



Community Enterprise Approach in Floodplain Management for Climate Action



বিলম্বিতাধিকার রাহমানিক রাহিম
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Keywords

CEA	Community Enterprise Approach
CEAFM	Community Enterprise Approach in Floodplain Management
GHG	Agroecology, Green House Gas
BAU	Business-as-usual
NDCs	Nationally Determined Contributions
AFOLU	Agriculture, Forestry and Other Land Use
FPA	Floodplain Aquaculture
CPR	Common Pool Resources



SHISUK (Shikkha Shastha Unnayan Karzakram) stands for Education, Health, and Development Program. SHISUK addresses sustainable development through community approach involving the disadvantaged and influential class together in the process of socioeconomic development.

SHISUK's model of Community Enterprise Approach (CEA) has been awarded National Gold Medal in 1999 by the Ministry of Fisheries and Livestock, Govt. of Bangladesh, and, selected as one of the SAARC Best Practices for Attainment of the SAARC Development Goals under the livelihoods category in 2007. Daudkandi flood prone areas, under the Comilla district, is one of the best practice sites, where in 1997 SHISUK pioneered Community based collective enterprise initiative on floodplain Aquaculture (FPA) popularly known as Daudkandi model. It is also cited as a development approach in the 7th and 8th Five Years Plan of the Bangladesh Government (July 2020-June 2025) of Bangladesh under 'Aquaculture Development' as one of the priority strategies. With the support of Bangladesh Government, SHISUK has undertaken adaptive trial in other flood prone areas of the country like Tidal floodplains in the coast and depressed area in the north of Bangladesh.

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INTRODUCTION

The Global Climate Risk Index 2021 by Germanwatch ranks Bangladesh 7th among the countries most impacted by climate change from 2000 to 2019. The key risks and vulnerabilities of climate change will pose disproportionate and severe impacts on Bangladesh's resources, water and food security, infrastructure, livelihoods, ecosystem, health, and biodiversity. The number of internal climate migrants may reach 19.9 million by 2050, comprising half of those in the entire South Asian region. The current rate of annual loss to gross domestic product (GDP) of approximately 1.3 percent due to climate-induced disasters may rise to 2 percent by 2050 and over 9 percent by 2100 under extreme scenarios.

The country faces significant environmental challenges, with a land area of 147,570 square kilometers; Bangladesh is predominantly composed of floodplains, in some years, flooding can affect more than 60 percent of the country. Most of these floodplains are composed of private lands, owned by different owners that are mainly used for agricultural purposes during dry seasons, while livelihood activities in the rainy season are confined to limited capture fisheries when many farming households suffer great hardship. These natural resources have lost their productivity due to overexploitation, indiscriminate use of pesticides, pollution, and climate change effect. However, most of the floodplains during the rainy seasons remain underutilized and ungoverned due to high transaction costs for coordination, limited information, and the capacity gap for investment-based resource development. In absence of livelihood opportunities, many opted for seasonal migration to urban areas and sometimes became victims of human trafficking. Due to climate change, more agricultural areas would be flooded in the near future, which would disrupt existing agriculture practices and livelihoods, and create more climate-induced migrants and victims of trafficking.

Rice is the primary food crop in Bangladesh, covering 80% of the cultivable land. In addition to the energy sector, rice cultivation is a notable source of methane (CH₄) emissions. Conversely, high-density aquaculture systems, which occupy around 0.5 million hectares, are significant contributors to greenhouse gas (GHG) emissions. In contrast, Bangladesh has 2.8 million hectares of flood plains¹, which are robust, renewable resources that contribute relatively little to fish production. Studies have reported that if only 25% of the floodplain areas can be brought under community management, then about 6.7 million people would benefit, including 2.7 million landless people.² Floodplain aquaculture can lead to lower pesticide use, higher earnings from rice yield as it increases the subsequent rice yields due to the fertilizing effect of the fish³. Adopting integrated agriculture-aquaculture systems in floodplains could enhance rice and fish production while enhancing carbon sequestration, reducing emissions, and replenishing soil carbon.

