

2019

Book of Abstracts

7th ANNUAL CONFERENCE
on
RESEARCH FINDINGS-2019



ORGANIZED BY

SUST RESEARCH CENTRE

SHAHJALAL UNIVERSITY OF SCIENCE & TECHNOLOGY, SYLHET

<http://www.sust.edu/research/sust-research-center>

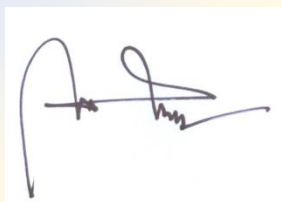
Preface

The SUST Research Centre is established with the aim to enhance the research environment in order to perform quality research by the faculty members of this university. As a tertiary level educational institution, the teaching-learning activities of SUST are notable at the national context; however, the standard still has some limitations to attain the international standard due to lack of facilities in terms of financial and technical supports. In this backdrop, the SUST Research Centre has been trying to boost-up the researchers since 2011 by allocating grants to carry out their research endeavors. Research and development are inseparably intertwined. The vision of the SUST Research Centre is to improve research potentials of the faculty members and students of SUST through promoting their projects through funding and capacity building approach.

The SUST Research Centre is going to organize its regular annual event **7th Annual Conference on Research Findings 2019** in 26-28 September, 2019 at SUST campus, Sylhet, Bangladesh. The honorable Member of the **University Grants Commission of Bangladesh** Professor Dr Md. Akhtar Hossain will be present in the Inaugural Ceremony as the Chief Guest. Professor Dr. Md. Anowarul Islam, Treasurer of SUST and Mr. Mohammad Ali, Deputy Managing Director and CTO of Pubali Bank Limited will be present as the Special Guests. The honorable Vice Chancellor of SUST Professor Farid Uddin Ahmed will chair the Inaugural Ceremony.

I am happy to inform you that the research findings of 183 research projects will be presented at the conference through 14 technical sessions. I congratulate all the presenters who have successfully completed their research projects during the time frame. I look forward to see the research outcomes as articles in renowned national and international peer-reviewed journals.

I would like to thank our Vice Chancellor Professor Farid Uddin Ahmed for his cordial and continuous support to organize the conference. I express my gratitude to all members of the management committee of SUST Research Centre for their consistent support and team work. Special thanks to all the participants whose gracious presence and active participation made the conference a grand success.



Professor Dr. Md. Zakir Hossain

Director

SUST Research Centre, SUST

PROGRAMME	Day-1 (26 September, 2019)	Day-1 (26 September, 2019)
	10:00 Guest Reception	1:00 pm to 3:30 pm
	10:10 Welcome Address: Professor Dr. Md. Zakir Hossain Director, SUST Research Centre	Technical Sessions 1-3
	10:20 Vice Chancellor Award	3:30 pm to 7:00 pm
	10:30 Speech of the Special Guests: Mr. M.A. Halim Chowdhury Managing Director and CEO, Pubali Bank Limited	Technical Sessions 4-6
	Professor Dr. Md. Anowarul Islam Treasurer, SUST	Day-2 (28 September, 2019)
	10:45 Speech of the Chief Guest: Professor Dr. Md. Akhtar Hossain Member, University Grants Commission of Bangladesh	10:00 am to 1:00 pm
	10:55 Speech of the Chairperson: Professor Farid Uddin Ahmed Vice Chancellor, SUST	Technical Sessions 7-9
	11:15 Vote of Thanks: Professor Dr. A. Z. M. Manzoor Rashid Member, SUST Research Centre	1:00 pm to 3:30 pm
	11:20 Tea Break	Technical Sessions 10-12
		3:30 pm to 7:00 pm
		Technical Sessions 13-14

Schedule of the Technical Sessions

Session No.	Time	Session Chair	Resource Person
1	Sep 26, 2019 at 1:00-3:30 pm	Prof Dr Mohammad Shahidur Rahman	Prof Dr Mohammad Reza Selim
2		Prof Dr Md Nazrul Islam	Dr Abdul Awwal Biswas
3		Prof Dr Md Elias Uddin Biswas	Prof Dr Md Rashed Talukder
4	Sep 26, 2019 at 3:30-7:00 pm	Prof Dr Syed Shamsul Alam	Prof Dr Md Mizanur Rahman
5		Prof Dr Sabina Islam	Prof Md Ahmad Kabir
6		Prof Dr A. Z. M. Manzoor Rashid	Prof Dr Md Shamsul Haque Prodhan
7	Sep 28, 2019 at 10:00-12:30 pm	Prof Dr Md Kabir Hossain	Prof Dr Zayed Sharmin
8		Prof Dr Mohammad Iqbal	Prof Dr Nazia Chawdhury
9		Prof Dr Md Mizanur Rahman	Prof Dr. Mohammed Mastabur Rahman
10	Sep 28, 2019 at 1:00-3:30 pm	Prof Dr Md Nazrul Islam	Prof Dr Mohammad Jasim Uddin
11		Prof Dr Md Shamsul Haque Prodhan	Prof Dr A. Z. M. Manzoor Rashid
12		Prof Dr Mushtaq Ahmed	Prof Dr Abul Mukid Mohammad Mukaddes
13	Sep 28, 2019 at 3:30-7:00 pm	Prof Dr Mohammad Iqbal	Prof Dr S M Saiful Islam
14		Prof Dr Tulshi Kumar Das	Prof Syed Hasanuzzaman
Coordinator: Professor Dr Md. Zakir Hossain, Director, SUST Research Centre			

