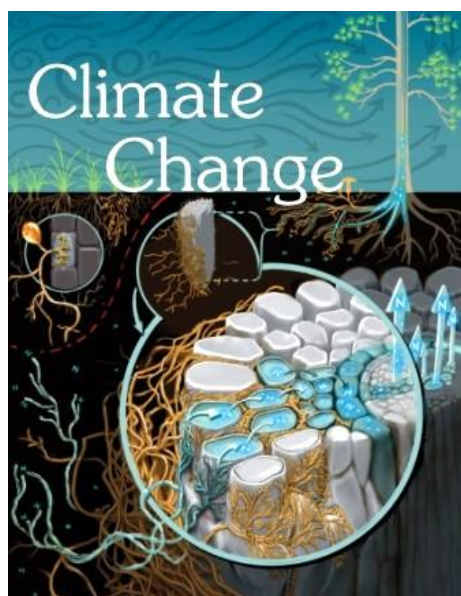


Climate Change

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 CO₂ 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 (CO₂) 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 (CO₂) 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 CO₂ 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 CO₂ 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 CO₂ 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.

Oil Spill Pollution on the Cat Ba Island in northern Vietnam

Doan Quang Tri, Nguyen Thi Mai Linh

A 2D oil spill model was applied for the simulation and prediction of oil spill pollution on Cat Ba Island, the northeast Vietnam. The oil spill model has comprised of three modules: Wind-wave module, hydrodynamic module, and spill analysis module in this paper. GIS software was used to establish biological environment surveys and coastal ecosystem maps in the study areas. The results from the wind-wave and hydrodynamic modules showed that the hydrodynamic regime was complicated in the near shore areas. The results from oil spill model showed that oil spill would affect across a vast area in Cat Ba Island in two scenarios S2 and S3. The oil spill response plan, which is the preparation and sharing providing useful information for ecosystem assessment, habitat conservation, conservation planning and decision-making to minimize damages in case of an oil spill incident.

Climate Change, 2018, 4(13), 42-57

Perspective

Forest fires from the perspective of environmental psychology

Jaime Senabre

Forest fires are a global environmental problem influenced by numerous causal factors. They must be conceived as a latent risk in current societies that can compromise the economic and social development of future generations, especially in rural areas. In Spain, thousands of hectares of forest and agricultural land are destroyed annually. The Valencian Community is one of the regions of the country most affected by this type of disturbance, reaching, sometimes, disastrous consequences. One of the reasons why an individual, a community and a society do not act in a preventive manner in the face of the likelihood of a risk is because of the perception of the probability of occurrence of that risk and the proximity of its consequences. Although it may happen that you do not have the necessary resources to prevent or minimize it. Add a determining factor, the will. Aware that the same risk can have different interpretations and meanings, a study is proposed, with a general population, that deepens the analysis of the perception of risk on the reality of forest fires, the willingness to act against them and the predictive factors of both variables.

Climate Change, 2018, 4(13), 58-68

Grass root-level planning perspective for the tropical region for addressing implication on climate change for NRM sectors

Sarun S, Sheela AM

Climate Change Adaptation is strongly essential to avoid further serious consequences. The priority issues related to climate change are to be identified and the measures to be adopted to combat climate change are to be clearly specified. Agriculture, Fisheries, Forests, and Water Resources are the major affected sectors. It is highly essential to specify the priority issues as well as adaptation measures to be adopted for the betterment of the society. The urgent need is to provide these adaptation measures at the ground level. Thus the concerned departments as well as Local Self Government can only implement these measures at ground level. The members of the local self-government institution have to recognize this risk and to act accordingly to adapt it to the changes. Understanding local government institution roles and powers for addressing climate change risks is a critical component for motivating climate change action, in Kerala and elsewhere.

Climate Change, 2018, 4(13), 69-79

Phenological shifts due to climate change and the associated conservation threats

Rameez Nazir Rather, Aijaz A Wani, Mahpara Kashtwari, Zahoor A Beigh

Phenology a routine agricultural practice of past centuries has emerged fast as a very important discipline in global climate change research. Phenology can be a helping hand to various adaptation and mitigation efforts to counter or at least slow down the magnitude and range of conservation threats posed by global climate change. There are two ways by which plants respond to rising temperatures which depend upon the time at which warming occurs. Warming during chilling phase leads to delayed spring phenophases, as it takes longer to achieve the required chilling to complete endo-dormancy, while warming during forcing period causes earlier arrival of spring phenophases. Among animals birds have been studied extensively as far as the effects of warming on phenophases is concerned. Majority of the studies have found early arrival of migratory birds and early start of breeding times. Extremely heterogeneous results have been found from different studies. Meta-analyses have helped overcome this problem and provided vital breakthroughs in understanding the effects of climate change on phenology of the organisms by combining and analyzing results from numerous studies across diverse taxa and different regions. The shifts have posed alarming extinction risks to different taxa throughout the globe with maximum damage expected to occur at higher latitudes and in regions with high number of endemic species mainly due to disruption of interactions between organisms. Thus there is an urgent need to constantly monitor the changing phenologies of organisms with special focus to be given on keystone species from higher latitudes and altitudes so that appropriate conservation efforts are taken in time.

Climate Change, 2018, 4(13), 80-86

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