The floodplain aquaculture (FPA) management system, developed by SHISUK through the Community Enterprise Approach (CEA) is a community-driven business model designed to revitalize neglected and underutilized common pool resources (floodplains) using ecological solutions. By aligning individual interests with community goals, CEA turns community members into shareholders of these initiatives. Local households collectively invest in environmentally friendly infrastructure and businesses, leading to sustainable development. The approach has proven effective in pilot projects, improving floodplain fisheries during the monsoon and promoting ecological agriculture afterward. This approach aims to boost productivity with regenerative practices, lower carbon emissions by enhancing soil and water management, minimizing the use of harmful chemicals (fertilizers and pesticides) particularly in rice cultivation. Enterprise initiatives have successfully generated diverse employment and livelihood opportunities for under-employed communities, increased nutritional intake, improved gender relations, and promoted sustainable community development. The CEA has significant potential for broader adoption and can support Nationally Determined Contributions (NDCs) indicators.

¹ The State of World Fisheries and Aquaculture 2014

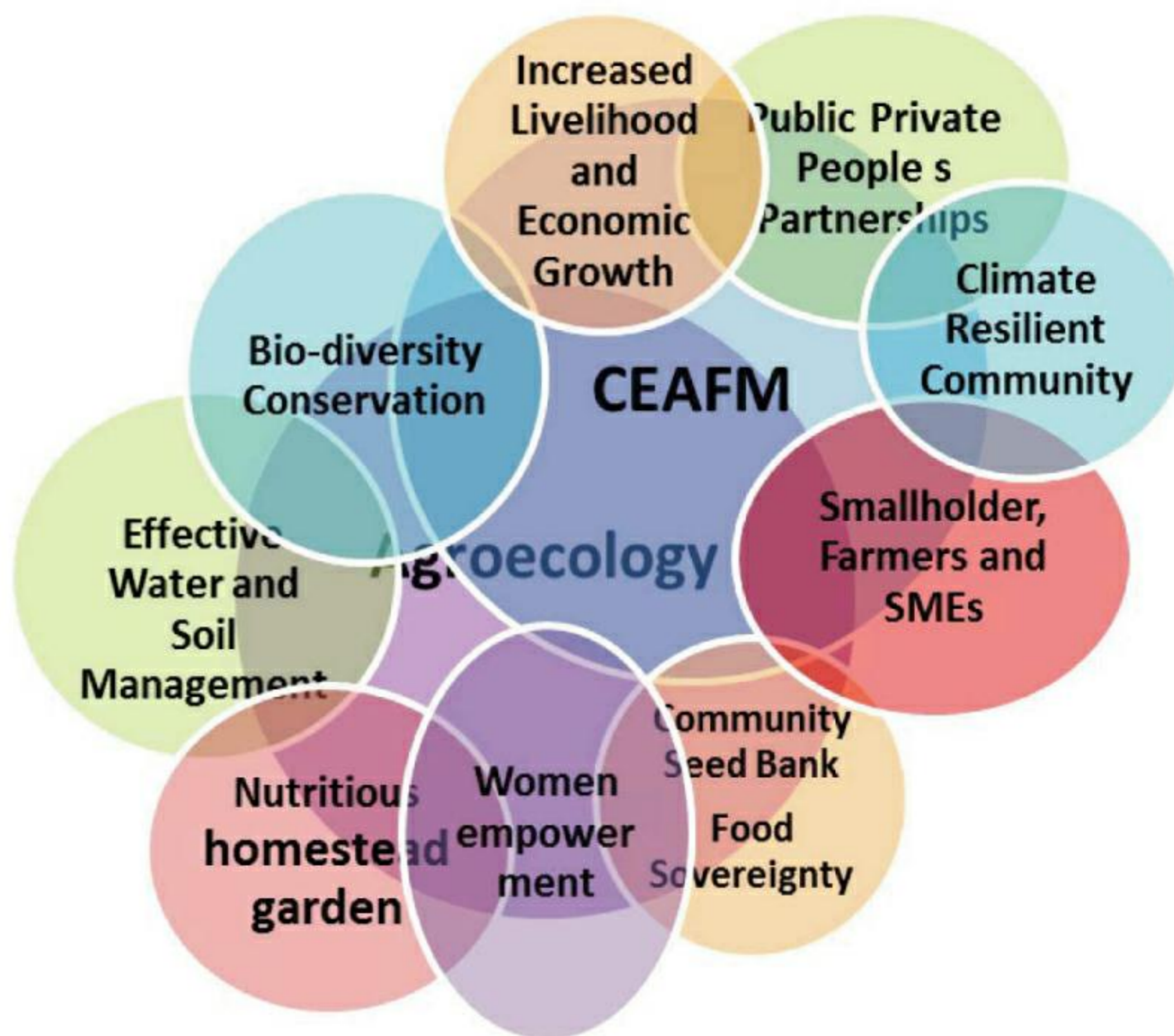
² Dey and Prein, "Community-based fish culture in seasonal floodplains," (2006)

