



Sher-e-Bangla Agricultural University

SDG Activity Report on

SDG 17: Partnerships For The Goals

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Faculty Research and Publications

Thermochemical and physical characterization of agricultural biomass for sustainable energy in Bangladesh

Author: Debu Kumar Bhattacharjya

Year: 2024

Abstract:

The United Nations Sustainable Development Goals (SDGs) prioritize affordable, clean energy solutions to tackle global issues like poverty, climate change, and environmental degradation. In Bangladesh, agricultural biomass residues present a renewable and underutilized alternative to fossil fuels. This study systematically characterizes the thermochemical and physical properties of key agricultural residues—rice husk, rice straw, wheat straw, sugarcane bagasse, jute stick, dhaincha, and water hyacinth—to assess their potential for sustainable energy production. Key analyses include higher heating value (HHV), proximate composition (volatile matter, fixed carbon, ash), and elemental makeup. Volatile matter content ranged from 71.52 % in rice husk to 90.83 % in sugarcane bagasse, while fixed carbon varied between 7.00 % in sugarcane bagasse and 16.45 % in dhaincha. Ash content was highest in rice straw (15.05 %) and lowest in sugarcane bagasse (2.17 %). The HHV ranged from 19.65 MJ/kg for dahincha to 11.95 MJ/kg for water hyacinth, highlighting dahincha's high energy potential. However, elevated potassium in rice straw (1.62 %) and water hyacinth (2.84 %) suggests risks of slagging in thermal conversion systems. These findings underscore the value of region-specific biomass data in informing energy policy and advancing renewable energy initiatives. By identifying high-potential feedstocks and conversion needs, this study supports targeted biomass applications, contributing to cleaner energy solutions and reduced dependency on fossil fuels. Advanced conversion technologies and ash management strategies are recommended to optimize the energy efficiency of these residues, particularly in regions with abundant agricultural waste. The insights provided serve as a foundation for sustainable biomass utilization in Bangladesh, with potential replicability in other agrarian countries facing similar energy and environmental challenges.

The Novel Study On Arsenic Contamination, Health Risk, and Approaches to Its Mitigation From Water Resource of a Developing Country: A potential review.

Author: Mir Mohammad Ali,

Year: 2024

Abstract:

The pollution and contamination by arsenic (As) in the water resources is a worldwide concern due to its adverse toxic effects on the environment and public health. The current study aimed to investigate arsenic levels in the groundwater system with the possible health risk, and sustainable mitigation strategies. The data on arsenic in the water system were collected from the Web of Science and Scopus databases. The published data showed that arsenic concentration (0.0002–19.0

mg/kg) in the water system in Bangladesh was higher than the permissible standards and data from other countries, indicating severe contamination of water resources by arsenic. The study concluded that the water resource in Bangladesh is not safe for human consumption. The review has also identified the research gaps in various strategies for controlling the arsenic problem and their impact on the ecosystems. The present study suggested future research directions on sustainable intervention, impacts assessment of arsenic on humans, and formulating existence policy that helps to combat arsenic contamination.

Do climate-smart agricultural practices impact the livelihoods of vulnerable farmers in the Southern part of Bangladesh?

Author: Mohummed Shofi Ullah Mazumder

Year: 2024

Abstract:

Efforts to reduce food insecurity must include building resilience in rural farmers to shocks. One way to achieve this is through climate-smart agriculture (CSA). This paper analyzes the impact of CSA on farmers' livelihoods. Data were collected in two phases in 2010 and 2018 from a study (CSA practitioners) and control group (CSA non-practitioners) of climate-affected farmers (240 farmers in each group) using a quasi-experimental survey design considering all possible biases. Descriptive statistics, variance inflation factor analysis, multiple regression, path analysis, FE-IV, and propensity score matching models were applied. Practicing CSA technologies improved food security and the incomes of the farmers through increased agricultural productivity. The impact of CSA technologies differed based on farmers' understanding of technologies, the time and amount of financial support, availability of extension staff, the provision of technical and other logistical support, and CSA practitioners' experience, such as knowing how to enhance plant resilience. Specific policy interventions, including financing of CSA, would benefit rural farmers. CSA provides a path towards sustainable livelihood development and food security. These findings will be useful for policymakers, planners, administrators, and development workers.

