CLIMATE SMART AGRICULTURE AND DISASTER RESILIENCE HOUSE MODEL FOR THE DISASTER PRONE COASTAL AREAS OF BANGLADESH

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Abstract: Coastal areas of Bangladesh are most highly disaster prone areas among the world. Cyclone, flood, salinity intrusion, water logging and similar disasters are frequently affecting the areas. So people of these areas need to fight every time to survive. In past time many disaster has faced by the local people of coastal areas. And, this disasters are not only damage the houses of the people but also the agricultural product. In addition, these areas are most vulnerable to sea level rising. So considering the scenario climate smart agriculture is the main solution. And, if we want to ensure climate smart agriculture, then we need to follow its main three principles (1) increase yields, (2) reduce vulnerability to climate change, and (3) reduce greenhouse gas emissions. And, finally, cumulatively three principles will fulfill "National Food Security and Development Goal". In addition, disaster resilience house for the people which will reduce structural damage of the people during different disaster. Here, it is mentionable that land scarcity is very high in Bangladesh. So every planning should use minimum land and maximum output on it. This study will focus on the practical implication of climate smart agriculture with disaster resilience house as a realistic solution for the people of coastal area.

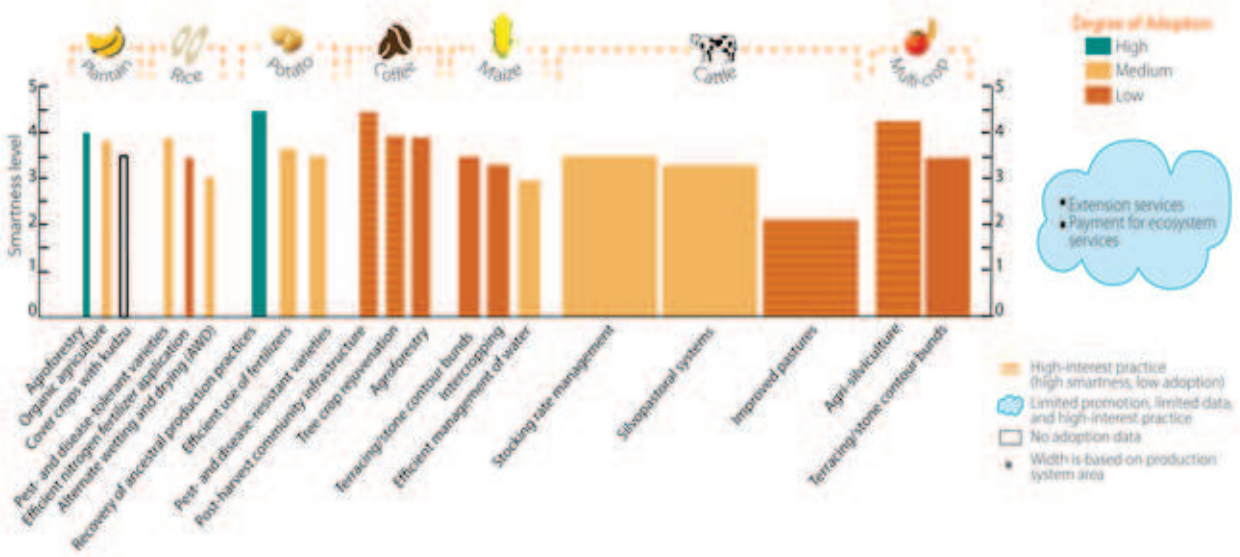
Keywords: Smart Agriculture (CSA), Resilience, Coastal, Salinity Intrusion

Introduction: Climate Smart Agriculture (CSA) is relatively a new issue to the farmers and general people. Practice of CSA has quickly adopted by different countries people of earth, and, it is visible in every continent. But, the coverage of CSA is still very limited scale. And most of the cases CSA practice has adopted by farmers according to advice of different international and national agencies people. Process and technology of Climate Smart Agriculture will change according to changing of landscape. CSA approach in Coastal areas of Bangladesh is a crucial issue for maintaining national production sufficient for country people. In addition, disaster resilience house is another criterion by which people of coastal area can adopt quickly after any disaster. The priorities of different countries and stakeholders are reflected to achieve more efficient, effective, and equitable food systems that address challenges in environmental, social, and economic dimensions across productive landscapes. While the concept is new, and still evolving, many of the practices that make up CSA already exist worldwide and are used by farmers to cope with various production risks (FAO, 2013). This study has identified one case of climate smart agriculture with disaster resilience house in the coastal area of Bangladesh. This study will elaborate about the house and different social and environmental benefit of the practice.