³ M. Halwart, "Trends in rice fish farming," in FAO Aquaculture Newsletter (1998), 3-11.

Potential for Transformational Change

The Community Enterprise Approach for Floodplain Management (CEAFM), known as the Daudkandi model, was launched by SHISUK in 1997 as an independent pilot, with minimal reliance on external funding. Despite obstacles like elite capture and the environmental impact of some private enclosures, CEAFM's strength lies in its focus on community ownership, ensuring that floodplain management stays within the hands of local users for sustainable resource use.

By harnessing local resources, social networks, and active community engagement, CEAFM has delivered notable economic and social benefits. These include increased productivity, higher income and employment rates in the fishing sector, reduced agricultural costs, and a strong emphasis on agroecological sustainability. This model not only tackles poverty but also supports sustainable agriculture, lowers greenhouse gas emissions, and helps conserve the environment.



The "Eco-Friendly Management of Floodplains" initiative aligns well with both national and international goals in sustainable development, biodiversity conservation, and climate resilience. The CEAFM model's emphasis on collective governance enhances local resilience and serves as an inspiration for neighboring communities, opening the door for wider regional transformation. With ongoing political support, CEAFM could emerge as a leading model of climate resilience and sustainable development for flood-prone, low-income regions. The model also addresses critical social issues, such as forced migration and displacement, by creating local job opportunities, empowering women, and fostering social cohesion. Expanding the Daudkandi model to additional floodplains could promote nature-based solutions, advance sustainable land and water management, and encourage low-carbon development, making a valuable contribution to global climate action.



Adaptation, Mitigation and Resilience Technologies and Practices

How Community Enterprise Approach (CEA) can Facilitate Adaptation from the Perspective of NAP

Addressing agricultural production and livelihood improvement in climate-affected areas is a significant challenge. Poverty often leads to overuse of environmental resources, while environmental degradation further limits access to these resources. A community-wide integrated approach is necessary to lift households from extreme poverty and institutionalize economic gains sustainably.

Community Enterprise Approach (CEA) is founded on environment-friendly community-led collective enterprise initiative based on local potentials, offering opportunities for greater participation and ownership, thereby community make decisions for sustainable management of their community resources. Hence, the community led initiative does not take any harmful decision which could have adverse effect on their land, water, environment and their health. Following CEA in floodplain management brings positive result not only in increased productivity but play a significant role in ensuring sustainable use of the resources and conserving bio-diversity and climate change adaptation through promoting increase productivity and income, conservation and enhancing fisheries bio-diversity, effective water management and water conservation, maintaining soil fertility and pest management.

Food Security



Food and nutrition systems have become more inclusive with access to more diversity, community enterprise, augmented income, availability

- ▶ CEA has increased fish production in floodplain @4MT/ha in intervention area whereas the national average is less than 100kg/ha.
- ▶ The increased productivity of collective enterprise initiatives improves the availability of nutritional food at an affordable price.
- ▶ Priority marketing for local consumers at wholesale price supports increased food and nutrition intake for the community.
- ▶ Women and mothers can buy the fresh food of their choice at the farm gate.

Increased Productivity and Income

The CEA's success in Floodplain Aquaculture (FPA) in more than 5000 ha of floodplain at the Daudkandi piloting area has resulted in the production of over 20,000 metric tons of fish annually during the monsoon season, transforming what were previously unproductive floodplains. This indicates to the potential of the CEA for increasing productivity and income of the local communities via sustainable utilization of floodplains.