Climate-smart agriculture and food security in climate-vulnerable coastal areas of Bangladesh

Author: Monoj Kumar Majumder , Md. Sadique Rahman , Ripon Kumar Mondal , Mst. Shopna Akter.

Year: 2024

Abstract:

The issue of global climate change is increasingly worrisome, particularly for countries heavily reliant on agriculture. To reduce the negative impact of climate change on agriculture, farmers of Bangladesh started adopting different climate smart agriculture (CSA) practices. The CSA sustainably increases productivity, resilience, and food security, which can contribute to the achievement of a number of sustainable development goals (SDGs). However, the adoption of CSA is low especially in the climate-vulnerable coastal areas of Bangladesh. Therefore, this study

was conducted to identify the factors affecting the adoption of CSA and its influence on coastal household's food security. A total of 327 sample farmers from three coastal districts of Bangladesh were interviewed. The collected data were then analyzed by using the binary probit and ordered probit model. The findings indicated that highest 65 % of farmers adopted early planting of rice as one of CSA practices. The adoption of CSA practices positively affected by the household annual income, extension services and awareness regarding CSA practices. Moreover, the adopters of CSA were more food secure than non-adopters. For instance, adoption of one additional CSA practice leads to an increase in the likelihood of being food secure by 4.3 %. In terms of policy perspective, the adoption of CSA in the coastal areas can be increased through creation of employment opportunities, increasing access to extension services, and broadcasting of CSA-related programs on mass media.

Knowledge, attitude, and practice of food safety: a survey on processed potato products manufacturer in Bangladesh

Author: Dr. Tuhin Suvra Roy

Year: 2024

Abstract:

The main focus of the study was to evaluate the level of knowledge, practices, and policies of potato-based product, manufacturers in Bangladesh regarding food safety and quality issues, particularly acrylamide, a probable human carcinogenic compound formed in potato-based products during heat processing. Among twenty-one processed potato product manufacturers, only fifteen were found interested in participating in this study. A pre-developed questionnaire was used to collect data from the respondents and descriptive statistical measures were used for data analysis. The results revealed that most of the manufacturers are not aware of the Maillard reaction (60%) and acrylamide formation (53.3%) during potato processing. Although the manufacturers are familiar with reducing sugar (80%) and amino acids (73.3%), they were unaware that these are acrylamide precursors that must be quantified before potato processing. Most of the manufacturers (83.3%) prefer 150-200°C temperature for frying and the remaining (16.7%) use above 200°C. However, no manufacturers performed acrylamide analysis as they didn't have any standard policy. Only 16.7% of manufacturers adopted the mitigation strategy for acrylamide reduction. Additionally, almost 58.3% of manufacturers are not aware of the international trade barrier on the export of potato products based on the acrylamide level. There has been a crucial demand for further research on revising and updating the food safety policies and practices during the processing of potatoes to safeguard the health of the consumers by relevant regulatory bodies in Bangladesh for acrylamide to get on with the latest industrial and technological innovations along with skill developing training to remove the trade barrier on export.

Moving Beyond CLT: Revisiting the Scopes, Ideologies and Setbacks of Post-Method in Secondary EFL Teaching

Author: Meherun Nessa

Year: 2024

Abstract:

The present study investigated the feasibility, ideologies and setbacks regarding the efficacy of the transition of English language teaching from communicative language teaching (CLT) approach to post-method pedagogy in secondary level English as a foreign language (EFL) classrooms of Bangladesh depicting the teachers' insights on the scopes and uses of post-method in EFL teaching. The study followed a qualitative approach, conducting in-depth interviews with fifteen secondary EFL teachers to explore their perceptions and experiences of both CLT and post-method. The findings revealed that while CLT is tentatively sound, its practical implementation has been hindered by over-reliance on traditional grammar-translation (GT) methods, inadequate training, and systemic support issues. Contrariwise, post method offers a flexible and context-sensitive pedagogical approach that allows for adapting teaching methods to meet the students' particular needs. However, challenges such as the lack of formal guidelines, resource constraints, and traditional confrontation to alteration pose substantial barriers to its effective implementation. Integrating AI tools can offer promising opportunities to support post-method pedagogies by creating adaptive learning environments and enhancing student engagement. The study recommended intensive professional development workshops, institutional supports, and teachers' digital literacy with the skills needed for this pedagogical shift. By addressing these issues, educational stakeholders can foster a more effective and contextual EFL teaching at the secondary level of Bangladesh.