Necessity of CSA for Coastal Area: Coastal area of Bangladesh is facing different types of disaster frequently. And, these disasters are damaging crops and agriculture production of the affected areas. Considering the scenario, climate smart agriculture could reduce the damage properties of agriculture of affected areas. Also, during no disaster periods agriculture production will higher for more income and savings of the farmers. This savings could increase their resilience to disaster and they can easily survive with their savings. Moreover, salinity is higher in coastal belt which permit only alternate way of farming. **An example of climate smart agriculture research in Peru (Latin America):** A study carried out in Peru (Latin America) on different type of crops and animal husbandry. Here, Plantain, Rice, Potato, Coffee, Maize, Cattle and multi-crops has described is respect of climate smart agriculture. Here smartness level has ranked 1 to 5 and degree of adaptation has expressed as High, Medium and low according to findings of research. This graph displays the smartest CSA practices for each of the key production systems in Peru. Both ongoing and potentially applicable practices are displayed, and practices of high interest for further investigation or scaling out are visualized. Climate smartness is ranked from 1 (very low positive impact in category) to 5 (very high positive impact in category). *(World Bank Group, 2014)*

Climate Smart Agriculture and coastal ecology of Bangladesh: Climate smart agriculture has great impact on coastal ecology. Coastal ecology is diversified and many species live along the coastal area. And, if we need to preserve the species of the coastal are we need to follow alternate agriculture system like CSA. CSA encourage alternate pest control methods which allow habitat flying species. As well as reduce the water pollution due to pesticide, which will ensure habitat of different species which are living in water. CSA focused on alternate pest control method which reduce the production cost of the farmer and increase the profit

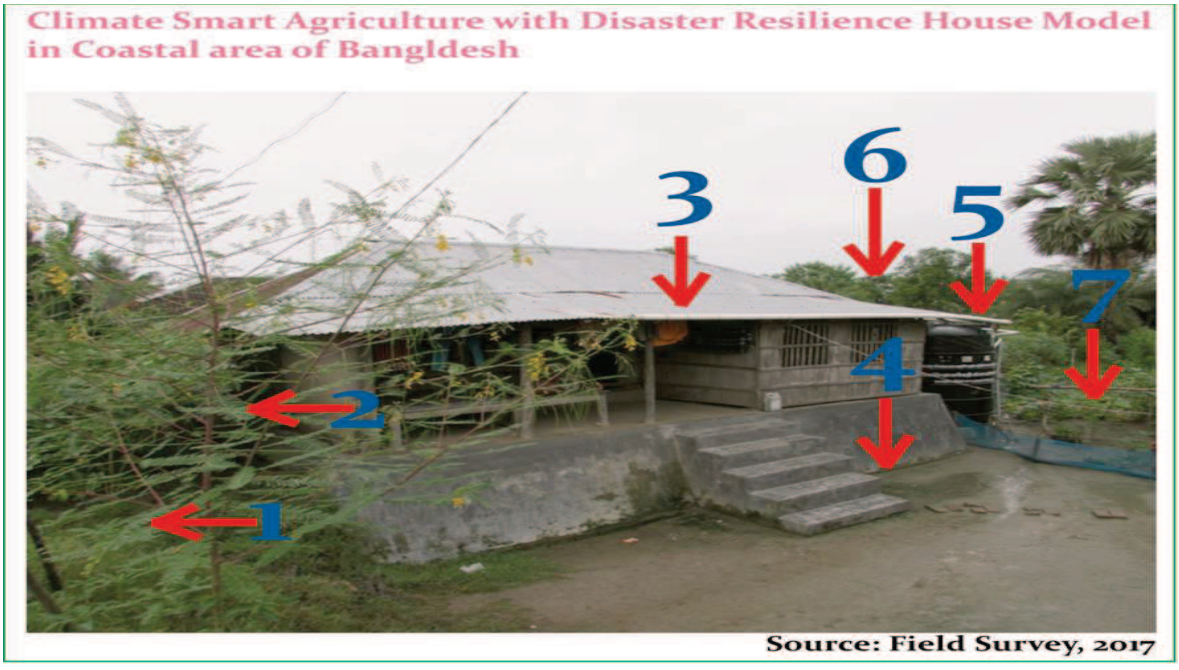
margin. And CSA reduce, soil, water and other types of pollution due to agriculture activity. So by considering environmental, economical and other aspects CSA is the best options for coastal area of Bangladesh.



