Journal of Agroforestry and Environment

Volume 19, Issue 2, 2026

Journal DOI: https://doi.org/10.55706/jae

Journal homepage: www.jagroforenviron.com

Potentiality of Salt Production in Bangladesh: Impact of Climate Change Issues

Roksana Akter [1, †], Samia Sarker Pinkey [2, †], Sheikh Mohammad Sayem [2, †], Md. Shamsuzzoha [3] and Md. Anwarul Abedin [4, *]

[1.] Department of Mathematics, Government Titumir College, Dhaka 1212, Bangladesh
[2.] Department of Agricultural and Applied Statistics, Faculty of Agricultural Economics & Rural Sociology, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh
[3.] Department of Emergency Management, Faculty of Environmental Science and Disaster Management, Patuakhali Science and Technology University, Patuakhali-8660, Bangladesh
[4.] Laboratory of Environment and Sustainable Development, Department of Soil Science, Faculty of Agriculture, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh
† Equally contributed as first authors.

* Correspondence: m.a.abedin@bau.edu.bd (M.A.A.); Tel.: +880 1718-031462 (M.A.A.)

Received: 09/07/2026

Accepted: 08/11/2026

Available online: 12/11/2026

Copyright: ©2026 by the author(s). This work is licensed under a Creative Commons Attribution 4.0 License.
https://creativecommons.org/licenses/by/4.0/

Abstract: Bangladesh's coastal salt industry depends largely on solar evaporation and is therefore sensitive to rainfall, temperature, sunshine duration and other weather conditions. This study examines national salt production and demand trends, explores associations between salt output and selected meteorological variables, and identifies production constraints reported by salt farmers. Annual secondary data for 2000–2024 were obtained from the Bangladesh Small and Cottage Industries Corporation (BSCIC) and the Bangladesh Meteorological Department (BMD). In addition, primary information was collected from 22 salt producers in Cox's Bazar Sadar Upazila, supported by one focus group discussion and two key-informant interviews. Linear, exponential, quadratic and cubic trend models were compared using forecast-error and information criteria. The cubic specification was selected in the source analysis for both production and demand. The reported 2030–2031-point forecasts were 45.13 for production and 44.75 for demand; however, the original table's unit designation requires confirmation before these values can be interpreted. In the climate analysis, salt production was positively correlated with maximum temperature ($r = 0.54$) and negatively correlated with rainfall ($r = -0.41$) and sunshine hours ($r = -0.69$). A dynamic regression specification including lagged production, rainfall, sunshine hours, and maximum temperature explained 83% of the observed variation (adjusted $R^2 = 0.79$). The farmer survey indicated that 51% of respondents used leased or Khas land, 50% were illiterate, and 59% reported a lack of salt-production training. These findings suggest that weather variability interacts with production practices and structural constraints. The results should be interpreted cautiously because the farm-level sample is small, the national time series is short, and the reported sunshine-hour association requires further investigation. Strengthening climate information, training, access to suitable land and storage, and market support could improve the resilience of Bangladesh's salt sector.

Keywords: Salt farmers; Sea-salt production; Climate change; Climate variability; Rainfall variation; Sunshine duration; Temperature; Time-series analysis

INTRODUCTION

Salt is an essential mineral used in food processing, preservation, animal husbandry and a wide range of industrial applications (Albarracín et al., 2011; Hutton, 2002). In Bangladesh, crude sea salt is produced predominantly along the southeastern coast, particularly in Cox's Bazar and adjoining coastal areas (Ismail et al., 2025). The conventional production system relies heavily on solar evaporation: seawater or brine is introduced into shallow saltpans, concentrated through evaporation and then

harvested as salt. Production is consequently seasonal and dependent on the availability of suitable dry weather (Hutton, 2002). Earlier work on Bangladesh's salt-producing coast has described the economic and environmental dimensions of this production system and the importance of land-use suitability and coastal resource management (Hossain et al., 2003; 2006). Meanwhile, salt farmers are losing interest in producing salt because mill owners have lowered the price of salt through syndication during the peak season. This study will try to find the impact of climatic change on salt production and generate policy options that can be implemented to overcome these challenges.