Table of Contents

TECHNICAL SESSION-I		1
AS/2017/27	English to Bangla neural machine translation	1
AS/2018/1/08	Developing a deep neural network based sentiment analyzer for Bangla Text	1
AS/2018/1/10	SUST admission Chatbot: A conversational agent to answer all the admission related query	1
AS/2018/1/11	SUST online Judge (SOJ): A Programming platform for all the Students	2
AS/2018/2/25	Securing digital services of SUST	2
AS/2018/2/26	Identify students harassments in campus environment and use ICT based platform for supporting victims	3
AS/2018/1/12	Farmer robot for harvesting and maintaining farms	3
AS/2018/1/13	Smart video surveillance system for university campus	3
AS/2018/1/01	A typological study on urban retail spaces in central business district of Sylhet, Bangladesh	4
AS/2018/1/02	Aesthetic and spiritual values of ecosystems: recognizing cultural ecosystem services of tea cultural landscape of Sylhet	4
TECHNICAL SESSION-II		6
SS/2017/11	Water diplomacy and the water sharing problem between Bangladesh and India: A study on the Teesta River	6
SS/2017/29	Rape and remedies: some observations about the causes and consequences of rape in Sylhet and Sunamgong	6
SS/2018/1/01	Rohingya Refugee crisis; livelihood strategy and humanitarian response: An anthropological study in Kutupalong Rohingya camp of Ukhia, Cox's Bazar	7
SS/2018/1/02	Ordering the border: An inspection into the role of Lauwaghar-Balat Border Haat on the Bangladesh-India border management	7
SS/2018/1/03	Social inclusion or exclusion through language: A study on Khasi linguistic group in Sreemangal	7
SS/2018/1/04	Understanding the impacts of using social media on the study-time allocation, academic achievements and mental health of university students at the Shahjalal University campus, Sylhet, Bangladesh	8
SS/2018/1/05	Rohingya Refugees an anthropological understanding on human rights crisis	9
SS/2018/2/24	The Knowledge, Attitude And Practices of Menstrual Hygiene Management among Adolescent Girls in Sylhet Division	9
SS/2018/2/25	Organizational diversity towards Social unity: An anthropological survey on potentials of ethnic organizations to redefine social cohesion in CHT	9
SS/2018/1/12	Climate change in blockbuster studies: The Philosophy of consensus gentium	10
SS/2018/1/13	The development of English language skills of SUST students: A case study	10
SS/2018/2/29	Students' use of off-class hours in campus and its effectiveness: A case study on the Development of English Students at SUST	11
TECHNICAL SESSION-III		12

PS/2017/24	Mathematical model and analysis on dengue and chikungunya Transmission in Bangladesh	12
PS/2017/25	Numerical simulation of non-newtonian blood flow through stenosed artery	12
PS/2017/27	Theory of semi lattices and its subclasses	13
PS/2017/28	Theory of ordered sets as generalization of lattice theory and its application to searching techniques	13
PS/2017/29	Analysis of a particular class of piecewise linear equations with wired dynamics	13
PS/2017/30	Study of gamma rings for the advancement of algebra	14
PS/2018/1/09	Algorithms for decomposing posets into terms and factors through poset matrix	14
PS/2018/2/18	Study on domain integrals and automatic mesh generation- An attempt to develop software for solving engineering problems	14
PS/2018/2/19	Representation of 0-Modular p Algebras	15
PS/2018/2/20	Large Eddy Simulation of turbulent flows in some benchmark problems by using different sub-grid scale and wall stress models	15
PS/2018/2/21	Comparison of Picard and Newton iterative schemes in the finite element modeling for one-dimensional variably saturated-unsaturated flows	16
PS/2018/3/36	Translating Ocean into Economics: Modelling marine spatial planning scenarios for Blue Economy Development in the northern Bay of Bengal	16

TECHNICAL SESSION-IV 18

PS/2017/01	Label free single molecule detection of troponin 1 by AFM study: Virus nanoparticles as AFM tip	18
PS/2017/02	Electrochemical detection of total arsenic and building up of arsenic map of different zones of Bangladesh including Sylhet area	18
PS/2017/04	Comprehensive Characterization of Bioactive compounds from Kalanchoe crenata for Anti-Microbial Activities	18
PS/2017/11	Synthesis, X-ray crystal Structures, photoluminescence studies and bioactivities on M(II) complexes of the bidentate N, S chelating legends derives from dithiocarbazates	19
PS/2017/32	Cost effective removal of Pb (lead) by using bio-adsorbent	19
PS/2018/1/01	Development of Electrochemical Sensor for Paracetamol Using Thiocyanate Adlayer-Coated Gold Electrode	20
PS/2018/1/03	Fabrication of Flat Carbon Electrolyte for Hydrogen Transport in All Solid Sate Battery	20
PS/2018/1/04	The Synthesis of Schiff base ligands having NNO and NSO group and their Zn(II), Cu(II) and Sn(II) complexcs and investigation of their biological activity	21
PS/2018/1/05	The effects of organic surface treatment by p-aminophenyltrimethoxsilane on the photostability and UV shielding effects of TiO ₂ nano-particles	21
PS/2018/2/14	Design, Synthesis, and Characterization of a series of water soluble triazole ligands for transition metal complexes	22
PS/2018/2/15	Design, Synthesis, Characterization, and study of Optical Properties of a series of new p-Anisolythiol-Funtionalized Platinum (II) Bis (Alkenylarylalkynyl)	23

PS/2018/2/16	Microwave Assisted an Efficient and Green Procedure for the Synthesis of Olefinic (unsaturated) Arylidene Compounds by Reaction of Active Methylene Compounds with Carbonyl Compounds using TPP or BiCl ₃ or NH ₄ OAc as a promoter	23
PS/2018/2/17	Fabrication, Characterization of Quantum Dot-Dye sensitized Solar Cells	24
PS/2018/3/27	Promotion of composite Materials to enhance catalytic activities pertaining to environment Related Reactions	25
PS/2018/3/28	Adsorptive removal of toxic chromium (Cr) from tannery waste effluent by using low cost bio-degradable sorbents and re-using this recovered Cr for other purposes	25
PS/2018/3/29	Fabrication of Hybrid Carbon Nanotubes-Polymer Nanocomposites for Sustainable Flame Retardant Textiles	25
PS/2018/3/30	Sustainable Utilization of waste paper sludge (Hypo Sludge) in Bangladesh Construction Industry	26