Climate Smart Agriculture and Food Security of Bangladesh: Bangladesh is a small country with more than 140 million of people (BBS 2011). And each year huge food needs to import for feeding the population of the country. Considering the scenario, CSA could be a good option which can minimize the food scarcity. And, it can change the fate of the root level of population (Farmer) by ensuring more food production. In addition, CSA ensure diversified agricultural product for cultivation. That will ensure the soil fertility of the coastal area. So ensuring National food security CSA is the best options for the coastal areas of Bangladesh. Moreover, CSA is also applicable for ensuring National Food Security of other countries facing disaster related problem through their coastal areas.

Climate Smart Agriculture Practice in Coastal Area of Bangladesh

In the field level, practice of CSA has captured through photo. This photo has taken from Shyamnagar Upazilla of Satkhira District of Bangladesh. In a word this house called smart house.



Description of the Model: 1= Lentil Cultivation, species of lentil is semi-saline tolerant, 2= Livestock shed, livestock can use as a capital for tackling disaster, 3= Disaster resilience House, Special attention to coastal flood, 4= Plinth of house for surviving during different disaster (especially coastal flood), 5= Rain water Harvesting system, this will reduce pressure on ground water with drawling, 6= Fruits trees, trees will work as a natural barrier to cyclonic storm. 7= Vegetable cultivation in ground and Netting which will ensure more production in a small amount of land.

Replication of the model: Described model has replicated by many other farmers living surrounding the area. They have seen and learned from the existing model. And, this model is replicating surrounding the model area.

Advantage of the model: In agriculture production: This house is cultivating different types of crops in a small land. And, the production is much higher than normal technique of agriculture. Generally, household consumption vegetable can supply from the cultivated vegetable. And, trees are giving more benefit as the tree itself a fixed resource with fruits. Livestock cow/goat rearing is a profitable activity for a household for tackling different disaster.

Meeting Nutritional requirement of the family members: Nutritional requirement of family members could easily meet up by cultivating diversifies crops through CSA. As well as it will reduce dependency for meeting family requirement form shop.

In water resource management: This house is using Rain Water Harvesting System for their water consumption. In addition, small amount of water can use in gardening vegetables. So water collection technique like this house will reduce salinity intrusion.

In protecting from different disaster: Coastal flood can not affect the house as the plinth is raised to the highest flood level. In addition, water logging can not affect much the superstructure of the house. During cyclone, the people must move to the cyclone shelter. And, strong pillars of the house and plinth will not allow damage the house totally.

Limitation of the Model: This model has some limitations. Roof of the houses has constructed by using GI sheet. This will be generated hit during the hot weather by sun light. Moreover bamboo made wall of the house is not safe during storm and cyclone. And, raising the plinth level by disable people will be difficult.

Conclusion: Climate Smart Agriculture relatively a new concept for Bangladesh. Farmers are practicing CSA in many places beyond the coastal area. But, they do not know about CSA in theoretically. Most of the cases, farmers are trying to ensure sustainable land management system. Another thing, fish culture could be a part of CSA which has not considered in the research. The model has described here is very effective for coastal areas of Bangladesh. Here, Brick and RCC structure has not considered because majority people cannot afford those structure for living. This model is also applicable for the coastal area of India, Myanmar and Sri Lanka especially for the poor people. In a nutshell, CSA is a vast area where future research can carry out. And, this will be a practical solution for different climatic zone under same crisis of disaster. Considering the practical need, many new research need to initiate for providing solution in climate change also.

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