Bangladesh is one of the salt-producing countries in the world. In 2019, the country was ranked 24th compared with other countries in salt production at 1625.25 thousand metric tons. Additionally, it is produced commercially in about 120 nations worldwide and is available in every nation. This industry employs roughly 5 million people directly or indirectly. Additionally, these 5 million people are largely responsible for the socioeconomic lifestyle of around 25 million others. The annual contribution of this industry to the national economy is around Bangladeshi Taka (Tk.) 300 to Tk. 350 crores, or Tk. 1200 to Tk. 1500 crores that will be processed. Thus, there is no need to exaggerate the significance of the production of crude salt or the salt producers. Farmers are using improper methods for growing crude salt, which deviates greatly from the concepts of fractional separation of the soluble chemicals in the sea brine and gradual natural evaporation (Al Mamun et al., 2014).

The meteorological conditions that support solar salt production can also create substantial operational risk. Rainfall can dilute brine, interrupt crystallisation and wash away harvested salt, whereas temperature, humidity and solar exposure influence evaporation. The timing and persistence of dry-season conditions are therefore important to production planning. Evidence from salt-producing regions elsewhere has similarly linked seasonal and climatic variability to salt productivity (Bhat et al., 2015; Halil, 2019; Mani et al., 2012). In Bangladesh, these climatic pressures occur alongside coastal hazards such as cyclonic storms, tidal inundation, salinity intrusions and sea-level rise, which can affect saltpans, access routes, storage facilities and farmers' livelihoods (Rahman & Rahman, 2015; Sarwar & Khan, 2007; Rani et al., 2026; Shamsuzzoha et al., 2026a).

Climate-related exposure is not the only determinant of production. Many salt producers operate on leased land and use labor-intensive methods, while access to training, technology, credit, storage and reliable markets may be limited. Price instability and competition from imported salt can further weaken incentives to invest in production improvements. A useful assessment of the sector therefore needs to consider national production and demand alongside meteorological associations and the experiences of producers. This study addresses three linked questions: (1) how have national salt production and demand changed over 2000–2024, and what do trend models indicate about their near-term trajectories? (2) How are annual salt production levels associated with rainfall, temperature, humidity and sunshine duration? (3) What production constraints are reported by salt producers in Cox's Bazar Sadar Upazila? By combining national secondary data with a small local producer survey and stakeholder discussions, the study provides an integrated, exploratory assessment of the potential and vulnerabilities of Bangladesh's salt industry.

METHODOLOGY

Study design and data sources

The study used a mixed-source design comprising (i) annual national secondary data on salt production and demand for 2000–2024, (ii) meteorological data for the climate–production analysis, and (iii) primary field information from salt producers and sector stakeholders. National production and demand data were obtained from BSCIC and related organisations, while meteorological observations were sourced from BMD. The source thesis does not provide a complete station list, variable-specific data definitions, missing-data treatment or a reproducible data extraction protocol. These details should be added from the original data files before journal submission.

Field survey and qualitative information

The field component focused on Cox's Bazar Sadar Upazila, selected because salt producers are concentrated in the area and the location is relevant to the coastal salt industry (Figure 1). Primary data were collected from 22 respondents directly involved in salt production. The source describes the sampling approach as random sampling but does not report the sampling frame, selection procedure, survey dates or response rate. One focus group discussion (FGD) with salt producers and two key-informant interviews (KIIs) with sector stakeholders were also conducted to obtain contextual information about production practices, market conditions and institutional constraints (Hossain et al., 2026). These qualitative inputs informed the SWOT assessment (Shamsuzzoha et al., 2026b).