TECHNICAL SESSION-V 27

PS/2017/12	Devastating flood of April 2017 in haor area of Mithamoin Upazilla, Kishoreganj - how much impacts of climate change on the livelihoods of the people?	27
PS/2017/14	Obesity and Food Habits of Primary School Going Children: A Longitudinal Study	27
PS/2017/16	Exploring the pattern of children's disability in Sylhet Division	28
PS/2017/17	Evaluating capacity for climate change adaption in food productivity through local knowledge in the north eastern region of Bangladesh	28
PS/2018/1/10	Nutritional Status of the Rural Aging in Sunamganj District based on BMI	29
PS/2018/1/11	Quantitative Measure of Healthy Aging in Sylhet City: A Frailty Index Approach	30
PS/2018/1/12	Identifying factors associated with course drops among in SUST	30
PS/2018/1/13	Surface and Ground Water in the Vicinity of Sylhet City, Bangladesh: Assessment of Quality and Association Based on Multivariate Statistical Techniques	31
PS/2018/2/23	Extent of lifestyle and heritability effects on cancer Bangladesh perspective	31
PS/2018/2/24	Disaggregate level maternal health care indicators in Sylhet division: An Application of Area-level Small Area Estimation Method	32
PS/2018/2/25	Evaluation of Performance Efficiency of Primary teachers on ICT use in Sunamganj District of Bangladesh	33
PS/2018/2/26	Evaluation of rice farm's efficiency and adaptation through local knowledge and community-based knowledge: A case study of Bangladesh	33
PS/2018/2/37	Climate Vulnerability, Adaptive Capacity and Food Security: A study of Wetland-Communities in Sunamgonj, Bangladesh	33
PS/2018/2/35	Heterogenicity and the impact of depression on health-related quality of life among patients with Type 2 diabetes living in Sylhet City Corporation: An Application of trajectory modeling techniques	34

TECHNICAL SESSION-VI 35

LS/2017/02	Molecular Characterization of Flavonoid Compounds from Tridax procumbent for Anti-Arthritis Drug	35
------------	--	----

LS/2017/03	Biochemical and Molecular characterization of hilsa shad, <i>Tenualosailisha</i> for natural stock management in Bangladesh	35
LS/2017/04	On-site detection of CaC ₂ used for artificial ripening of fruits	36
LS/2017/06	Study the impact of consanguineous marriage to accumulate heritable connective tissue diseases in Bangladeshi population	36
LS/2017/07	Molecular identification of plant parasitic nematodes from different tea states in Sylhet city and their control strategies by using indigenous plant extracts	37
LS/2017/015	Development of simultaneous saccharification and fermentation (SSF) Technique for production of bio-ethanol from potato peel and rice straw	37
LS/2018/1/02	Paper-based device for culturing and profiling of microbes through drug sensitivity test	38
LS/2018/1/03	Genetic Diversity Analysis of Native Orange (<i>Citrus reticulata</i>) of Sylhet Region through Molecular Markers	39
LS/2018/1/04	Production of Biodiesel by <i>Lipomyces starkeyi</i> from the Residual Biomass of Agro-industrial and Municipal Solid Wastes	39
LS/2018/2/08	Evaluation of production performance, carcass quality and immunological parameters in broiler chickens using onion (<i>Allium cepa</i>) and garlic (<i>Allium Sativum</i>) extract as growth promoters	39
LS/2018/2/09	In vitro Inhibition of Key Enzymes Linked to Diabetes by Protein Extracts from Piper betle Leaves: A Nobel Approach to Manage Diabetes Mellitus	40
LS/2018/3/11	Production and Characterization of Biomaterials from <i>Scylla serrata</i> for Control Delivery of Drugs to Induce Osteoclast Differentiation and Bone Regeneration	40
LS/2018/3/12	Crack the Molecular mechanism of β -thalassemia disease in Bangladeshi Population	41
LS/2018/3/13	Phyto-pharmacological assessment of indigenous medicinal plants for anti-diabetic and anti-cholesterol potentials	42
LS/2018/3/14	Production of Recombinant Cellulase and Protease Enzymes by Using Organic Municipal Solid Wastes	42
LS/2018/3/15	Molecular ecology to compare salinity adaptation of hilsa shad, <i>Tenualosa ilisha</i> for control production in Bangladesh	43

TECHNICAL SESSION–VII 44

SS/2017/03	Quality of Community clinic health service delivery, Sylhet: Does Management matter?	44
SS/2017/25	Coping and Resilience of the people Hit Through the Recent Flash Flooding in Sunamganj District	44
SS/2018/1/14	Procedural Justice, Police Legitimacy and Public Support for Policing: Understanding Public Perceptions	45
SS/2018/1/15	Improving the e-Health Service Delivery through Community Clinic at Rural Level in Bangladesh	46
SS/2018/2/34	Accessibility and Affordability to Public Health Care Delivery for Urban Poor People, Sylhet	46
SS/2018/3/41	Access to Child Health care in Rural Areas of Bangladesh: A Study of Kanaighat Upazila	47
SS/2017/07	Adaptation to climate Change: Role of Social Network in HakalukiHaor in Moulvibazar district, Bangladesh	47

SS/2018/2/30	Bridging the Gap between Service Delivery of Local Government Authority and Public's Demand: A Case Study on Sylhet City Corporation	48
SS/2018/2/31	Impact of e-Governance on Socio-economic Development in Hoar Region of Bangladesh: A Study on Union Digital Center	48
SS/2018/2/32	Adapting to climate change in Bangladesh: The role of Social capital	49
SS/2018/2/33	An Investigation of Environmental and Social Effects of Stone Quarrying in Jaflong in the Sylhet, Bangladesh	49
SS/2018/1/06	প্রমিত-বাংলা ও সিলেটি উচ্চারণ বৈচিত্র্য : একটি ভাষাতাত্ত্বিক অধ্যয়ন (Pronunciation Diversity of Standard Bangla & Sylheti: A Linguistic Study)	50
SS/2018/2/26	সিলেটের লোকসংগীত: অন্বেষণ ও বৈশিষ্ট্য নিরূপণ, শ্রেণিকরণ ও কবি-পরিচয় এবং ভাবসম্পদ বিচার	51