Energy potential of biomass from rice husks in bangladesh: An experimental study for thermochemical and physical characterization

Author: Debu Kumar Bhattacharjya

Year: 2024

Abstract:

Rice husks, abundant leftovers from rice production, offer immense potential as a renewable energy source through thermochemical conversion processes. However, their efficient utilization hinges on understanding their unique thermal properties and reaction kinetics. This study addresses a critical gap by meticulously analyzing four prominent Bangladeshi rice husk varieties: BR22, BRRI Dhan46, BRRI Dhan47, and BRRI Dhan49. Through rigorous experimentation, we unveil a comprehensive dataset encompassing their physical, chemical, and thermochemical characteristics. Our investigation reveals favorable alignment of moisture content with various conversion technologies, alongside suitable bulk density for efficient handling. Proximate analysis sheds light on crucial components like ash, volatile matter, and fixed carbon, vital for optimizing combustion efficiency. Furthermore, elemental analysis not only highlights the presence of ash-forming elements but also assures low nitrogen and sulfur content, suggesting potential environmental benefits compared to conventional fuels. Delving into thermochemical characteristics, we measured higher heating values ranging from 13.31 MJ/kg to 14.42 MJ/kg, confirming the viability of these rice husk varieties for energy conversion. Thermogravimetric and

kinetic analyses further illuminate their unique decomposition behavior, with BRRI Dhan47 exhibiting the highest decomposition rate, emphasizing the distinct reactivity profiles of different varieties. This extensive dataset empowers researchers and industry professionals with valuable insights for informed decision-making. By understanding the unique attributes of each rice husk variety and their behavior during conversion, we can optimize operational parameters for various thermochemical methods. Ultimately, this study bridges a critical research gap and paves the way for more efficient and sustainable utilization of rice husks as a renewable energy source, contributing to a greener future.

Silver nanoparticles in plant health: Physiological response to phytotoxicity and oxidative stress

Author: Mirza Hasanuzzaman

Year: 2024

Abstract:

Silver nanoparticles (AgNPs) have gained significant attention in various fields due to their unique properties, but their release into the environment has raised concerns about their environmental and biological impacts. Silver nanoparticles can enter plants following their exposure to roots or via stomata following foliar exposure. Upon penetrating the plant cells, AgNPs interact with cellular components and alter physiological and biochemical processes. One of the key concerns associated with plant exposure to AgNPs is the potential of these materials to induce oxidative stress. Silver nanoparticles can also suppress plant growth and development by disrupting essential plant physiological processes, such as photosynthesis, nutrient uptake, water transport, and hormonal regulation. In crop plants, these disruptions may, in turn, affect the productivity and quality of the harvested components and therefore represent a potential threat to agricultural productivity and ecosystem stability. Understanding the phytotoxic effects of AgNPs is crucial for assessing their environmental implications and guiding the development of safe nanomaterials. By delving into the phytotoxic effects of AgNPs, this review contributes to the existing knowledge regarding their environmental risks and promotes the advancement of sustainable nanotechnological practices.

Techno-economics and environmental sustainability of agricultural biomass-based energy potential.

Author: Nazmin Sultana

Year: 2024

Abstract:

This paper explores the viability of utilizing agricultural biomass-based energy potential, employing mathematical, engineering, and economic modeling techniques. Moreover, the potential of a biogas-based co-digestion (CD) system, integrating its techno-economic performance and environmental sustainability in terms of electricity generation, has also been studied. In this investigation, the categorization of 25 different plant species into two groups:

arable field crops (AFCs) and horticultural plants (HPs), was performed. Data was collected during the 2021–2022 cropping season in Bangladesh from various sources, including literature reviews, governmental, and non-governmental organizations. The findings revealed that the available agricultural biomass residues, totaling 1,02,585.75 KT, have the capacity to generate 1,33,815 million m³/year of biogas. This energy potential corresponds to 291,125.85 TJ/year or 9231.60 MW of electricity, which can fulfill 88% of the national total energy demand. In terms of levelized cost, the proposed approach is more competitive and shows a greater promise compared to other technologies. Furthermore, it demonstrates environmental friendliness by reducing CO₂ emissions by 156 tons at a cost of \$7/ton while earning \$1092 annually from the potential carbon-credit market. This approach presents a potential solution to address Bangladesh's energy crisis. The payback period of the system ranged from 2.93 to 3.75 years, with and without the inclusion of a slurry, respectively. The recommended methods hold significant promise for meeting national energy demands. A case study was provided as a proof-of-concept (PoC) to validate the approach. This study is the first of its kind, providing valuable insights into the renewable energy potential in Bangladesh. The results will assist policymakers in formulating sustainable energy policies.