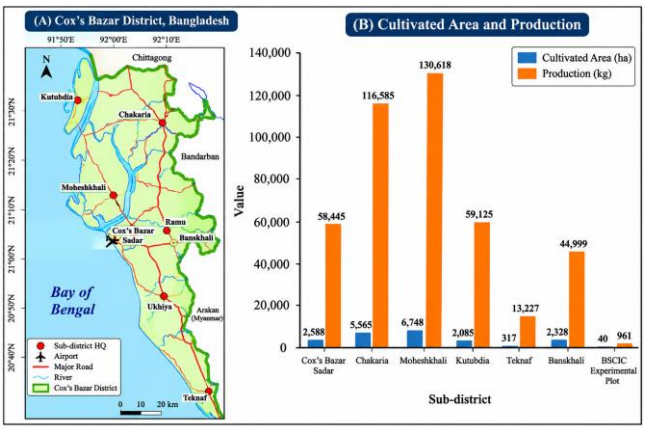


Figure 1. Salt production status of Cox's Bazar District

Trend and forecasting analysis

DOI: https://doi.org/10.55706/jae1938

Annual production and demand series were examined descriptively and modelled using linear, exponential, quadratic and cubic deterministic trend specifications. Model performance was compared using mean absolute deviation (MAD), mean squared deviation (MSD), mean squared error (MSE), root mean square error (RMSE), mean absolute percentage error (MAPE), adjusted coefficient of determination and Akaike information criterion (AIC). Lower forecast-error and AIC values, together with higher adjusted R^2, were treated as evidence of comparatively better fit. The selected cubic trend models were then used to generate forecasts for 2024–2025 to 2030–2031. The source does not report out-of-sample validation or the exact forecast-origin procedure; therefore, the forecasts are treated as extrapolations rather than validated predictions.

Climate–production analysis

Pearson correlation coefficients were used to describe pairwise associations between salt production and time, rainfall, humidity, sunshine hours, minimum temperature and maximum temperature. Variance inflation factors (VIFs) were calculated to assess collinearity among predictors. A sequence of dynamic regression specifications was estimated, progressively introducing lagged salt production and meteorological variables. The preferred reported specification (Model 4) was:

$$Y_t = -41.37 + 0.28Y_{t-1} - 0.016R_t - 3.18S_t + 2.71T_{max,t} + \varepsilon_t$$

where Y_t is salt production in year t, Y_{t-1} is production in the preceding year, R_t is rainfall, S_t is sunshine duration, $T_{max,t}$ is maximum temperature, and ε_t is the error term. The source reports standard errors of 0.15, 0.004, 0.98 and 0.91 for the lagged production, rainfall, sunshine and maximum-temperature coefficients, respectively. Because the underlying units and temporal aggregation of each climate variable are not fully documented, coefficient magnitudes should not be compared across predictors or interpreted as causal effects.

Analysis of producer constraints and ethics

Survey responses were summarised using descriptive statistics and percentages. FGD and KII information was used to identify strengths, weaknesses, opportunities and threats (SWOT) relevant to salt production. The source thesis states that participants provided informed consent and that their information was kept confidential. No institutional ethics committee name, approval number or exemption statement is provided; the authors should insert the applicable ethics approval details or confirm the relevant institutional requirements.

RESULTS

National production and demand trends

The 2000–2024 national series indicated an overall increase in both salt production and demand. The source analysis describes production as generally exceeding demand, although the size of the gap and annual fluctuations varied. Production showed greater variability than demand, while both series increased in the most recent period covered. The cubic trend model was selected in the source analysis for both series. For production, the reported cubic-model statistics were MAD = 1.864, MSD = 4.466, MSE = 5.359, RMSE = 2.315, MAPE = 14.275, adjusted R^2 = 0.716 and AIC = 114.025. For demand, the corresponding values were MAD = 0.618, MSD = 0.718, MSE = 0.861, RMSE = 0.928, MAPE = 4.235, adjusted R^2 = 0.962 and AIC = 70.145 (Table 1).

The cubic forecasts increased across the forecast horizon. The reported point forecasts for 2030–2031 were 44.75 million tons for demand and 45.13 million tons (MT) for production (Table 2).

Table 1. National production and demand trends.

Series	Production (cubic)	Demand (cubic)
MAD	1.864	0.618
MSD	4.466	0.718
MSE	5.359	0.861
RMSE	2.315	0.928
MAPE (%)	14.275	4.235
Adjusted R^2	0.716	0.962
AIC	114.025	70.145

Table 2. National demand and production forecast.

Financial year	Demand forecast	Production forecast
2024–2025	27.56	25.16
2025–2026	29.76	27.58
2026–2027	32.21	30.33
2027–2028	34.92	33.44
2028–2029	37.90	36.93
2029–2030	41.17	40.82
2030–2031	44.75	45.13

The source thesis contains inconsistent annual growth-rate summaries: the abstract reports 31.23% for demand and 33.38% for production, whereas the growth-rate table reports geometric means of 31.43% and 27.11%, respectively. These figures have not been used as headline findings in this article and require recalculation from the original annual series.