TECHNICAL SESSION–VIII**53**

PS/2017/20	Optical and electronic properties of semiconducting polymers for organic photocells	53
PS/2017/21	Status of quantum information near black holes due to Wigner rotation	53
PS/2017/22	Elongated dependence of the c axis on the critical concentration of x in $\text{Ni}_x\text{Zn}_{1-x}\text{Cr}_2\text{O}_4$	54
PS/2017/23	Non-monotonic Potential Description of the Cross section, Vector, and Tensor Analyzing Powers of the $^6\text{Li}+^{12}\text{C}$ Elastic Scattering at 30 and 50 MeV	54
PS/2018/2/22	Relativistic wave packet generation with application to nanophysics	54
PS/2018/3/32	Management of Radioactive Low and Intermediate Level Wastes (LILW) in Bangladesh	55
PS/2018/3/33	Investigation of Exciton Dissociation in Organic Semiconductors	55
PS/2018/1/06	Migration Pattern and Adaptation Techniques to Natural Hazards Outside the Coastal Embankment of Bangladesh, the Case Study of Barguna District	56
PS/2018/1/07	Assessment of Ecological Threat to the Coastal Wetland of Bangladesh: The Case Study at Sonadia Islands, Cox's Bazar	57
PS/2018/1/08	Environmental Sustainability Analysis of Stone Quarrying and Crushing Activities at Jaflong, Sylhet	57

TECHNICAL SESSION–IX**59**

AS/2017/12	Improvement of nitrogen (ammonium, nitrite and nitrate) removal from wastewater through nitrification and denitrification	59
AS/2017/15	Semiconductor Photo catalytic Process: A Sustainable Technology for the Treatment of Textile Dye Containing Wastewater	59
AS/2018/1/03	Hexavalent Chromium Adsorption and Reduction in Aqueous Phase with Adsorbent	60
AS/2018/2/19	Pathogenic waste treatment by Electroporation-A noble technique development	60
AS/2018/2/20	Removal of arsenic by adsorption process using activated carbon derived from agricultural waste	61
AS/2018/2/21	Development and Characterization of electrically conductive thermoplastic polymer composite and their Optimization	61
AS/2018/3/34	Biomethane production from organic waste portion of municipal solid waste through dry fermentation: process design, optimization, modeling using MATLAB and scale up	62

AS/2018/3/35	Development of heterostructure metal oxide nanoparticles for electrochemical sensor and photocatalytic degradation of organics	62
AS/2018/3/36	Automation and control of nitrification to enhance ammonium-nitrogen removal	63
AS/2018/3/31	Modeling of tensile behavior of Polymer Composites	63
AS/2017/18	Identification of groundwater potential Zone by Electrical resistivity techniques in and around the SUST campus	64
AS/2017/19	Conversion of Plastic Waste into Liquid Fuel by Pyrolysis	64
AS/2018/1/18	Biodiesel production from waste plam oil by transesterification process	65
AS/2018/2/33	The state of gas seeping and environment around the gas blow out area of Sylhet Gas Field, Haripur, Sylhet: A view for protecting the future environment	65

TECHNICAL SESSION–X 67

SS/2017/12	Representations of the Female Body in Bangladesh: A Study on Embodiment, Agency and Empowerment	67
SS/2017/13	Migration, Individual Modernity and Fertility Performances: A Study among the Slum Dwellers in Sylhet City Corporation Area	67
SS/2017/15	Does Financial inclusion through mobile banking increase financial resilience in flood prone region? A case of Sunamganj haor basin in Bangladesh	68
SS/2018/1/18	The socioeconomic factors influencing attitude towards Rohingya Refugees from Myanmar living in Bangladesh	68
SS/2018/1/19	Social Capital and Social Resilience: Collective Action in Community Based Fishery Management in Bangladesh	69
SS/2018/1/20	Marriage Patterns, Conjugal Relations and Kinship Support: A Study on Slum Woman in Sylhet city	69
SS/2018/1/22	Justice for the Poor: an assessment of the existing services of District Legal Aid Office, Sylhet	70
SS/2018/1/23	Knowledge, Attitude and Perceptions of General people about antibiotic usage and resistance: a cross-sectional study in Sylhet Bangladesh	70
SS/2018/2/39	Voices of the Poor: Demystifying the Nexus between Rights and Agency of Tea Workers in Bangladesh	71
SS/2018/3/45	Cultivating decent working conditions through Accord remediation program: workplace consciousness and quality of work-life in RMG sector in Bangladesh	71
SS/2018/3/46	Civil Society and Social Development in Bangladesh: A Study in Sylhet Division	72
BUS/2018/1/06	Economic and Social up (Down) Grading in the Global Production Network of Bangladesh's Tea Sector: Drivers, Dynamics, Directions	72
BUS/2018/3/07	Longitudinal impact of micro-credit-credit on the livelihoods of clients: A study on Sunamganj district of Bangladesh	73

TECHNICAL SESSION–XI 75

FES/2018/1/01	Livelihood Pattern and floristic diversity with the changes of land use systems in Southern coastal zone of Bangladesh	75
---------------	--	----

FES/2018/1/02	Modelling the impact of Projected climate and use change on stream flow in Halda Basin, South eastern Bangladesh	75
FES/2018/2/03	Integrating Ecological Models and Conservation Planning Frameworks for Sustainable Protected Area Management in the North-Eastern Bangladesh	76
FES/2018/2/04	Isolation, Characterization and Culture of Plant Growth Promoting Rhizobacteria (PGPR) to Produce Bio-fertilizer and Bioassay its Effect on Plant Growth	76
FES/2018/2/05	Identification and characterization of Phytophthora species associated with the diseases of tree species in semi-evergreen forests of Sylhet district	77
FES/2018/2/06	Assessing the Effects of Invasive Alien Species on Native Biodiversity and Rural Livelihoods- A Case Study from Protected Areas of Bangladesh	78
FES/2018/2/07	Comparative study of land use change biodiversity among two different types of forest protected areas of Bangladesh as an effect from co-management	78
FES/2018/3/08	Developing a framework and a modified model for valuation of recreational economic benefits of protected areas in Bangladesh	78
BUS/2018/1/01	The Impact of work Stress on work Productivity at Higher education: A Comparative Study on Teachers of Public and Private Universities in Bangladesh	79
BUS/2018/1/02	An Investigation on Profitability and Efficiency of Leasing Companies-A Study on Selected Firms through Data Envelopment Analysis	80
BUS/2018/1/03	Impact of Environment Friendly Management on Sustainable Development and Organizational Success: A Study on SMEs Sector in Bangladesh	80
BUS/2018/1/04	The Impact of Financial Inclusion on The Profitability of Banks: A Study on PCBs in Bangladesh	81
BUS/2018/1/05	Job Stress on Job Satisfaction: A Study on the University Teachers in Bangladesh	81