Effective Water Management/ Water Conservation

In Bangladesh, the flash flood water comes from upstream around May/June and remains up to October; most of the water runs away to the sea without any use. The CEA based aquaculture approach includes connecting neighboring villages with environmentally-friendly bunds to regulate floodwaters. This also enhances connectivity, improves social interaction, and protects crops from flash floods. This approach incorporates effective water management techniques, such as systematic water drainage before the planting season, reducing groundwater reliance and promoting the recharge of groundwater tables by retaining surface water for 2 to 3 months longer till the planting season.



Conservation and Enhancing Fisheries Bio-diversity

Conventionally, the open floodplains are dried up and poisoned to exploit the last resort of the fisheries, which destroys the breeding grounds of the wild fish. CEA aquaculture maintains at least 10% of the floodplain as sanctuaries for the wild brood of fishes and to stock small fishes for the next season, which helps to protect and improve the biodiversity in the floodplain.

Besides conserving the bio-diversity, community enterprise approach also helps to enhance the fisheries bio-diversity by introducing the threatened species through inter-exchanging uncommon species among the projects or collecting from neighbouring natural sources.



SHISUK maintains the fish bio-diversity monitoring following the IUCN country list of fish-diversity, Relative abundance data are collected through catch monitoring with GPS coordinate of the sample sites. 54 species are available in SHISUK sites

Maintaining Soil Fertility and Pest Management

Farmers of Community Enterprise Approach for Floodplain Management (CEAFM) experience reduced chemical fertilizer needs due to improved soil fertility from supplementary fish feed residue and fish droppings. Communities are encouraged to use organic fertilizers and bio-pesticides, which supports integrated agroecology in agriculture-aquaculture systems.

In open floodplains, invasive species like water hyacinth are rampant, which is a good means for pest breeding. These are also significant methane emitters. Farmers used to spend a good amount for weedicides and cleaning weeds, water-hyacinth, etc. after the monsoon. But the Community Enterprise Approach for Floodplain Management (CEAFM) aquaculture prevents the growth of weeds and helps keep floodplains clean and well-organized that results fewer pest infestations eliminate the need for pesticides; Prevent weedicide use and Zero cleaning (weeds) cost. Controlling harmful pesticide use and less use of chemical fertilizer helps to protect and improve the biodiversity in the floodplain.



Conventional Scenario

Promoting Agroecology and Agro-biodiversity

SHISUK's floodplain aquaculture initiative not only boosts fish production and community livelihoods but also promotes agroecology, reducing pesticide and chemical fertilizer use, enhancing soil fertility, and increasing crop yields. While agroecology is not widely practiced in Bangladesh due to limited research, SHISUK is developing an "Agroecology Zone" in Daudkandi, Cumilla, aimed at safe food production. Key steps include establishing Field Learning Sites with agroecology-practicing farmers, raising awareness, and building the capacity of farmers, women, youth, agricultural workers, and NGOs. SHISUK also partners with new communities to promote ecological farming and creates educational materials to support these practices, alongside policy advocacy to scale sustainable aquaculture and agroecology in flood-prone areas.

SHISUK has formed women-led community groups in 20 villages, fostering ownership and active participation in promoting agroecology and food sovereignty. Each group of 20 members advocates for reduced pesticide use, bio-diversity conservation, soil health, and seed sovereignty. Training sessions focus on the risks of chemical pesticides, and trained women now advocate bio-pesticides within their communities, improving safe pesticide practices and empowering participants.

A community-based seed banking initiative has emerged, encouraging seed preservation over reliance on purchased seeds. Led by women, these seed banks not only lower costs but also enhance crop yields and biodiversity conservation, contributing to resilient local agriculture. SHISUK sees this model growing alongside the successful Daudkandi floodplain fisheries, aiming for long-term sustainability in Bangladesh's agricultural practices.