Associations between salt production and meteorological variables

Salt production was positively correlated with time ($r = 0.83$, $p < 0.01$) and maximum temperature ($r = 0.54$, $p < 0.01$). Negative correlations were reported for rainfall ($r = -0.41$, $p < 0.05$) and sunshine hours ($r = -0.69$, $p < 0.01$). The correlation with humidity was weak ($r = -0.07$), and that with minimum temperature was also weak ($r = 0.25$) (Table 3). The negative sunshine-hour association is counter to the expected evaporation mechanism and to some of the literature cited in the thesis. It may reflect confounding by time, seasonal structure, measurement definitions or data issues; it should not be interpreted as evidence that increasing sunshine reduces salt production without further diagnostics.

DOI: https://doi.org/10.55706/jae1938

The VIF values for rainfall (1.104), humidity (1.086), sunshine hours (1.101) and maximum temperature (1.104) were low, with a mean VIF of 1.098. This suggests that severe linear multicollinearity was not evident among the included predictors under the reported diagnostic. In the preferred dynamic regression Model 4, rainfall had a negative coefficient (−0.016, SE = 0.004), sunshine hours had a negative coefficient (−3.18, SE = 0.98), and maximum temperature had a positive coefficient (2.71, SE = 0.91). The model had $R^2 = 0.83$, adjusted $R^2 = 0.79$ and AIC = 102.79. The lagged production coefficient was 0.28 (SE = 0.15).

Table 3. Correlation with production of climatic variables.

Variable	Correlation with production	Reported significance
Time	0.83	$p < 0.01$
Humidity	−0.07	Not significant
Rainfall	−0.41	$p < 0.05$
Sunshine hours	−0.69	$p < 0.01$
Minimum temperature	0.25	Not significant
Maximum temperature	0.54	$p < 0.01$

Characteristics and constraints reported by salt producers

The field survey comprised 22 salt producers in Cox's Bazar Sadar Upazila. Respondents' mean age was 39.64 years (SD = 10.68), and mean household size was 7.32 (SD = 1.94). The reported mean annual input cost was BDT 493,909.09 (SD = 724,497.19), while the mean annual salt-output price/revenue measure was BDT 548,363.64 (SD = 866,136.66). The source labels the latter as "salt output price in a year"; it should be clarified whether it represents gross sales, total revenue or a price measure.

Land tenure, education and training emerged as important structural issues in the survey. Weather-related constraints included excessive or sudden rainfall and untimely tides, while lack of technology and volatile market prices were also reported. The percentages are descriptive of this small local sample and should not be generalised to all salt producers in Bangladesh (Table 4).

Table 4. Reported constraints/characteristics in relation to climate change issues.

Reported constraints/characteristics	Respondents (%)
Cultivable land leased or Khas	51
Illiterate	50
Lack of salt-production training	59
Less than five years of production experience	36
Excessive rainfall	20
Lack of technology	20
Volatile salt-market price	10
Sudden rainfall	5
Untimely tides	5

SWOT synthesis

The SWOT assessment identified the availability of seawater and coastal salt-producing locations, growing domestic demand, employment and livelihood benefits, and accumulated farmer experience as strengths (Shamsuzzoha et al., 2026b) (Figure 2). Weaknesses included limited farmer capital and land ownership, weak producer organisation and market management, inadequate technology, low formal education, and insufficient storage and processing facilities. Opportunities included market expansion, employment creation and adoption of improved or renewable-energy-based production technologies. Threats included climate variability, sea-level rise, unpredictable rainfall and tides, uncertain farm-gate prices, inadequate research investment and potential degradation of seawater quality and productive land.

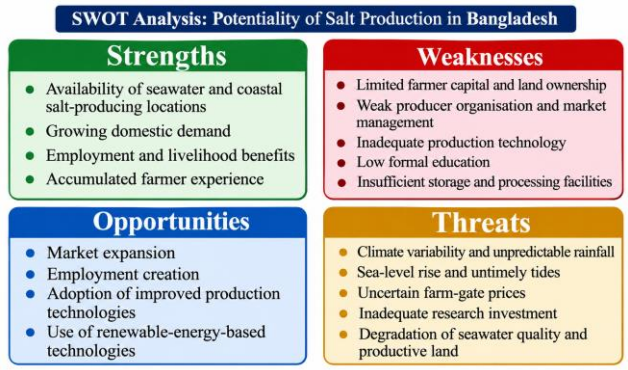


Figure 2. SWOT analysis of the study.