Site suitability mapping for different seaweed cultivation systems along the coastal and marine waters of Bangladesh: A Generalized Additive Modelling approach for prediction.

Author: Afshana Ferdous

Year: 2024

Abstract:

While seaweed cultivation has reached an advanced stage in many Asian countries, this industry remains nascent in Bangladesh, hindered by a lack of comprehensive site suitability mapping. To address this gap, we employed the Generalized Additive Model (GAM) approach to develop habitat suitability maps for different seaweed cultivation systems encompassing the entire coastal and marine territorial areas of Bangladesh. Our study leveraged an in-situ dataset comprising production and environmental factors from 180 cultivation plots of four species (*Gracilaria* sp., *Enteromorpha intestinalis*, *Ulva lactuca*, and *Hypnea musciformis*) across five cultivation sites, supplementing this data with other ecological variables derived from satellite observations and model simulations. The GAM analysis identified seven key explanatory variables that collectively accounted for 78 %, 76 %, and 79 % of the observed variability in seaweed data for off-bottom long-line, off-bottom net, and floating long-line cultivation systems, respectively. The model predicted that total suspended solids (TSS) predominantly influenced the habitat suitability for off-bottom net and floating long-line cultivation systems, while salinity was a crucial determinant for off-bottom long-line cultivation systems. The study further demonstrated that the predicted suitable areas (50–100 %) for floating long-line cultivation systems (1850 km²) substantially outnumbered those for off-bottom long-line (372 km²) and off-bottom net (380 km²) cultivation systems. The model showed that the southeast coast, specifically the sandy bottom areas of the Moheshkhali channel and its surroundings, exhibited high suitability (>75 % probability) for off-bottom long-line and off-bottom net cultivation systems. In contrast, the floating long-line cultivation system appeared most suitable for seaweed farming along almost the entire coastline of Bangladesh, excluding the Meghna and adjacent estuaries in the central region. Notably, the

most suitable areas were specifically concentrated in the coastal areas of Moheshkhali Island, Cox's Bazar, Teknaf, and Saint Martin's Island in the southeast coastal zone, extending potentially to far offshore waters. The predictions of our model aligned well with in-situ observations, as evidenced by an area under the curve (AUC) of 0.83 and an R² value of 0.85. The insights gleaned from this research offer invaluable guidance to seaweed farmers, entrepreneurs, and policymakers, thereby contributing to the sustainable development of the emerging seaweed-based blue economy in Bangladesh.

River pattern influences the composition of small indigenous species (SIS) of fish in deltaic Rajbari district, Bangladesh.

Author: Kazi Ahsan Habib

Year: 2024

Abstract:

Bangladesh is endowed with diverse rivers providing huge ecosystem services, but the diversity status and the abundance of the small indigenous species (SIS) are not identical in all rivers due to the natural water flow regime and anthropogenic challenges. Therefore, the present study endeavors to elucidate the composition and conservation status of SIS fish from four rivers namely, the Padma, the Gorai, the Chandana and the Horai rivers of Rajbari District, Bangladesh. Data were meticulously collected through fish sampling in each season, field observations, focus group discussions, and individual interviews by using a semi-structured questionnaire spanning from May 2021 and April 2022. The number of SIS in the Padma, the Gorai, the Chandana and the Horai rivers of Rajbari were 60, 36, 33 and 26, respectively, whereas a predominant concentration of fishes was notably observed in the benthopelagic zone of these rivers. Among the 60 riverine SIS, 23 fish were common in the four rivers. Additionally, Cyprinidae (>30%) was observed to be the most abundant SIS in the studied rivers. The fishermen in the research area used seven major fishing equipment of which cast nets are the most common for catching fish species. The abundance of SIS during the rainy season was the highest for all the studied rivers than the other seasons and 12 SIS were available throughout the year. Notably, the least concerned SIS outnumbered the other categories whereas, more than 10% was under the vulnerable category in the four rivers. The leading threats to the fish diversity were pollution followed by illegal and overfishing, siltation, reduced depth, degeneration of rivers and others. Consequently, to safeguard the existing SIS, reducing human pressure, implementing fishing regulations strictly, establishing and administering fish sanctuaries, and raising public awareness can be helpful for the sustainability of aquatic resources in deltaic areas.