Benefit to the Marginal Farmers/ Landless/ fishermen

- Share of Lease value for their land
- Dividend of their shareholdings
- Full beneficiaries of Employment and
- Entrepreneurial opportunity in backward and forward linkage
- Welfare support
 - Reserve share for Underprivileged
 - Reserve fund for charity (5-10% of the net profit)
- Empowerment
 - Opportunity for participation and ownership in big investment
 - Equal voting rights



Community Enterprise Approach as a Vehicle for Technology Transfer

Community Enterprise Approach (CEA) is also a means for technology transfer. Traditionally, it is a costly intervention to outreach and build capacity among the smallholder farmers; they are hesitant to accept innovation or adapt to using new technology easily. But community enterprise approach has been successful in informing farmers about the benefits of using new technology. Once the enterprise leaders are convinced, they are ready to adapt to innovation and new technology because of the following reasons:

- ▶ Improved technology can easily transfer through the collective Community Based Organization CBO/ Enterprise platform
- ▶ Local and indigenous knowledge, technology generation by farmers (peasant science) recognized and integrated into farming practices
- ▶ Enhance ability to cope with situations resulting from climate change such as floods, droughts and salinity through collective initiative.



Carrying fish safely after harvesting, sorting the fishes from the net and keep it alive in the boat



Cost effective way of transporting bulk quantity fish to the market with Ice. FAO consultant Mike Dillon observing the local technique



Sorting fish in hygienic way for auction at the farm gate. FAO consultant Elizabeth in her project monitoring mission.



Local technic of selling live fish using water tank on the pick-up van with Oxygen cylinder. Innovation possible for solar aero rotator.

Mitigation Potential: How CEA can contribute to Carbon Emission Reduction

Bangladesh is promoting afforestation and reforestation initiatives to enhance carbon sequestration and mitigate deforestation rates. Projects such as the Social Forestry Program and the Mangrove Reforestation Project aim to restore degraded ecosystems and increase forest cover. Bangladesh is also implementing climate-smart agriculture initiatives to improve productivity and reduce emissions. Climate-smart agricultural practices, including conservation agriculture, agroforestry, and crop diversification, help mitigate emissions from the agriculture sector while enhancing resilience to climate change impacts.

Carbon di Oxide and Methane Emission Reduction in Rice Fields

SHISUK's approach of 'Eco-Friendly Management of Floodplains' falls under the Agriculture, Forestry, and Other Land Use (AFOLU) sector of the Nationally Determined Contributions (NDCs). In the AFOLU sector, Business As Usual (BAU) is prepared following rice cropping area and livestock population projection for 2030 from relevant Ministries and agencies. AFOLU (Agriculture & Livestock) was responsible for 27.13% of GHG emissions in the 2012 base year. In Bangladesh, 11378kg of CO₂ is emitted per ha in rice fields. SHISUK's approach, if replicated in the other floodplain regions of the country, can cover a substantial rice cropping area in the country's floodplains and indirectly contribute significantly to reducing GHG emissions of 2.95% from AFOLU (Agriculture) in 2030, as per updated NDC. The significant mitigation actions for both Unconditional and Conditional Contributions are methane (CH₄) emission reduction from rice fields, up-scaling effective water management, and improvement in fertilizer management in dry season rice fields.

Effective water management, organic matter management, and reduced tillage practice are the most effective methods for CH₄ emission reduction. This method follows the Integrated Aquaculture and Agriculture (IAA) system of floodplains. Systematic step-by-step water drainage from the fishery enables farmers to implant seedlings without plowing in moist soil. It saves the use of underground water, rather than recharging more groundwater tables holding the surface water 2 to 3 months more until the plantation season. In FPA, farmers need less chemical fertilizer due to the enhancement of soil fertility by the residue of fish feed and fish drops. Conversely, no pesticide is needed because of less/no pest infestation. Moreover, the communities are encouraged to use organic fertilizers and bio-pesticides. This integrated approach thus complements each other and makes low-cost heavy carbon mitigation possible.

How CEA can create more Resilient Communities

Frequent flooding, soil erosion, and the declining fertility of arable land weaken Bangladesh's agriculture-based economy, where the majority of people rely on farming. The Community Enterprise Approach fosters unity and shared governance, building a resilient community in areas vulnerable to disasters. In regions like Bangladesh, where poor and marginal farmers and fishing families often bear the brunt of natural calamities, their individual financial and physical limitations make them especially vulnerable. Without proper safeguards or risk-sharing mechanisms, these communities are left with little protection for their livelihoods. The absence of insurance coverage further exacerbates this vulnerability, leaving individual producers or entrepreneurs unable to recover from the financial burdens of disasters on their own.