DISCUSSION

The upward national production and demand trajectories indicate that salt remains an economically relevant coastal industry with potential for further development. The cubic model provided the best comparative fit among the four trend forms considered in the source analysis. However, models fit to a historical series do not establish forecast reliability. A cubic polynomial can extrapolate rapidly outside the observed period, and the source does not report a holdout validation period, prediction-interval coverage assessment or comparison with established time-series models. The forecasts should therefore be regarded as exploratory planning scenarios rather than definitive estimates of future national supply and demand.

The negative association between rainfall and salt production is physically plausible for solar salt production. Rainfall can dilute brine, delay crystallisation and damage exposed salt stocks. The positive association with maximum temperature is also consistent with the role of heat in evaporation. These results align with previous work describing the dependence of coastal salt production on dry-

DOI: https://doi.org/10.55706/jae1938

season conditions and meteorological variability (Bhat et al., 2015; Hossain et al., 2006; Vyas et al., 2022). Nevertheless, the current analysis is based on annual data and cannot resolve the timing of rainfall events within the production season. Seasonal rainfall during active salt harvesting may have a substantially different effect from annual rainfall totals. Future work should therefore use monthly or daily weather observations aligned with the local salt-production calendar. The negative sunshine-hour correlation and regression coefficient require caution. Solar radiation and sunshine generally support evaporation, and previous research cited in the thesis reports a positive association between sunshine duration and evaporation. The negative association in this dataset may arise because sunshine hours decline over time while production rises, as suggested by the strong negative correlation between time and sunshine hours ($r = -0.81$). This pattern creates a risk of confounding and potentially unstable coefficients in a short annual series.

The apparent negative coefficient should be re-examined using time controls, seasonal measures, station-level data, residual diagnostics and alternative model specifications. It should not be presented as a causal climate-change effect. The farmer survey adds a local perspective to the national time-series analysis. More than half of respondents reported using leased or khas land, and 59% reported a lack of salt-production training. Such constraints can reduce incentives to invest in improved saltpans, protective covers, storage and efficient brine management. The reported weather and market constraints also show that climate exposure is mediated by infrastructure and institutional capacity. This interpretation is consistent with earlier studies that identify both environmental and economic dimensions of Bangladesh's sea-salt industry (Hossain et al., 2006).

Several practical priorities follow. First, producers need accessible seasonal weather forecasts and early warnings that are relevant to the salt-production calendar, accompanied by practical guidance on protecting brine and harvested salt during rainfall and tidal events. Second, training and extension support should address improved saltpan preparation, brine management, harvesting, quality control and safe storage. Third, access to suitable land, affordable credit and shared storage or processing facilities could reduce production risk for small-scale operators. Finally, transparent market information, stronger producer organisations and appropriate policy mechanisms could improve farmers' bargaining position and reduce the effects of price volatility. These measures should be evaluated for financial feasibility and environmental sustainability before large-scale implementation, based on policy recommendations to achieve a sustainable salt sector in Bangladesh (Figure 3).

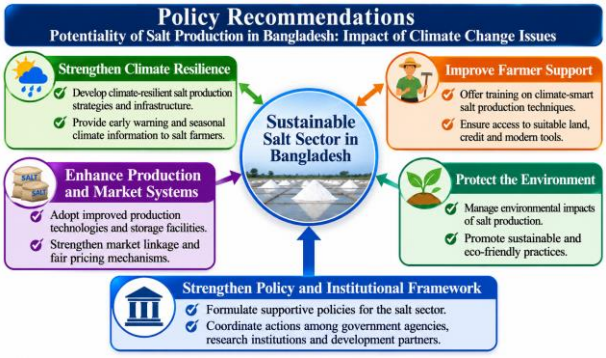


Figure 3. Policy recommendations

Limitations and future research

This study has several limitations. The primary survey included only 22 producers from one upazila; its findings are therefore exploratory and cannot represent the diversity of salt-producing areas across Bangladesh. The sampling frame and fieldwork dates are not fully documented in the source material. The national time series covers 25 annual observations, which limits the complexity of reliable time-series modelling. The source also provides incomplete information about meteorological station coverage, temporal aggregation, missing values, variable units and data harmonisation. Inconsistencies in the reported growth rates and forecast units require resolution from the original datasets. In addition, climate analysis identifies statistical associations rather than causal effects of climate change. No explicit attribution framework for climate change is presented.

