MS in Climate Smart Agriculture
Institute of Climate Smart Agriculture
Patuakhali Science and Technology University, Dumki, Patuakhali

Course Profile

Course Code: CSA 5101
Course Title: Global Climate Change and Climate Smart Agriculture
Credit Hour: 2
Student Level: Level-6, Semester-1

Rationale
Human activity around the world has caused climate change, resulting in increased temperatures, altered and increasingly extreme weather patterns, rising of sea levels and the collapse of natural ecosystems, as the current speed of change is such that many forms of life have difficulty to adapt). Agricultural practices and especially rainfed agriculture, which is the most common form of agriculture in Bangladesh, can be affected by climate change enormously. Part of the solutions can be found in the application of Climate Smart Agriculture.

In this course, students learn about human induced climate change and its effects, especially on agricultural activities, as well as possible solutions, in particular Climate Smart Agriculture.

Objectives
At the end of this course, students will have gained sufficient knowledge on:
(i) The causes and effects of human induced climate change
(ii) Effects of climate change on agricultural activities (global)
(iii) Effects of climate change on agricultural activities (Bangladesh)
(iv) The principles of Climate Smart Agriculture as solution to CC
(v) Examples of CSA – both global and local

Learning Outcomes	**Course Content**	**Teaching-Strategy**	**Assessment Strategy**
-Define human induced climate change - Knowledge on causes and effects - Being able to name examples of climate change effects -Knowledge on solutions to climate change	**(i) Global Climate Change**: Concept of human induced climate change, specific causes, effects (global/ abroad, and for southern Bangladesh specifically) and solutions.	Lecture, Student assignment Presentation, Group Discussion	-Essay -Checklist
-Define -Describe -Analyze	**(ii) Effects of Climate Change on Agriculture (global)**: …	Lecture, Reading assignment,	-Short Answer -Essay -Completion

		Group discussion	
-Define -Analyze -Prepare -Design	**(iii) Effects of Climate Change on Agriculture in Bangladesh**:	Lecture, group assignment, group discussion	-Short Answer -Practical exam -Peer rating
-Define -Evaluate	**(iv) Climate Smart Agriculture**: Concept and definition, history, major components, benefits and limitations	Lecture Discussion QA	-Short Answer -Essay
	(v) Application of Climate Smart Agriculture – global and local: …	Lecture	

Recommended Books and Publications

International Panel on Climate Change.
The Physical Science Basis, Summary for Policy Makers (IPCC, 2007)
FAO source book http://www.fao.org/climate-smart-agriculture/en/
CCAFS (CGIAR) - https://ccafs.cgiar.org
First document to name 'Climate Smarte Agriculture', 2010 (paper by the Food and Agriculture Organization of the United Nations)
Course material CSA course WUR (Ronald?)
Publications CIMMYT / Tim or Babu(also recent, for collaborative research), DIFD
Aryal et al. (2020) - Major Climate risks and Adaptation Strategies of SmallholderFarmers in Coastal Bangladesh
https://unfccc.int/sites/default/files/resource/TNC%20Report%20%28Low%20Resolation%29%2003_01_2019.pdf (pag 138 -)

1) Schneider, P., Asch, F.
Rice production and food security in Asian Mega deltas—A review on characteristics, vulnerabilities and agricultural adaptation options to cope with climate change
(2020) *Journal of Agronomy and Crop Science*, 206 (4), pp. 491-503.
2) Hasan, M.K., Kumar, L.
Perceived farm-level climatic impacts on coastal agricultural productivity in Bangladesh
(2020) *Climatic Change*, 161 (4), pp. 617-636.
3) Jehan, I., Atta-ur-Rahman, Waqas, T.
Assessment of meteorological drought and trend detection in Khyber Pakhtunkhwa, Pakistan
(2020) *Arabian Journal of Geosciences*, 13 (16), art. no. 765, .

4) Islam, M.A., Warwick, N., Koech, R., Amin, M.N., Lobry de Bruyn, L.
The importance of farmers' perceptions of salinity and adaptation strategies for ensuring food security: Evidence from the coastal rice growing areas of Bangladesh
(2020) *Science of the Total Environment*, 727, art. no. 138674, .
5) Aryal, J.P., Sapkota, T.B., Rahut, D.B., Krupnik, T.J., Shahrin, S., Jat, M.L., Stirling, C.M.
Major Climate risks and Adaptation Strategies of Smallholder Farmers in Coastal Bangladesh
(2020) *Environmental Management*, 66 (1), pp. 105-120.
6) Islam, R., Islam, M.M., Islam, M.N., Islam, M.N., Sen, S., Faisal, R.K.
Climate change adaptation strategies: a prospect toward crop modelling and food security management
(2020) *Modeling Earth Systems and Environment*, 6 (2), pp. 769-777. Cited 2 times.
7) Hasan, M.K., Kumar, L.
Meteorological data and farmers' perception of coastal climate in Bangladesh
(2020) *Science of the Total Environment*, 704, art. no. 135384
8) Akter, S., Ahmed, K.R.
Insight and explore farming adaptation measures to support sustainable development goal 2 in the southwest coastal region of Bangladesh
(2020) *Environment, Development and Sustainability*
9) Islam, A.R.M.T., Shill, B.K., Salam, R., Siddik, M.N.A., Patwary, M.A.
Insight into farmers' agricultural adaptive strategy to climate change in northern Bangladesh
(2020) *Environment, Development and Sustainability*
10) Hoque, M.Z., Cui, S., Xu, L., Islam, I., Tang, J., Ding, S.
Assessing agricultural livelihood vulnerability to climate change in coastal Bangladesh
(2019) *International Journal of Environmental Research and Public Health*, 16 (22)
11) Roy, R., Gain, A.K., Samat, N., Hurlbert, M., Tan, M.L., Chan, N.W.
Resilience of coastal agricultural systems in Bangladesh: Assessment for agroecosystem stewardship strategies
(2019) *Ecological Indicators*, 106, art. no. 105525