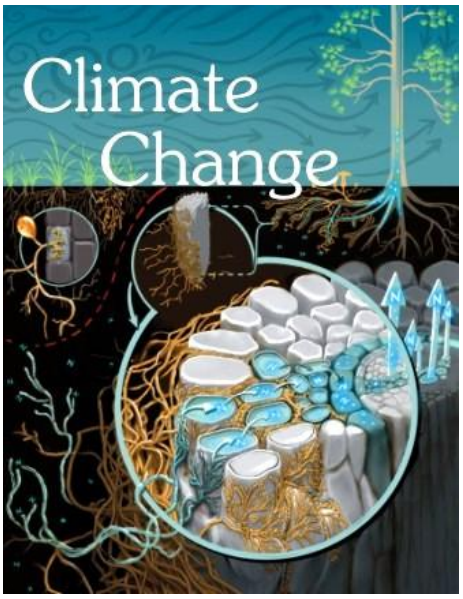
Volume 4, Number 13, Pages 1-94 January – March, 2018

Climate Change

About the Cover



The objectives of the present study were to investigate the effect of different fertilization treatment on Total Organic Carbon (TOC) and Total Nitrogen (TN) pool in different soil texture up to 0-30cm soil depth during the fallow period of agriculture and to calculate the amount of CO_2 released into the atmosphere from the soil in different fertilizer treatment in three different soil textures. A short term column experiment was done on three different soil texture, loamy, sandy loam and siltyclay, subjected to six treatments: 1) Organic Manure(OM), 2) Chemical fertilizer(CF), 3)7OM:3CF(70%Organic Manure +30% Chemical Fertilizer) 4) 5OM:5CF (50% Organic Manure +50% Chemical Fertilizer) 5) 3OM:7CF (30 % Organic Manure +70 % Chemical Fertilizer) and 6)CK (Check, means Without Fertilizer treatment). Amount of Carbon di oxide (CO_2) released into the atmosphere from the soil by using different fertilizer treatment in three different soil textures was calculated on the basis of the percentage change in TOC and comparative analysis was done in various permutation and combinations of fertilizer treatment and soil texture. The result of multiple regression taking OM and sandy loam as reference in fertilizer treatment and soil texture respectively reveals that if we shift from OM to CF treatment in sandy loam, loam or siltyclay soil, the potential of additional amount of CO_2 release in the atmosphere from one hectare agriculture land would be 40.10, 40.21, 40.62 tons respectively. Similarly the same was calculated with shifting to other fertilizer treatment from manure in different soil texture and it was found that the more use of CF the more CO_2 emission potential would be in the atmosphere. As the experiment represents fallow period so even the CK has less contribution than any combination of CF in terms of CO_2 emission in the atmosphere. Strong positive correlation was observed between percentage change in TOC and change in TN(g/Kg) (0.86, 0.79, 0.86, 0.85, 0.89, and 0.78). As per the statistical analysis of experimental data the predictability (R^2,$p<0.05$) (0.73, 0.62, 0.73, 0.73, 0.79, 0.61) and coefficient of change in TN (g/Kg) (1.210, 0.314, 0.700, 0.548, 0.546, 0.535) with respect to percentage change in TOC decreases as we shift in fertilizer treatments OM, 7OM:3C, 5OM:5CF, 3OM:7CF, CF, CK respectively (Ref: Poonam Kumari, Arvind Kumar Nema. Effect of different fertilizer treatment and soil texture on the emission of CO_2 in the atmosphere from the soil. *Climate Change*, 2018, 4(13), 1-11); (Cover source: atlasofscience.org/nitrogen-limitation-of-co2-fertilization-relief-from-fungal-partners/).

Analysis

Effect of different fertilizer treatment and soil texture on the emission of CO_2 in the atmosphere from the soil

Poonam Kumari, Arvind Kumar Nema

The objectives of the present study were to investigate the effect of different fertilization treatment on Total Organic Carbon (TOC) and Total Nitrogen (TN) pool in different soil texture up to 0-30cm soil depth during the fallow period of agriculture and to calculate the amount of CO_2 released into the atmosphere from the soil in different fertilizer treatment in three different soil textures. A short term column experiment was done on three different soil texture, loamy, sandy loam and siltyclay, subjected to six treatments: 1) Organic Manure(OM), 2) Chemical fertilizer(CF), 3)7OM:3CF(70%Organic Manure +30% Chemical Fertilizer) 4) 5OM:5CF (50% Organic Manure +50% Chemical Fertilizer) 5) 3OM:7CF (30 % Organic Manure +70 % Chemical Fertilizer) and 6)CK (Check, means Without Fertilizer treatment). Amount of Carbon di oxide (CO_2) released into the atmosphere from the soil by using different fertilizer treatment in three different soil textures was calculated on the basis of the percentage change in TOC and comparative analysis was done in various permutation and combinations of fertilizer treatment and soil texture. The result of multiple regression taking OM and sandy loam as reference in fertilizer treatment and soil texture respectively reveals that if we shift from OM to CF treatment in sandy loam, loam or siltyclay soil, the potential of additional amount of CO_2 release in the atmosphere from one hectare agriculture land would be 40.10, 40.21, 40.62 tons respectively. Similarly the same was calculated with shifting to other fertilizer treatment from manure in different soil texture and it was found that the more use of CF the more CO_2 emission potential would be in the atmosphere. As the experiment represents fallow period so even the CK has less contribution than any combination of CF in terms of CO_2 emission in the atmosphere. Strong positive correlation was observed between percentage change in TOC and change in TN(g/Kg) (0.86, 0.79, 0.86, 0.85, 0.89, and 0.78). As per the statistical analysis of experimental data the predictability (R^2,$p<0.05$) (0.73, 0.62, 0.73, 0.73, 0.79, 0.61) and coefficient of change in TN (g/Kg) (1.210, 0.314, 0.700, 0.548, 0.546, 0.535) with respect to percentage change in TOC decreases as we shift in fertilizer treatments OM, 7OM:3C, 5OM:5CF, 3OM:7CF, CF, CK respectively.

