Program Profile		
Program	Program name	Climate-Resilient Construction Initiative in Bangladesh
	Category	A6

Summary of Program	
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Abstract of Program	Bangladesh is one of the most climate-vulnerable countries in the world, facing recurring floods, cyclones, river erosion, and rising sea levels. These challenges pose significant threats to the construction sector, leading to structural damage, increased costs, and reduced community safety. Traditional construction methods, often relying on low-lying brick structures and non-durable materials, are ill-suited to withstand these extreme climate events. The Climate-Resilient Construction Initiative in Bangladesh aims to address these vulnerabilities by developing sustainable, adaptive, and cost-effective construction practices suitable for both urban and rural environments. The initiative integrates engineering innovation, environmental considerations, and community engagement to promote resilient infrastructure. Key strategies include the use of elevated plinths, bamboo-reinforced concrete, and compressed stabilized earth blocks (CSEBs) to improve structural durability; implementation of water-resistant and flood-adaptive design techniques; and integration of renewable and locally sourced materials to reduce environmental impact. The program also emphasizes capacity building by training local masons, engineers, and students through workshops and mobile learning modules, ensuring knowledge transfer and practical implementation. Pilot projects have been established in flood-prone districts such as Kurigram and Satkhira to test the effectiveness of these methods, gather community feedback, and refine construction techniques. Geographic Information System (GIS) mapping and Building Information Modeling (BIM) are employed to identify high-risk zones, simulate structural performance, and guide evidence-based planning. By promoting climate-resilient construction, the initiative seeks to safeguard infrastructure, reduce long-term economic losses, and enhance community well-being. It aligns with global sustainability goals, particularly SDG 9 (Industry, Innovation, and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action). Ultimately, this program offers a replicable framework for building resilient infrastructure in climate-sensitive regions, bridging the gap between engineering innovation, policy support, and societal needs.
Details of Program	
Planning	

Objectives	Long-term Goals	The Climate-Resilient Construction Initiative aims to transform Bangladesh's construction sector into a model of sustainable and disaster-resilient infrastructure by 2035. The program seeks to institutionalize climate-adaptive building practices nationwide, promoting the use of eco-friendly materials, elevated and flood-resistant structures, and energy-efficient designs. It also aims to influence national policies and building codes to integrate resilience and sustainability principles. By fostering collaboration among academia, industry, and government, the initiative strives to reduce structural vulnerability, minimize economic losses from climate disasters, and enhance the safety and well-being of communities across urban and rural Bangladesh.
	Short-term Targets	Within the next year, the initiative aims to pilot climate-resilient housing in flood-prone districts, conduct training workshops for local masons and engineers, and develop practical guidelines for sustainable construction. These efforts will demonstrate adaptive techniques, build local capacity, and gather community feedback for iterative improvement.
	Rationale	Bangladesh's high vulnerability to floods, cyclones, and rising sea levels makes traditional construction methods insufficient. This initiative addresses structural fragility by promoting climate-resilient designs, eco-friendly materials, and adaptive construction practices, ensuring safer, sustainable, and cost-effective infrastructure for communities across urban and rural regions.
Subject (Leader)	Initiator(s)	Hasan Ul Kabir Joy
	Champion(s)	Hasan Ul Kabir Joy
	Major team member(s)	Hasan Ul Kabir Joy
Environment	Nature/Society	Frequent floods, cyclones, and erosion threaten the safety and longevity of structures in Bangladesh.
	Industry/Market	Developers seek profit but are gradually adopting green and resilient construction due to rising awareness.
	Citizen/Government	Citizens demand safer housing, while the government encourages climate-adaptive construction policies.
Resources	Human resources	Human Resources: Faculty, engineers, students, and local masons collaborate to implement climate-resilient construction.
	Financial resources	Funded through university grants, NGO support, and partial government contributions.
	Technological resources	GIS mapping, BIM design, and eco-friendly construction materials guide planning and implementation.
Mechanism	Strategy (Weight/Sequence)	Prioritize vulnerability assessment (40%), community engagement (30%), and pilot implementation (30%)
	Organization	Led by the Civil Engineering Department in collaboration with municipalities, NGOs, and private developers.
	Culture	Promotes innovation, cross-disciplinary research, and applied learning for sustainable infrastructure.
Doing		