Statements on Open Science for Sustainable Development Goals.

Author: Mizanur Rahman Sarker

Year: 2024

Abstract:

This article attempts to practicalise Open Science (OS) to promote ideas and enhance efforts for the Sustainable Development Goals (SDGs). It delineates General Statements (n = 20) as guiding beacons and the Specific Statements (n = 70) that act as precision tools in OS orientated policymaking, research, innovations, and public engagement, and access to scientific knowledge. The authors hope to draw kindled and educated attention to OS besides underscoring the need for unbiased, inclusive, and diligent execution of the SDGs. By adopting these Statements accordingly and in appropriate stages within national strategies and ensuring transparent reporting of the progress, the authors envision a transformed world by 2030. With this appeal, scientific endeavours could be more effectively directed and optimised with OS, significantly advancing progress toward the SDGs.

Managing Natural Resources Through Innovation: The Importance of Sustainable IoT-Based Models—The Smart Solar Dryer.

Author: Md. Masud Rana

Year: 2024

Abstract:

Many developing countries are use traditional methods of fish drying, which might lead to inferior quality products because of unsanitary conditions and environmental concerns. By using IoT and solar energy to create a regulated drying environment, the smart solar dryer solves these problems. By controlling temperature and airflow, an Internet of Things controller maximizes drying process effectiveness and quality. The smart solar dryer is a flexible solution for a range of situations and needs since it can be adjusted to operate at varying scales, from bigger commercial facilities to small-scale artisanal fish drying. According to preliminary findings, fish can successfully have their moisture content reduced by the smart solar dryer, producing dried goods of superior quality. 500 kg of fish must be dried in 30 h in order to lower the moisture content from 88%. Products are of far higher quality in terms of color, flavor, and texture than the traditional ones. According to preliminary results, this recently created environmentally friendly technique may greatly enhance the quality of dried fish while upholding the principles of sustainable energy. The regulated drying environment lowers the possibility of contamination and enhances overall product safety by assisting in the creation of hygienic conditions that meet food safety regulations. With potential uses in the global food processing industries, the smart solar dryer is a viable option for the sustainable manufacturing of dried fish.

Clean energy transition in rural Bangladesh: Challenges in adoption and impact

Author: Md. Sadique Rahman, Md. Hayder Khan Sujan

Year: 2024

Abstract:

At the household level, the solar photovoltaic (PV) system is an off-grid clean energy source with significant poverty reduction potential, thereby contributing to the attainment of several sustainable development goals. Nevertheless, there has been limited adoption of renewable or clean energy technologies in Bangladesh. At present, renewable energy sources account for only 3% of the country's electricity generation. This study thus investigates the drivers of solar PV adoption and the impact of this on household income and poverty in Bangladesh. We present an econometric analysis of data from the International Food Policy Research Institute's Bangladesh Integrated Household Survey, 2020. Our findings indicate that only 5.51% of the sample households adopted solar PV, with the likelihood of adoption 3.8% higher in households with a mobile phone, 1.7% higher in households with internet access, and 2.8% higher among homeowners. However, the government's programs to expand the electricity grid made the delivery of solar PV by partner organizations less competitive. Our analysis reveals that the adoption of solar PV has a positive effect on household income of between 9.31% and 13.50%. The poverty gap is likely to decrease by around 20% to 26% due to adoption. These findings are pertinent to ongoing policy development efforts targeted at increasing the adoption of renewable energy to meet the sustainable development goals. Solar PV information could be potentially disseminated through mass media and modern communication technologies that require internet access. Furthermore, increasing the installation of solar PV systems in rented houses may promote the adoption of solar PV. It is imperative to implement policies that provide incentives for the installation and utilization of solar PV.

Catastrophic risk perceptions and attitudes in aquaculture: Evidence from flood prone areas of Bangladesh.

