A Summary of Recent Studies Published by DIU Researchers

Daffodil International University

The researchers of Daffodil International University (Faculty, Students, Alumni) have conducted a number of research projects related to SDG 15 (Life on Land) and results of the projects have also been published as research papers in various international reputed peer reviewed and Scopus indexed journals. The summary of the research publications related to SDG 15 are given below:

1. **Does agricultural ecology cause environmental degradation? Empirical evidence from Bangladesh**

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Highlights

- The relationship between agro-economic climate and CO_2 emissions in Bangladesh from 1985 to 2017 is analysed
- The results exhibit that production of cereals, other agricultural products, and land production, increased CO_2 emissions.
- Unplanned, static crop intensity and a lack of modern farming infrastructure degrade the environment.
- The findings may help Bangladesh achieve UN-SDG targets 7, 9, 12, 13 and 15.

Abstract

Agricultural sector accelerates a nation's economic growth towards sustainable development. There exists a significant relationship between agriculture and the environment. Sustainable agricultural development ensures food quality and in tandem prevents natural calamities like drought. However, in order to fulfill the food demand of a growing population, poor law quality and untenable agriculture practices arise, which in turn lead to environmental degradation. The current study explores the relationship between the agro-economic atmosphere and CO_2 emissions as a measure of environmental degradation in Bangladesh between the years of 1985 and 2017. To exhibit the long-run relationship of agricultural ecology and carbon dioxide emissions, three cointegrated equations- Fully-modified ordinary least square (FMOLS), Dynamic ordinary least square (DOLS), and Canonical cointegrated regression (CCR) were assessed. For cointegration, Bayer-Hanck cointegration was implied. In long-run estimates, it was found that livestock, rice area harvested, cereal production, and other crop production impeded environmental dilapidation. The Granger Causality Test enabled unidirectional causality towards burned biomass (crop residues), the agricultural economy, and carbon emissions. Therefore, this dimension's causality concluded that carbon dioxide emissions were caused by cereal production, other agricultural production, and agricultural land production. The overall findings of this study could potentially

assist the Government of Bangladesh and the necessary authorities for implementing synchronized policies to help reduce environmental pollution and set an example for other developing nations like Bangladesh.

Keywords

- Environmental degradation
- Agricultural ecology
- CO_2 emission
- Bangladesh

2. Co-management approach to sustainable management of marine protected areas: The case of Malaysia

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Marine Policy, Volume 138

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Abstract

The management of Marine Protected Areas (MPAs) and sustainable use of natural and marine resources require the collective participation of the

government and host community. This study aims to uncover the community's perception of co-management approach and its perceived impact on the development of diverse resources of MPAs in Malaysia. A survey questionnaire was used to collect data, which was then analysed using partial least square structural equation modelling (PLS-SEM). The findings revealed that most of the participants acknowledged the co-management approach as necessary to conserve and develop the diverse natural resources. They believed it will increase cooperation, collaboration and coordination among various associated parties, and encourage social interaction among the community members. The findings also indicated that community financial resources have improved marginally, including job prospects, business opportunities, access to business financing and other financial benefits for marine park residents. Furthermore, the adoption of co-management approach is considered essential for the development of financial, natural and physical resources. In other words, the community maintains that implementing a co-management structure will boost the development of diverse resources and promote the sustainable management of physical resources. Therefore, policymakers and concerned authorities should consider the implementation of co-management approach to ensure the sustainable use of natural resources and socioeconomic development of the marine park residents.

Keywords

- Marine protected areas
- Co-management approach
- Financial resources
- Natural resources
- Social resources
- Sustainable management

3. Assessment of Ecosystem Services, Plant Diversity Pattern, and Water Quality of an Urban Water Body in Dhaka, Bangladesh

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Part of the Advances in Science, Technology & Innovation book series (ASTI)

Abstract

The balance between open space and built environment is one of the key constituents of a sustainable city. The purpose of this research is to assess the ecosystem services, plant diversity pattern, and water quality of an urban green zone with a lake so that the adverse impact of encroaching these spaces can be scientifically proved. Dhanmondi Lake is one of the earliest examples of manmade water bodies in Dhaka City. A total of five provisioning services (fish, fruit, medicine, flower, and fuel), ten regulating services (photosynthesis, CO_2 sequestration, O_2 production, pollination, seed dispersal, air quality regulation, airflow, noise control, etc.), eighteen cultural services under four categories (relaxation, recreation and spiritual, social relation, economic, and academic) have been identified in the study area. Dhanmondi lake provides a huge range of habitat for fish (06), birds (18), and plant (34) species. The value of plant diversity in Dhanmondi lake is ranging from D = 0.72–0.93 (out of 0–1). It indicates the rich plant diversity pattern. The quality of the lake water is quite decent. The slight deterioration in pH (7.3–8.5), DO (3.1–4.1 mg/l) and alkalinity (252–344 mg/l) is caused due to the anthropogenic activities around the lake. A brief Total Economic Value Framework has been produced to study the valuation of these Ecosystem Services. This study has the strength to re-evaluate the importance and impact of the open spaces in an urban area. Also, it provides scientific evidence for new open space development for a sustainable smart city.

Keywords

- Ecosystem services
- Plant diversity

- Water quality
- Dhanmondi lake

4. The impact of financial development on accelerating the environmental degradation in Bangladesh

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Abstract:

Purpose. To examine long-run and short-run effects of industrial financial development on carbon emissions in Bangladesh.

Methodology. The auto-regressive distributed lag model was implemented on the data collected from 1976 to 2020 to exhibit cointegration in regression form. Traditional unit roots as well as the Zivot-Andrews structural break test was conducted for investigating a significant single-break. The auto-regressive distributed lag model (ARDL) model approved long-run cointegration having a structural break in this study.

Findings. The results conclude that energy consumption triggers carbon emissions with a significant effect on short and long-run models but financial development has no significant effect on environmental degradation. A considerable U-shape Environmental Kuznets Curve hypothesis is observed at the nexus of carbon emissions and economic growth.

Originality. The current study proposed to contribute to the existing literature by assessing the effects of financial development, economic growth, and energy consumption on environmental degradation in Bangladesh using modern econometric methodologies.

Practical value. The results obtained will be useful to scientists, economists and practitioners dealing with economic and environmental development of different industries.

Keywords: *financial development, industry, energy consumption, ARDL, economic growth, environmental degradation*