaging and marketing table salt should be engaged to promote best practices in the production processes in their supply chain, as they work directly with the various traders, millers, middlemen and producer groups that supply their salt stocks. These best practices may include active dialogue on and involvement in promoting improved labour practices in salt production, supporting OSH and good labour practices through public awareness campaigns, and facilitating post-harvest value-addition practices at the farmers' end to ensure higher profitability for farmers through effective and efficient trading practices.
- ▶ Strong enforcement of import policies to curb unethical practices currently being employed by importing agencies and private sector enterprises that are controlling the local crude salt price by importing inferior quality sodium sulfate (which is extremely hazardous for human consumption) and using it for salt and other food item processing.

▶ 3.3. Effective integration with the key value chains and industrial segments that uses salt as a critical raw material for manufacturing

Government priorities for strengthening sectors like leather and leather goods, animal feed processing, textiles and human food processing indicate steady growth for these sectors in coming years based on trends seen over the last decade. Because crude salt is used as a key raw material in these sectors, fostering better collaboration and trading terms among salt producers and these key sectors and incentivizing the local purchase of salt instead of imported supply can be critical for ensuring steady demand from industrial consumers of crude salts. Issues related to fostering such engagement may include addressing topics such as:

- ▶ Supporting/developing policies for various industry players in the private sector to prioritize use of local salt as a raw material instead of using imported alternatives, including tax benefits linked to demonstrating increased use of local crude salts.
- ▶ Facilitating investments in Cox's Bazar district to build modernized production plants that can provide easy access for farmers and producers, thereby reducing cartel practices and improving efficiency in transactions. This should include not only processing plants for salt destined for human consumption, but also processing to meet the needs of all other major sectors in Bangladesh that need crude salt as a key ingredient for their manufacturing work.

▶ 3.4. Local product diversification through promotion of downstream value-chain activities

Production of a more diversified array of salt products primarily aimed at the local tourism market could be an interesting opportunity for local salt producers and traders to earn additional income. Diversification of salt-based items may include:

- ▶ Introducing standards and policies for locally produced beauty products derived from crude salt, such as, salt scrubs for beauty salons and salt soaps and black salt for bathing. There is evidence of small initiatives along these lines being facilitated around Cox's Bazar district by NGOs or individual entrepreneurs, but no commercial brands are visible in the local markets that can drive production to raise substantial demand
- ▶ Engaging industry players – including large local/regional brands of consumer and beauty products – in regard to R&D, developing road maps for future growth potential, identifying key challenges, developing guidelines for standardizing product features, developing tax and tariff regulations, and welcoming commercially viable investments will be critical for driving such product diversification.

for crude salt. While working with large consumer brands on upstream value-chain activities is essential, working with them in the research and development (R&D) space to develop more value-added salt-based products needs to be explored.

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Rapid market analysis of the salt value chain in Cox's Bazar

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