Author: Airin Rahman

Year: 2024

Abstract:

Aquaculture is still an emerging industry that is highly dependent on the environment and more unstable than other conventional agricultural operations. Diverse environmental and production hazards must be managed by aquaculture farmers for sustainability. Farmers' decisions on farm operations and risk management are significantly influenced by their risk attitudes and perceptions of risk. However, few empirical studies on risk management have been done, but literature on aquaculture is scarce. In light of this knowledge vacuum, the current study investigated how farmers perceive catastrophic risk and their attitudes toward various sources. The information was gathered using a stratified random sample method, with 300 aquaculture farmers interviewed from two major flood-prone regions in Bangladesh. A cubic utility function and the Equally Likely Certainty Equivalent (ELCE) approach were used to quantify farmers' risk aversion. The risk matrix technique was used to assess farmers' perceptions of risk. The effects of socioeconomic factors on farmers' risk attitudes were examined using a Logit model. Floods, strong rains, and pest and diseases all posed potential productivity hazards and most farmers were risk averse in nature. Age, educational position, income, and land proprietorship were the most important predictors of risk attitude, while social and agricultural characteristics had little influence on farmers' risk perceptions. The study's findings will eventually allow policymakers to forecast the suitable risk management measures for the aquaculture farmers in Bangladesh.

The path of microplastics through the rare biodiversity estuary region of the northern Bay of Bengal.

Author: Mir Mohammad Ali

Year: 2024

Abstract:

Due to its harmful effects on ecosystems and human health, microplastic (MP) pollution has become a significant environmental problem on a global scale. Although MPs' pollution path and toxic effects on marine habitats have been examined worldwide, the studies are limited to the rare biodiversity estuary region of Hatiya Island from the northern Bay of Bengal. This study aimed to investigate the MP pollution path and its influencing factors in estuarine sediments and water in rare biodiversity Hatiya Island in the northern Bay of Bengal. Sixty water and sediment samples were collected from 10 sampling sites on the Island and analyzed for MPs. The abundance of MPs in sediment ranged from 67 to 143 pieces/kg, while the abundance in water ranged from 24.34 to 59 pieces/m³. The average concentrations of MPs in sediment and water were 110.90 ± 20.62 pieces/kg and 38.77 ± 10.09 pieces/m³, respectively. Most identified MPs from sediment samples were transparent (51%), while about 54.1% of the identified MPs from water samples were colored. The fragment was the most common form of MP in both compartments, with a value of 64.6% in sediment samples and 60.6% in water samples. In sediment and water samples, almost 74% and 80% of MP were <0.5 mm, respectively. Polypropylene (PP) was the most abundant polymer type, accounting for 51% of all identified polymers. The contamination factor, pollution load index, polymer risk score, and pollution risk score values indicated that the study area was moderately polluted with MPs. The spatial distribution patterns and hotspots of MPs echoed profound human pathways. Based on the results, sustainable management strategies and intervention measures were proposed to reduce the pollution level in the ecologically diverse area. This study provides important insights into evaluating estuary ecosystem susceptibility and mitigation policies against persistent MP issues.

Farmers perspectives on options for and barriers to implementing climate resilient agriculture and implications for climate adaptation policy.

Author: Shilpi Kundu

Year: 2024

Abstract:

The impacts of climate change in low lying coastal areas, such as Bangladesh, are adversely affecting food and livelihood security, requiring adaptation to build resilience. However, effective implementation is limited by a lack of local-level knowledge regarding the barriers that prevent adoption and up-scaling of climate resilient

agriculture (CRA). Case studies in coastal Bangladesh provide novel insights regarding barriers to planned and autonomous adaptation from the perspective of farmers facing multiple climate change impacts across seven key dimensions of CRA (agrometeorology services, water management practices, nutrient management activities, technologies and knowledge management activities, infrastructure development, socio-economic resilience, and institutions and good governance). Farmers generally perceive that adaptation actions increase resilience in crop production systems and their surrounding social systems, but also identify the important barriers that inhibit or constrain planned and autonomous adaptation opportunities. Planned adaptation actions are perceived to be limited by institutional arrangements and lack of implementation capacity. Autonomous adaptation was found to be dependent on income level, farm-holding size, access to input resources and services and peer/social influences. Planned and autonomous adaptation actions were both affected by specific social and geographic contexts and cultural factors. Recommendations are suggested to address key constraints and thereby promote CRA in coastal agricultural landscapes in Bangladesh and in other developing countries confronting similar challenges.