Future research should expand the producer survey across multiple salt-producing upazilas and include a transparent sampling design. Monthly or daily meteorological data should be matched to production-season observations, with explicit measures of rainfall intensity, dry-spell duration, humidity, solar radiation and tidal or storm impacts. Longer and more complete production records would support robust time-series methods, out-of-sample validation and uncertainty analysis. Farm-level panel data could help distinguish climate effects from changes in cultivated areas, technology, labour, input costs and market prices. Linking production records to independent farm-level data would also help evaluate the effectiveness of adaptation measures (Figure 4).

DOI: https://doi.org/10.55706/jae1938

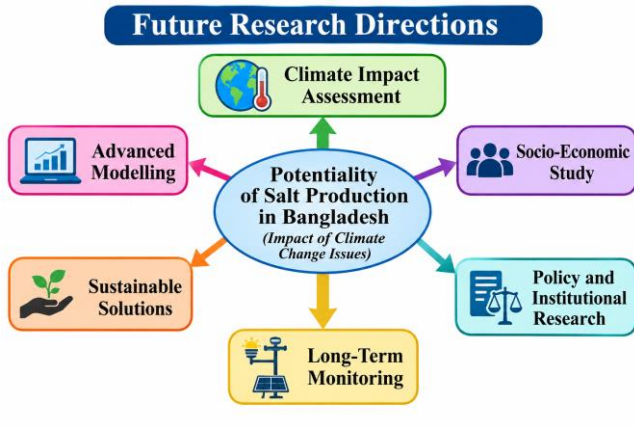


Figure 4. Future research directions

CONCLUSIONS

This study brings together national salt production and demand trends, meteorological associations and local producer constraints to assess the potential and vulnerabilities of Bangladesh's salt industry. The 2000–2024 data show increasing production and demand, and the cubic trend specification was selected as the best-fitting model among those compared. Rainfall was negatively associated with production, while maximum temperature was positively associated. Sunshine hours also showed a negative statistical association, but this unexpected result requires further investigation and should not be interpreted causally. The small survey in Cox's Bazar Sadar highlighted insecure or leased land access, limited training, low formal education, technology constraints, weather disruption and market instability. The sector's potential will depend not only on favourable dry-season conditions but also on improvements in farmer training, technology, storage, finance, land access and market institutions. More spatially extensive and seasonally resolved research is needed to quantify climate risks and evaluate adaptation options.

DECLARATIONS

Author Contributions

Roksana Akter: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Conceptualization. **Samia Sarker Pinkey:** Writing – original draft, Visualization, Software, Methodology, Investigation, Formal analysis, Data curation. **Sheikh Mohammad Sayem:** Writing – original draft, Visualization, Software, Methodology, Investigation, Formal analysis, Data curation. **Md. Shamsuzzoha:** Writing – original draft, Writing – review & editing, Software, Resources, Formal analysis, Visualization, Validation. **Md. Anwarul Abedin (M.A.A.):** Writing – review & editing, Validation, Supervision, Resources, Methodology. All authors have read and approved the final version of the manuscript.

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Informed consent was obtained verbally from all the subjects involved in the research.

Data availability Statement

The data supporting this study are available from the corresponding author upon reasonable request.

Acknowledgements

The authors thank the authorities and staff of the Bangladesh Agricultural University and Patuakhali Science and Technology University for their guidance and support. The authors thank the reviewers for their constructive comments, which helped improve the study's quality and address necessary corrections. The authors may acknowledge BSCIC, BMD, participating salt producers, FGD participants and key informants after confirming permissions and preferred wording.

Conflicts of Interest

The authors declare no competing interests.

Use of AI and AI-Assisted Technologies

The authors used DeepL to correct sentences and remove grammatical mistakes. All content was reviewed and approved by the corresponding author using a licensed Microsoft 365 subscription product.

REFERENCES

Albarracín, W., Sánchez, I. C., Grau, R., & Barat, J. M. (2011). Salt in food processing; usage and reduction: A review. International Journal of Food Science & Technology, 46(7), 1329–1336. https://doi.org/10.1111/j.1365-2621.2010.02492.x

Al Mamun, M. A., Raquib, M., Tania, T. C., & Rahman, S. M. K. (2014). Salt industry of Bangladesh: A study in the Cox's Bazar. Banglavision, 14(1), 7–17.