As a result, many rural inhabitants, especially farmers, are forced to migrate in search of better opportunities, either within or outside the country. This displacement, driven by unemployment, loss of property, and poverty, has contributed to the rise of climate refugees, with traffickers preying on these vulnerable population. However, Community Enterprise Approach (CEA) offers a solution by sharing risk in times of disaster-whether from accidents, market downturns, or the impacts of climate change. Through collective efforts, communities can recover more effectively and return to stability.

A case study of Community Resilience through Community Enterprise Approach

The August 2024 floods in Comilla and Feni, triggered by an abrupt cloudburst on August 19, exemplify the escalating impact of climate change on extreme weather events. The downpour, which began early that morning, affected parts of Bangladesh and eastern India, leading to severe flooding as excessive rainfall caused rivers to overflow. Water from India's Tripura region surged downstream, submerging vast areas and causing widespread destruction. The cloudburst spanned 50 to 70 kilometers, from Tripura to Comilla and Feni, with Feni receiving a staggering 435 mm of rain between August 19 and 22, Comilla 557 mm, and Noakhali 605 mm.

The Muhuri and Gumti rivers near Comilla and Feni are just 100 kilometers from Tripura. Their narrow widths (200 to 300 meters) allowed the floodwaters to inundate large areas rapidly, exacerbating the devastation. Similar flash floods have recently affected other parts of Bangladesh, including Sylhet, Sunamganj, and Bandarban.

The floods severely affected the region's economy, particularly the fisheries sector, a vital contributor to Comilla and Laksham. Comilla ranks third in Bangladesh for fish production, producing over twice its demand from its rivers, ponds, and floodplains. However, the floods have crippled fish farming in the area, with initial estimates from the district fisheries office indicating losses of around Tk 400 crore. Fish farmers believe the damage could be even greater.

Laksham faced the worst damage, where more than 4,000 fish farms, ponds, and 16 hatcheries were flooded across one municipality and seven unions. Covering 1,400 hectares, the flood caused an estimated Tk 110 crore in losses, leaving individual fish farmers in financial ruin. The

community initially tried to contain their fish using temporary fencing, but as floodwaters rose, the nets were submerged, the roads and surrounding areas were inundated, resulting in significant fish stock loss.

Despite this unprecedented disaster, the leadership of each fish farming enterprise, guided by SHISUK and the Bangladesh Academy for Rural Development (BARD), responded swiftly. Project leaders strategically placed fish feed in the center of each submerged aquaculture project to keep the fish confined within designated zones, minimizing further losses. This approach, first adopted by the Isapura project, proved effective, inspiring other enterprises to follow suit. While mobilizing resources, including fencing materials and fish feed, posed a significant challenge due to labor and fund shortages, the community-based model allowed for resource sharing, proving the strength of unity in times of crisis.

The collective effort brought remarkable results. It not only preserved part of the fish stocks but also reinvigorated the community's spirit and commitment to safeguarding their assets. Each member took on additional responsibilities, including protecting the remaining fish from theft. This experience strengthened the community's bonds and showcased the power of collaboration and resilience.

With support from SHISUK and BARD, through a project promoting agroecology and a community enterprise approach funded by GGF and AEF, the community managed to turn a near-disastrous situation into a shared victory. While individual farmers struggled with resource shortages and labor challenges, the collective determination of the community helped them overcome the disaster, reinforcing their unity and resilience. This

How CEA provides Diversified Livelihoods and Empowers Communities

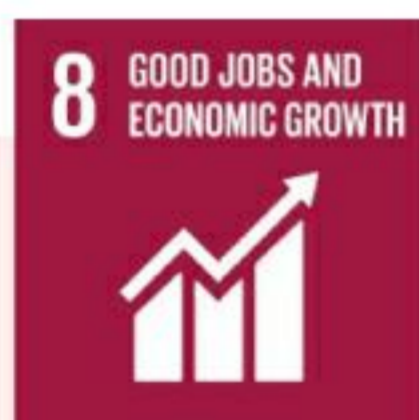
Community-based enterprises also provide substantial local employment, allowing members to remain within their communities while contributing to household activities, particularly during off-seasons. These enterprises create new opportunities for small-scale businesses, transforming household ponds into nurseries or hatcheries for fingerlings that can be sold to larger projects. As economic activities around these projects increase, growth centers are established, stimulating further local development.