Launch date	July2025
Responsible organization	Dept. of Civil Engineering, WUB.
Program content and process	The Climate-Resilient Construction Initiative in Bangladesh began with comprehensive field surveys in flood-prone districts, including Kurigram and Satkhira, to identify vulnerable communities and areas at high risk of structural damage due to flooding, river erosion, and cyclones. Based on these surveys, the program designed elevated housing prototypes that integrate bamboo-reinforced concrete, compressed stabilized earth blocks (CSEBs), and water-resistant coatings to improve durability and reduce maintenance costs. Pilot construction sites were established to test these designs under real environmental conditions, allowing the team to monitor performance during seasonal rains and minor flooding events. A central component of the program is capacity building. Local masons, engineers, and university students participated in hands-on workshops, supplemented by mobile-based learning modules that provided technical guidance on climate-resilient construction methods. Community engagement was emphasized throughout the process, with residents invited to provide feedback on design, materials, and usability. This participatory approach ensured that the housing solutions were culturally acceptable, practical, and aligned with local needs. Technology played a crucial role in the program's success. Geographic Information System (GIS) mapping was used to identify high-risk zones, while Building Information Modeling (BIM) assisted in designing prototypes that accounted for topography, water flow, and flood projections. Lessons learned from initial pilot houses were iteratively applied to refine designs, improve material selection, and optimize construction techniques. The program also fostered collaboration between academia, government agencies, and NGOs, facilitating access to funding, regulatory approvals, and technical expertise. This integrated approach ensured that the initiative addressed both the structural and social dimensions of climate vulnerability. By combining engineering innovation, community participation, and sustainable materials, the program offers a scalable model for climate-resilient construction in Bangladesh, with potential replication in other similarly vulnerable regions.
Key highlights of the content/process	The program's key highlights include the introduction of climate-resilient elevated housing, capacity building through training workshops for local masons, and active community participation in design and implementation. Additionally, GIS and BIM tools were used to optimize site selection and simulate flood impacts.
Differences from traditional approaches	Traditional construction methods in Bangladesh typically involve ground-level brick or tin structures with minimal flood resistance. In contrast, this initiative implements raised plinths, water-resistant coatings, and sustainable materials, integrating engineering innovation with community-centered design principles.
Progress as of today	Currently, pilot housing for 30 families has been completed, over 120 local masons have been trained, and structural monitoring has validated prototype performance. Feedback from residents and local authorities has been positive, with interest expressed for larger-scale implementation.
Problems in implementation	Challenges encountered include initial community hesitation to adopt new designs, difficulty sourcing eco-friendly materials locally, and occasional

	delays in governmental approvals.
Approaches to solve the problems	Demonstration houses were built first to gain community trust. Partnerships with NGOs helped subsidize material costs, and close coordination with local authorities expedited approvals and inspections.
Completion date, if completed	The program is expected to be completed by June 2026, with full evaluation and reporting finalized shortly thereafter.
Seeing	
Impacts on students	Gained hands-on experience in climate-resilient construction and community engagement.
Impacts on professors	Enhanced applied research opportunities and interdisciplinary collaboration.
Impacts on university administration	Strengthened institutional reputation and partnerships with NGOs and government.
Responses from industry/market	Local builders show interest in adopting resilient construction techniques.
Responses from citizen/government	Communities appreciate safer housing; local authorities support pilot implementations.
Measurable output (revenues)	$10,000 generated from consultations and prototype services.
Measurable input (expenses)	$8,500 spent on materials, training, and project management.
Cost-benefit analysis for effectiveness	Cost-Benefit Analysis for Effectiveness: Benefit-cost ratio = 1.18, indicating economic and social efficiency.
Future Planning	
Where does the project go from here?	Integrate climate-resilient methods into national building codes and policies.
Addendum	
Exhibits, pictures, diagrams, etc.	Maps of pilot regions, diagrams of elevated houses, and photos of construction workshops.
Reports, mimeos, monographs, books, etc.	Field Report on Resilient Housing (2025), Training Manual on Climate-Resilient Construction.
Others which may help explain the program (including website links)	(Include any materials that may help validate the program; links to the program's website will be especially useful.)