TECHNICAL SESSION–XII **83**

AS/2017/06	Design and Development of a Security System using Renewable Energy and Its Feasibility Study	83
AS/2018/1/17	Knowledge, Attitude and Practice (KAP) regarding Personal Protective Measure: A Concern among Labor-oriented Unorganized Small Industries	83
AS/2018/1/40	Assessment of the status of Safety Culture practices in Selected Thermal Power Plant Industries in Bangladesh	84
AS/2018/2/30	Design and feasibility study of a photovoltaic (PV) power generation system for a proposed Academic Building of SUST based on experimental Investigations	85
AS/2018/2/31	The Bio Heat Transfer to and through Human Skin During Burns and Their Treatments: An Investigation Using Finite Element Method	85
AS/2018/2/39	Design and Development of a Security System for Household Gas Stove Its Performance Improvement	86
AS/2018/1/04	Production of lightweight bricks using saw dust	86
AS/2018/1/05	Integration of biosorption and phytoremediation processes in biofilter design	86
AS/2018/1/06	Development of a phytoremediation based air purifier unit for indoor environment facilitated with Arduino gas sensor	87

AS/2018/1/07	Analysis on the Demand and Supply of Parking System at Sylhet Commercial Buildings	87
AS/2018/2/22	Investigation of ground water quality and subsurface lithology in St. Martin's Island in order to categorize potential ground water source	88
AS/2018/2/23	Investigating the effectiveness of iron decorated rice husk ash in removing heavy metal and metalloid from aqueous solution	89
AS/2018/2/24	Low-cost filter design for treating saline drinking water	89

TECHNICAL SESSION–XIII 91

AS/2017/21	Climate change-potential adaptive crop (foxtail millet) to develop a new product (noodles) for enhancing the food security of ultra-poor people in northwestern part of Bangladesh	91
AS/2017/24	Characterization and Optimization of Rice Noodles of different Rice Cultivars: Perspectives of Food Product Development	91
AS/2018/1/14	Model development and optimization of freeze drying process for Lychee (<i>Lychee ChinenissSonn.</i>) Preservation	92
AS/2018/1/15	Bioaccumulation and Health Risk Assessment of Heavy Metals in Poultry Feed (Chicken and Quail) and It's Deposition in Corresponding Foods at Different Regions in Bangladesh	93
AS/2018/1/16	Effect of boiling time on phytochemicals and antioxidant activity of commonly consumed carotenoid rich vegetables in Bangladesh	93
AS/2018/2/27	Production of High Quality Tomato Powder Using Foam-Mat Drying Technique to Reduce Post-Harvest Loss	94
AS/2018/3/38	Comparative analysis of organic and nano-organic tea cultivation systems in Panchagarh District of Bangladesh	94
LS/2017/09	JunB protein as a candidate biomarker in cancer diagnosis and its therapeutically implication	95
LS/2017/14	Isolation and Characterization of Collagen Types of Chicken and Fish Skin of Bangladesh	95
LS/2018/1/01	Investigation of the ameliorating effect of algae against arsenic toxicity through biochemical analysis in mice	96
LS/2018/2/05	Determination of folate in serum as an early risk factor for screening of Down syndrome in pregnant woman in Bangladesh	96
LS/2018/2/06	JunB protein as a candidate biomaker in cancer diagnosis and its therapeutic implication	97
LS/2018/2/07	Association of circulating biomarkers with type-2 diabetes and cardiovascular diseases: A population-based study in Bangladesh	97
LS/2018/3/10	Assessing the Health Status of SUST Faculty Members: Implications for Future Health Management Strategy	98

TECHNICAL SESSION–XIV 99

SS/2017/27	Preconceptions and Misconceptions about Menstruation: Experiences of Adolescent Girls in Sylhet City	99
SS/2018/1/16	Livelihood Status and Health Condition of Waste Pickers in Sylhet Corporation: A Study	99
SS/2018/1/17	Public Health Impact of Shrimp Farming with Water Salinity: A Study in the South-west Coast of Bangladesh	100

SS/2018/2/35	Women's Access to safe Abortion and Sextual and Reproductive Health in Three Selected Areas of Sylhet Division: A Study	100
SS/2018/2/36	Causes and Consequences of Dowry Practice and Legal Measures: A Study in Sylhet Division	100
SS/2018/2/37	GO and NGO Partnership for Protection of Women in Haor Regions of Bangladesh: A Study	101
SS/2018/3/42	HIV/AIDS in Bangladesh: An exploratory study	101
SS/2018/3/43	Sustainable Development of Haor Community Through Smart Village: a Study	102
SS/2017/21	Modeling Environmental Change, Internal Migration and Risk Sharing Network Using Survey Data	102
SS/2018/1/09	Exploring the Factors Determining the Residential House Rent in the Sylhet City	102
SS/2018/1/10	Smoking and Exposure to Second Hand Smoking (SHS): A Measure on the Effectiveness of Tobacco Law at Public Places in City Corporation areas of Bangladesh	102
SS/2018/2/27	Theoretical and Empirical Perspective of Price Differential between Trafficked and Legal International Migration	103

Technical Session–I

(For Dept. of CSE, EEE & ARC)

Date: September 26, 2019 || Time: 1:00 PM – 3:30 PM

Session Chair: Prof. Dr. Mohammad Shahidur Rahman

Resource Person: Prof. Dr. Mohammad Reza Selim

AS/2017/27 English to Bangla neural machine translation

Professor M. Jahirul Islam and Md Abdullah Al Mumin, Associate Professor

Dept. of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Neural machine translation has recently been able to achieve state-of-the-art translation quality on many language pairs. However, neural machine translation has not been tested for English-Bangla language pair, two linguistically distant and widely spoken languages. In this paper, we apply neural machine translation to the task of English-Bangla translation in both directions and compare it against a standard phrase-based translation system. We trained our statistical machine translation (SMT) and neural machine translation (NMT) systems on Shahjalal University parallel (SUPara) corpus. We obtain up to +1.85 and +4.70 BLEU improvement over phrase-based statistical machine translation for English to Bangla and Bangla to English respectively. We observe that neural machine translation significantly outperforms the phrase-based system, thus establishing itself as the state-of-the-art technology for low-resource English-Bangla machine translation.