Climate Change, 2018, 4(13), 1-11

Rainfall variability analysis over north-west India in context to climate change using GIS

Mohan Singh, Ram Niwas

The weather data for the period of more than 30 years 1980 onward of twenty-two meteorological stations located in arid, semi-arid and humid agro-climatic zones in the hills and plains of north-west India were used in this study. The collected rainfall data was computed as normal rainfall for annual, seasonal, decadal at each station, hills, plains and north-west India. For a given location the long period average of rainfall data was considered as normal rainfall. Rainfall trends (seasonal annual, decadal) in north-west India were evaluated using regression trend analysis. The map of north-west India was digitized and different rainfall zones were delineated using GIS software (ArcMap 10.1). Normal annual rainfall was more than one thousand millimetres at eight stations and ranged between 500-900 mm at eleven stations and between 200 to 500 mm for remaining three stations. Normal rainfall was highest at Palampur and lowest at Ganganagar among the 22 meteorological stations. The coefficient of variation was less than fifty per cent for all the stations. The slope (mm/year) of trend line was negative for nine stations and positive for remaining thirteen stations. The slope 5.51, 1.58 and 5.82 were found in hills, plains and north-west India with standard error of 8.35, 6.12 and 6.73 mm, respectively. The confidence level of significant of correlation coefficient was 41.3, 54.7 and 51 per cent in hills, plains and north-west India, respectively. During effective growing season out of 22 stations the rainfall showed decreasing trend at eight stations and increasing trend at remaining fourteen stations. During dormant season it was decreasing with 57 mm per century in hills, 10.7 mm per 100 years in plains but increasing with 68.6 mm per 100 years in north-west India, respectively.

Climate Change, 2018, 4(13), 12-28

Research

Coastal livelihood vulnerability improvement of rural farmers to climate change in Bagerhat district of Bangladesh

Borhan Uddin, Irteja Hasan, Golam Rabbani Akanda, Sanaul Haque, Shafiqul Islam

The study aimed at determining livelihood improvement of the farmers due to embankment establishment at Bagerhat Sadar Upzila of Bagerhat district and the relationships of 10 selected characteristics of them to their extent of livelihood improvement were also explored. Data were collected from a sample of 112 farmers rather than the population. The overall extent of livelihood improvement score of the farmers ranged from 76 to 148 with a mean of 120.22 and standard deviation of 13.61. Results showed that, majority (53.57 percent) had medium livelihood improvement while 36.61 percent of them had high improvement and only 9.82 had low improvement. The findings implied that most of the farmers (90 percent) had medium to high livelihood improvement regarding various capitals due to the favorable condition generated by the establishment of embankment. However, vast majority of the farmers (54.46 percent) had high improvement regarding financial capital aspects of livelihood improvement followed by social capital (46.43 percent) Out of ten selected characteristics of the farmers only six characteristics were significant. These were education, training experience, farm size, communication exposure, fatalism, and agricultural knowledge. Among these education, training experience, farm size, communication exposure and agricultural knowledge had positive relationship and only fatalism had negative relationship with their extent of livelihood improvement.

Perspective

Opinion

An overview of climate change impact in fisheries and aquaculture

Ruby P, Ahilan B

Fish can play a major role in satisfying the palates of the world's growing middle income group while also meeting the food security needs of the poorest. Already, fish represents 16 percent of all animal protein consumed globally. Coastal communities will be among the first to be impacted by changes in the oceans due to climate change. Changes in the oceans will include a rise in the sea level, which directly affects habitability of the coastline, and rising water temperature and ocean acidification, which affect productivity of local fisheries and the health of marine life and ecosystems. Small pelagic fisheries collapse to affect reduction industry (fishmeal and fish oil production) can be implemented to analyze the impact on aquaculture production that is dependent on fishmeal and fish oil as input. Climate change also affects aquaculture production, and impacts of climate change on both capture fisheries and aquaculture and their interactions on global fish markets.

Climate Change, 2018, 4(13), 87-94