Small farmers and entrepreneurs can pool their resources, knowledge, and skills to better manage climate risks and improve productivity. They can adopt strategies such as:

- ▶ Implementing climate-resilient farming practices to withstand environmental stresses.
- ▶ Investing in climate-resilient infrastructure, which strengthens their defenses against future challenges.
- ▶ Diversifying income streams to reduce dependence on a single crop or product, making their livelihoods more sustainable.

The Community Enterprise Approach (CEA) not only generates income and jobs but also empowers community members by involving them in decision-making and project implementation. This participation transforms them into entrepreneurs, strengthening their resilience. Additionally, CEA helps smallholders and farmers produce value-added products while managing value-chain factors such as production, quality control, transportation, preservation, and shelf life. With access to better market information and networks, communities can shift their products to the most appropriate markets, increasing profitability and ensuring long-term sustainability.

CEA based floodplain management have generated following jobs and livelihoods opportunities in backward and forward linkage in the intervention area; priority is given to the community members-



CEA-based aquaculture generates 23 category Jobs and Livelihoods in backward and forward linkage in the intervention area (@3.9 HH/ha).

Backward linkages (Input services)

1. Using small household ponds for Fingerling nursery
2. Fish Hatchery operators
3. Fingerling traders
4. Fish feed sellers
5. Lime and Fertilizer traders
6. Transport worker (Carrying inward): Rickshaw/Van/trolley
7. Transport owner (Carrying inward): Rickshaw/Van/ trolley
8. Cow dung/poultry litter based compost supplier
9. Fingerlings rearing workers
10. Project staffs (admin, security)
11. Local Money lenders

Forward linkages (Output services)

1. Ice plant operators
2. Ice suppliers/middlemen
3. Local Entrepreneur (whole sell buyers)
4. Fish Aratders/wholesalers
5. Retail buyers for local market
6. Transport worker (Carrying Outward): Rickshaw/Van/truck/trolley
7. Transport owner (Carrying Outward): Rickshaw/Van/truck/trolley
8. Fish Drying
9. Food venders
10. Fisherman Harvesting,
11. Project staff marketing
12. Local Money lenders