AS/2018/1/08 Developing a deep neural network based sentiment analyzer for Bangla Text

Ayesha Tasnim and Md. Eamin Rahman, Assistant Professor

Dept of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

AS/2018/1/10 SUST admission Chatbot: A conversational agent to answer all the admission related query

Marium-E-Jannat, Assistant Professor and Md. Mahadi Hasan Nahid, Lecturer

Dept of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Question answering system takes away the whole light to itself in Natural Language Processing and becomes the most interesting topic of research and creates a lot of opportunities for developing the sub fields of Natural Language Processing along with itself. This report serves the purpose of a generic question answering system in Bengali language for factoid questions only on a closed domain (SUST Admission) based on statistical approach. Our proposed system using models for combining multiple sources extracts the answer having the accuracy of 66.2% and 56.8% with and without mentioning the object name. The system also hits around 72% documents from which we can extract the answer manually. Again, the sub-part of our system, the question and document classifier, gives us the accuracy of 91% and 88.4% respectively.

Keywords: Bengali Question Answering System, QA System, Factoid Question Answering System, Question Classification, Bengali Answer Extraction.

AS/2018/1/11 SUST online Judge (SOJ): A Programming platform for all the Students

Md. Saiful Islam, Assistant Professor and Enamul Hassan, Lecturer

Dept of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

World is moving towards automaticity. It is much more important when it is in the case of computer programming. Checking program through manual compilation and execution is really time consuming, painful, wastage of money and sometimes erroneous. Computer programming contest is the most effective way to do brainstorming works as well as to judge one's programming efficiency. Through programming contest, people learn fast, thinks fast and generates new ideas fast. Beside this, giant companies are recruiting programmers through online contests as it is the fastest way to judge one's programming capability. In competitive programming contests, participants are given some programming problems to solve within a limited time frame. They read the problems, think to solve them, generate ideas, implement them with a programming language, then submit for judging. Judges have to check the program whether it gives the correct answer in all the cases within expected time limit and, they have to inform the verdict to the participants immediately. So, the tasks of the judges must be accurate, fast and reasonable. Usually, this testing is done through black box testing as some programs need billions of years to check whether they give the correct output for all possible cases. That's why black box testing is used with the help of online judge. Without an online judge, it is almost impossible to arrange a contest now-a-day. Besides judging programs, it also gives penalty for wrong programs, generate ranking among participants and host a discussion where questions are asked to the judges when participants get confused about a problem. Almost all good universities throughout the world have their own judging platform. Some have open access and some are restricted in their campus. Good companies also have their own customized online judge. Programming examinations could also be taken by these online judges. So, having an online judge is quite essential thing to run exponentially faster. Using this platform, several contests are arranged. Final examinations of different programming courses are taken. This platform is up and running in the web address: <https://www.sustcseoj.com>

AS/2018/2/25 Securing digital services of SUST

Dr. Md. Sadek Ferdous, Assistant Professor and Dr. Mohammad Shahidur Rahman, Professor

Dept. of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Universities in the developed countries provide a range of digital online services for their students, staffs and alumni. Examples of some of these services are library, student management systems, HR (Human Resource) systems including payroll management and so on. These services might require to utilize extremely sensitive private information of users to provide them the required services. Therefore, it is imperative that users can access such services in a secure fashion. SUST has been at the fore-front of several innovative initiatives at the national level. The total computerization of SUST introduces some of the above mentioned online services which helps SUST to maintain its position as the leader to embrace innovations within the public university domain of Bangladesh. However, this requires to ensure users can access such services in a secure fashion, which is mostly overlooked in Bangladesh. In

this two-year project, we aim to build a secure framework which can be integrated with any existing or future digital services of SUST.

AS/2018/2/26 Identify students harassments in campus environment and use ICT based platform for supporting victims

Dr. Md. Forhad Rabbi¹, Associate Professor and Zafrin Ahmed Liza², Assistant Professor

¹Dept of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

²Dept. of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

AS/2018/1/12 Farmer robot for harvesting and maintaining farms

Md. Mohsinur Rahman Adnan and Md. Asaduz Zaman Mamun, Lecturer

Dept. Electrical and Electronic Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Agriculture falls vulnerable to the impacts of climate change, which implies that any change in the climate can significantly affect the quality of the crops produced. Moreover, issues like labor problem, labor cost, productivity problem etc. are stumbling blocks of traditional cultivation systems. Also, farmers need to produce more, at a higher quality, and in a sustainable manner to feed the increasing population. All these complications necessitate an automated system in this sector. In this project, we have built an autonomous robot that can detect ripe fruit or vegetable using color detection mechanism and successfully harvest those with a robotic hand. The system can be sub-categorized into three units– fruit picker, watering pump and sensing unit. The function of Fruit picker is the identification of ripe fruits or vegetables from their color, cut them off of the tree and then store them into suitable storage. The watering unit will pump water and necessary elements from source tank and spread it in field. The sensing unit is for the indication of instant state of surroundings to help farmer to choose the right steps to be taken. Although there are some initial costs to implement this system, this robot can precisely detect the right fruit (e.g. tomato or pepper) to be harvested and hence it can be used to pace up harvesting speed and save the labor and other associated costs. In this report we have described the detailed processes followed to build this robot; hardware used; software implemented and assembly of the whole system as a functional unit.

AS/2018/1/13 Smart video surveillance system for university campus

Arif Ahammad and Mr. Jibesh Kanti Saha, Lecturer

Dept. of Electrical and Electronic Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

CCTV camera system is a very popular method of keeping a building or a place under surveillance. In Conventional security systems, the cameras only record and stream the video feed so that someone can watch what happened in that place at that time. But it can't prevent a burglary or can't immediately alert the authorities. In this project we proposed system to identify any individual in an institutional building from real time video surveillance footage. This system also offers fire alarm, anti-theft protection, and weather report and weapon detection facility. Our approach recognizes

a human face whether a student, teacher or stuff from previously stored data in the server in any background from the security camera footage. This method works on different level of lighting conditions with IP cameras already installed in the building without any significant error. We have implemented this project with the Raspberry Pi while taking advantage of python libraries like OpenCV and numPY. SQLite is used for database management. This system is designed to provide weather data, send fire alarm, detect theft and unauthorized personal, and detect unauthorized weapon. This system will keep log data of the whereabouts of all the individuals on real time. A software system is also developed to facilitate the admin to access the system properly with the help of JAVA. Moreover, GSM module will send a message or make a phone call to the security authorities when immediate action is needed.