Bhat, A. H., Sharma, K. C., & Banday, U. J. (2015). Impact of climatic variability on salt production in Sambhar Lake, a Ramsar wetland of Rajasthan, India. Middle East Journal of Scientific Research, 23(9), 2060–2065. https://doi.org/10.5829/idosi.mejsr.2015.23.09.95224

Budiman, A. (2022). Analysis of income level and profit of salt farming business. Efficient: Indonesian Journal of Development Economics, 5(1), 1434–1443. https://doi.org/10.15294/efficient.v5i1.50373

Halil, A. (2019). The impact of season change to salt productivity in Pangenan Sub-district Cirebon Regency in 2013 and 2014. IOP Conference Series: Earth and Environmental Science, 311(1), Article 012086. https://doi.org/10.1088/1755-1315/311/1/012086

Hossain, M. S., Hossain, M. Z., & Chowdhury, S. R. (2006). An analysis of economic and environmental issues associated with sea salt production in Bangladesh and Thailand coast. International Journal of Ecology and Environmental Sciences, 32(2), 159–172.

Hossain, M. S., Lin, C. K., Tokunaga, M., & Hussain, M. Z. (2003). Land use zoning for solar salt production in Cox's Bazar coast of Bangladesh: A remote sensing and GIS analysis. Asian Journal of Geoinformatics, 3(4), 69–77.

Hossain, M. M., Pal, I., Abedin, M. A., Setu, S. H., & Shamsuzzoha, M. (2026). Salinity and livelihoods: Dermatological health challenges in coastal Bangladesh. Journal of Hazards, Risk and Resilience, 1(1), Article 11. https://doi.org/10.53941/jhrr.2026.100011

Hutton, T. (2002). Sodium: Technological functions of salt in the manufacturing of food and drink products. British Food Journal, 104(2), 126–152. https://doi.org/10.1108/00070700210423635

Ismail, M., Jamalfaisal, S. I., Rahman, M. T., Johany, S. A., Akter, I., & Ahmed, S. (2025). Assessment of trace element contamination and human health risk in unrefined sea salt from Chattogram and Cox's Bazar, Bangladesh. Environmental Geochemistry and Health, 47(10), Article 418. https://doi.org/10.1007/s10653-025-02728-x

Mani, K., Salgaonkar, B. B., Das, D., & Bragança, J. M. (2012). Community solar salt production in Goa, India. Aquatic Biosystems, 8, Article 30. https://doi.org/10.1186/2046-9063-8-30

Rahman, S., & Rahman, M. A. (2015). Climate extremes and challenges to infrastructure development in coastal cities in Bangladesh. Weather and Climate Extremes, 7, 96–108. https://doi.org/10.1016/j.wace.2014.07.004

Rani, R., Hazra, P., Islam, M. K., Uddin, M. R., Mehzabin, N., Majumder, M. S. I., Shamsuzzoha, M., & Shaw, R. (2026). Shrimp aquaculture, soil degradation, and climate resilience: A comparative analysis of the Southwestern coast of Bangladesh. Sustainable Geosciences: People, Planet and Prosperity, 2, Article 100033. https://doi.org/10.1016/j.susgeo.2026.100033

Sarwar, G. M., & Khan, M. H. (2007). Sea level rise: A threat to the coast of Bangladesh. Internationales Asienforum, 38(3–4), 375–400.

Shamsuzzoha, M., Setu, S. H., Oyshi, I. Z., Lei, W., Abedin, M. A., Akter, A., & Ahamed, T. (2026b). Shoreline and onshore phenological characteristics change assessment of Bangladesh delta adjacent to the Bay of Bengal from 2021 to 2025 using satellite remote sensing. Coasts, 6(2), Article 21. https://doi.org/10.3390/coasts6020021

Shamsuzzoha, M., Kibria, M. G., Hosenuzzaman, M., Habiba, U., Pal, I., Setu, S. H., & Abedin, M. A. (2026a). The livelihood of coastal community people in a changing climate and the possible adaptation strategies in Bangladesh. Sustainability, 18(17), Article 9076. https://doi.org/10.3390/su18179076

Vyas, B. G., Labhasetwar, P. K., Yadav, A., & Paital, A. R. (2022). A compendium of evaporation techniques for salt production from seawater and sub-soil brine. Chemical Papers, 76(11), 6659–6674. https://doi.org/10.1007/s11696-022-02363-1

CC BY