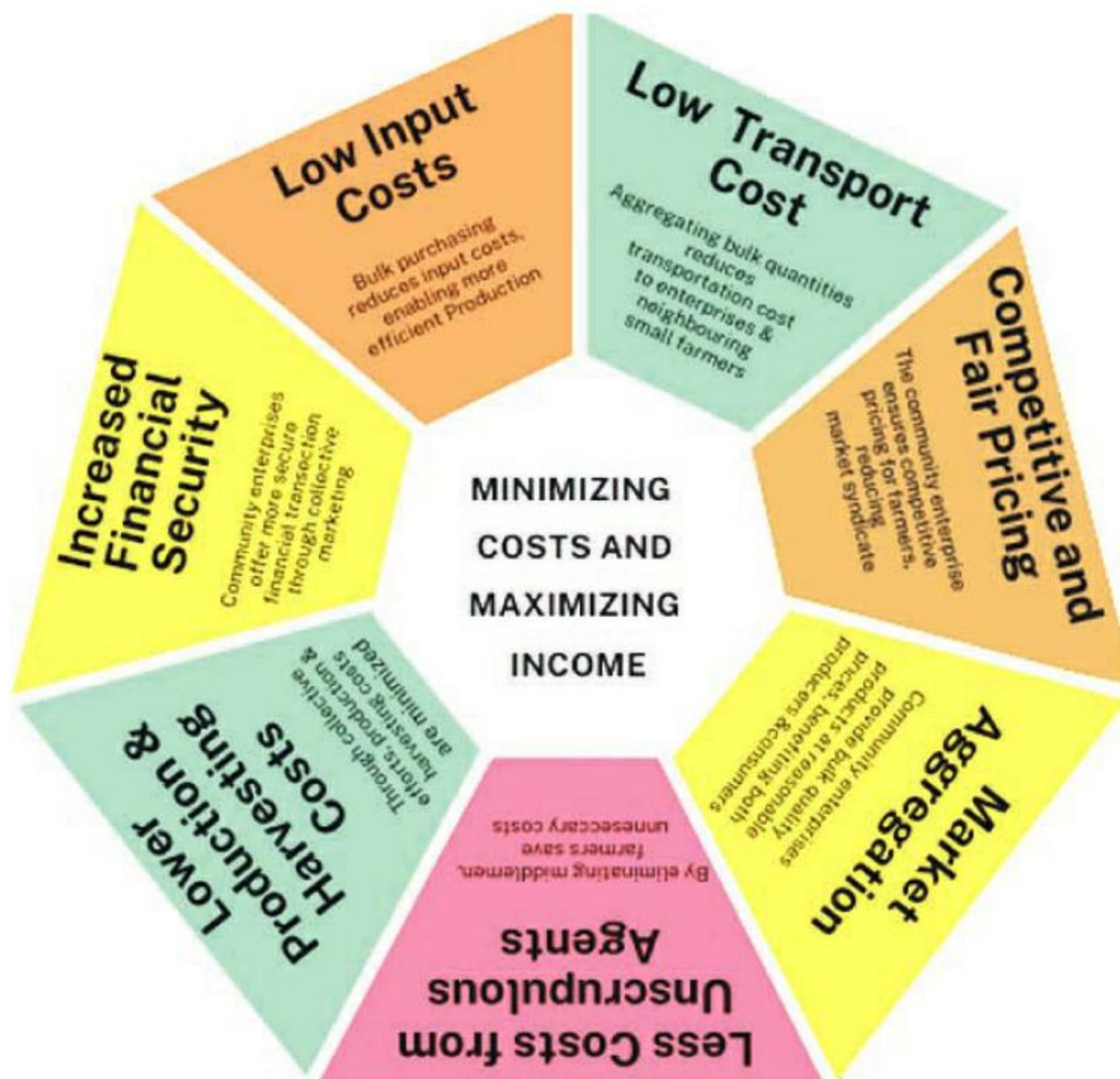
Reducing Exposure to Economic Risks

Minimizing Production Costs and Maximizing Income

Community enterprises work collectively to manage land, water, and common resources, helping members improve production, productivity, and risk management. This model allows participants to pool resources, share risks, and reduce the likelihood of loss. By setting clear goals, mobilizing resources, adopting new technologies, and acquiring the necessary skills and knowledge, community members transform their efforts into a thriving enterprise.

Community enterprises can reshape market governance and local politics, enhancing the community's capacity to manage large-scale collective initiatives while building entrepreneurial skills. The collective production by small farmers and the regular availability of products at scale attract more market players, including input suppliers and buyers. This creates a marketplace at the farm gate, where producers negotiate directly, and shifting market power from intermediaries to the community enterprise.

Instead of middlemen dominating the market, aggregators compete among themselves to secure the supply chain, benefiting the producers. This dynamic enables other nearby farmers to also gain fair prices for their products. Community-based collective production fosters transparency and trust between producers, consumers, and other market actors, transforming the value chain into a more reliable and equitable system.



Community Ownership and Conflict Resolution

CEA is an enterprise of the community, by the community and for the community

The Community Enterprise Approach (CEA) empowers communities to manage and protect their resources, focusing on sustainable floodplain fisheries in Bangladesh. CEA integrates all community members, including marginalized groups, to ensure equitable access and prevent resource mismanagement. Through community-based organizations (CBOs), the approach fosters social cohesion, self-esteem, and mutual respect by encouraging active participation. Profits are reinvested into social development, strengthening the community's social fabric.

The Community Enterprise Approach for Floodplain Management (CEAFM) emphasizes mobilizing local resources and social networks, promoting collective investment, and community-based decision-making. This fosters cooperation, reduces conflicts, and ensures equitable profit distribution. The approach enhances household resilience, gender equity, and environmental sustainability, while improving response to crises like climate change and biodiversity loss. By working collectively, communities can share risks, lower production costs, and adopt better marketing strategies, leading to both economic and environmental resilience.

In conclusion, CEA provides a sustainable, community-driven model that fosters stronger social bonds, resolves conflicts, and enhances long-term sustainability through collective governance and equitable resource management.

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