AS/2018/1/01 A typological study on urban retail spaces in central business district of Sylhet, Bangladesh

Mohammad Tanvir Hasan and Mohammad Nahyan, Assistant Professor

Dept. of Architecture, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

The trend of urban retailing is an ancient phenomenon in Sylhet. Many shopping spaces, bazaar, market place has developed over the time to reshape retail industry. Especially in last three decades, various new shopping mall, retail outlet, and store have developed along with the old market place in an unplanned manner. There is significant typological variation can be observed among old (tradition) and new (modern) shopping space with lack of standard service, infrastructure, and management. In contrary, the old shopping space had a significant spatial cultural value of this region and new shopping space could act as a place for public recreation. The aim of this research is to identify the typological differences between (old) traditional and new (modern) shopping spaces in the central business district of Sylhet and to investigate the use-pattern and user response in these two different spaces. Through the research, the study will help to draw a comparative typological analysis of exiting retail space and user behavior on these typologies. Finally, probable consideration will disclose that may act as a guideline for shopping space in Sylhet aiming to continue the spatial cultural values of retail space and satisfy the standard service and management of shopping spaces.

AS/2018/1/02 Aesthetic and spiritual values of ecosystems: recognizing cultural ecosystem services of tea cultural landscape of Sylhet

Kawshik Saha and Mohammad Shamsul Arefin, Assistant Professor

Dept of Architecture, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Bangladesh is the 10th largest tea producing country in the world. Tea industry here date back to British rule, when the East India Company initiated tea trading in 1840. Today, the country has 162 commercial tea estates, including many of the world's largest working plantations employing more than 4 million people in this sector. Tea gardens in Bangladesh are mostly located in northern and eastern districts where the highlands, temperate climate, humidity and heavy rainfall provide a favorable ground for the production of high-quality tea. Tea production in Sylhet region was introduced in the late nineteenth century with Assam. The picturesque Surma Valley of Sylhet is covered with terraces of tea garden and lush green tropical forests. Sylhet area covers around 150 tea gardens including three of the largest tea gardens in the world both in area and production. Local inhabitants, migrated communities and small aborigine groups are major sources of human resources working in the tea gardens. Thus, for hundred years' tea plantation in Sylhet region has formed a varied agricultural landscape with distinct cultural and natural resources. Human interaction with tea landscaped ecosystem created distinct forms of spiritual believe, language system, heritage, cultural values and identity. Both tangible and intangible cultural heritage properties are rooted here in various form

of music, dance, ritual, festival, crafting and others. Apart of economic values of tea cultivation, stunning aesthetic quality of tea landscape attract tourists from all over the country which have turned tea gardens to economically vibrant tourism center of the country. So, this research aims to assess tea gardens from perspective of cultural landscape and try to identify cultural values of existing ecosystem. Through the research, tea gardens were investigated to identify potential cultural and natural values and how they are connected in terms of 'space'. Physical survey and personal interviews were carried out to understand the key attributes and values that tea cultural landscape possess and how they have been connected to each other.

Technical Session–II

(For Dept. of ANP & ENG)

Date: September 26, 2019 || Time: 1:00 PM – 3:30 PM

Session Chair: Prof Dr Md Nazrul Islam

Resource Person: Dr Abdul Awwal Biswas

SS/2017/11 Water diplomacy and the water sharing problem between Bangladesh and India: A study on the Teesta River

Dr. Fahmida Akter and Amina Khatun, Assistant Professor

Dept. of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Water is an essential resource for life, good health, and development. However, one in three people worldwide does not have enough water to meet their daily needs (Allan: 1999). According to the UN, in 2025 nearly 2 billion people will live in conditions of absolute water scarcity, and two-thirds of the world in areas of water stress (Irina Bokova & Henk Ovink: 2016). Unsurprisingly, water crisis and the failure to adapt to climate change are first and second on the list of greatest global threats, as highlighted during the last World Economic Forum in Davos (2016). In our highly interconnected world, water should be an integral part of any discussion on agriculture, energy, public health, transportation, environment and the future. Bangladesh and India share 54 rivers. The Teesta is one of them. In this project, we want to know the consequences of water sharing problem on the Teesta River and try to build up a conceptual and analytical framework that identifies the key factors that, affecting the water sharing issues of the Teesta River. We also try to find out the solution of the water sharing problem on the Teesta River As well as the other rivers which are (54 river) sharing with Bangladesh and India. The Research work divided into five chapters. The first chapter (Introduction) discussed about Research Background, Objectives of Research, Methodology, Literature Review and Theoretical Perspectives. The second chapter discussed about Water Diplomacy and Water sharing problems and their interrelations. Also explain about different International Treaties and laws related to water sharing problems and tried to build up a conceptual and analytical framework that identifies the key factors that, affecting the water sharing issues of the Teesta River. Then third chapter discussed different water project on Teesta River and identified the consequences/ impacts of water sharing problems in Bangladesh and India. Then try to find out the way how to sign up an agreement between Bangladesh and India to resolve the water sharing problem on the Teesta River. In fourth chapter we identify another rivers condition, which are sharing between Bangladesh and India. Also try to identify a common solution for all sharing river water between Bangladesh and India. At last, fifth chapter discussed about recommendations and conclusions.

Key Words: Water Diplomacy, Water Sharing Problem, Water Scarcity, Climate Change.

SS/2017/29 Rape and remedies: some observations about the causes and consequences of rape in Sylhet and Sunamgong

Moni Paul, Assistant Professor & Professor A K M Mazharul Islam

Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

SS/2018/1/01 Rohingya Refugee crisis; livelihood strategy and humanitarian response: An anthropological study in Kutupalong Rohingya camp of Ukhia, Cox's Bazar

Md. Mokhlesur Rahman, Associate Professor and A K M Mazharul Islam, Professor

Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

SS/2018/1/02 Ordering the border: An inspection into the role of Lauwaghar-Balat Border Haat on the Bangladesh-India border management

A F M Zakaria, Associate Professor and Mohammed Javed Kaiser Ibne Rahman, Assistant Professor

Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

In an effort to provide a background to assess research directions for imaging governing borders, this study displays what we know about borders, and what we do not know well about borders governance, especially on the program of border Haats. In order to revive the image as ‘bloodiest border of the world’ and improve the livelihoods of borderland people, the governments of the border-sharing countries of India, Myanmar, and Bangladesh have introduced the concept of ‘Border Haats’ following the new wave of bilateral cooperative framework and MoUs in 2010 between India and Bangladesh. The study on Lauwaghar-Balat Border Haat helps how this organizing principles/ MoU/Modalities underlie the basic themes of border governance, trades, flows, culture, history, security, and sustainability. For identifying the rationales, technology, procedures of this new kind of management, we reviewed works of literature on policy documents of MoUs, frameworks, protocols, contracts between Bangladesh and India. We employed the key informant interview and In-depth Interview, Focus Group Discussion as major methods to collect the qualitative data in order to know the specific information and understanding the nature of governance and the effects on the local market of nearby border haat to Bangladesh. Our analysis is basically thematic and exploratory to understand the meaning of this management to the lives of the border people. We found that the aim of formalizing illicit trade through the border areas, and to offer an economic opportunity to people living in remote areas become a cover for retaining and reproducing the old forms of ‘business’ heavily with new arms. It is revealed that this particular move is politically more significant than it is socially or economically. In Foucauldian language, it is identified as ordering the population through Border Haat rather than controlling the geography, an old mechanism, a form of biopower (Foucault, 1978), an ‘Indian approach’ of border management.

SS/2018/1/03 Social inclusion or exclusion through language: A study on Khasi linguistic group in Sreemangal

Mohammad Monjur Ul- Haider¹, Lecturer and Sheikh Tawhida Rahman²

¹Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

²Dept of Social Work, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Social inclusion is seen to be defined in relation to social exclusion. Furthermore, inclusion and exclusion are inseparable sides of the same coin; the strength of intragroup ties and of the identity that forges them is inseparable from a community’s definition of itself as distinctive. Social exclusion as multidimensional phenomena and have considered several important living condition variables as proxies for social exclusion. They are: 1) Exclusion from formal citizenship rights; 2) Exclusion from labor market; 3) Exclusion from participation in civil society and 4)

Exclusion from social arenas. Participation in all these arenas would suggest that people are not socially excluded, but indicators of participation, degree of participation, and how the degree of participation in different arenas should be considered in relation to each other still need to be specified. This study aims to reveal the social inclusion or exclusion through language, it fills the gap in existing relevant knowledge. This empirical study was carried out in three villages from two unions of Sreemangal upazilla under Moulavibazar district. The study findings came up with the knowledge that how the vernacular can influence the social structure between ethnic and not ethnic group. In this study the Khasi peoples of Sylhet region were studied. This study followed both qualitative and quantitative methods and analyzes the patterns of social exclusion that emerges through inclusion initiatives by Khasi language. Findings that come from primary sources were analyzed under four themes, viz. Social Inclusion through Khasi Language, Initiatives taken by the Government, Initiatives taken by the NGOs and Private Sectors, and 'Inclusion' or 'Exclusion'. The findings were supported by several case studies. For the pursue of the study here only the linguistic part, especially the education in mother language has been focused. But, the linguistic part of the Khasi language is rich itself that might be another issue for further research.

SS/2018/1/04 Understanding the impacts of using social media on the study-time allocation, academic achievements and mental health of university students at the Shahjalal University campus, Sylhet, Bangladesh

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¹Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

²Dept of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Introduction: This study as designed to improve the quality learning system of the university students who now-a-days spend most of their time with the internet-based communication system. The outcome of the study will increase consciousness among students about using social media and its impacts in their student life.

Objectives: This study focuses mainly on the impact of social media on students' self-management process, study-time management, academic outcomes and the impact on mental health.

Methods: The study is based on mixed methods where in total 820 students were enrolled all together, and they were interviewed by using a semi-structured questionnaire, some focused group discussions were conducted along with some structured observations. Enrolled students were compared mainly within the Social Sciences School and Applied Sciences and Technology School of SUST Campus.

Findings: 62.56% social media users are students between the age 21-23 years who studies mostly in the 3rd year 1st semester and in the 4th year 1st semester. Smartphone is the most popular (83%) device in Social Sciences and in Applied Sciences and Technology School, along with Smartphone (48%), laptops are also popular (27%). Facebook and Messenger is most popular (43%) social media in total following Multiple Social Media user (38%). And for both groups, YouTube user is almost similar in popularity (around 25%). In total 37% students daily use social media from 2-3 hours at least . In consideration of study hour, in total, more than 60% students study less than 2 hours which is almost similar for both groups. The main reason of using social media among total samples is to pass time by observing others activities (32%), following chatting (15%). Regarding to the impact of social media on study, in total 57% students think that it has positive impact while 41% consider it as negative. For using social media, students have expressed that they under stress to manage their study time. The study shows in total 37% students study over time whereas 24% don't try to adjust even and 24% students are unable to adjust.

Conclusion: Even though the existence of SUST-WIFI system free of cost 45% students used to buy Megabytes from parents and around 20% utilize money from personal income. Finally, 44% students in total suffering from sleeplessness whereas 40% students said they are depressed as well as frustrated which are explored significant relationships in the statistical analysis.

Keywords: Social Media, Depression, Time management, Impacts, Academic Studies,

SS/2018/1/05 Rohingya Refugees an anthropological understanding on human rights crisis

Korima Begum and Moni Paul, Assistant Professor

Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

SS/2018/2/24 The Knowledge, Attitude And Practices of Menstrual Hygiene Management among Adolescent Girls in Sylhet Division

Nur Mohammad Majumder, Associate Professor and Mrs. Amina Khatun, Assistant Professor

Dept of Anthropology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Poor menstrual hygiene management (MHM) among adolescent girls in Bangladesh is a problem due to inadequate puberty education and conservative culture. Maternal, sexual, and reproductive health issues are considered as ‘culture of silence’ in Bangladesh. Adolescent girls are often reluctant to discuss their menstrual conditions with their parents and feel more hesitation to seek assistance and support. Lack of proper knowledge, positive attitude, and hygienic practices were found the main barrier among adolescent girls in Bangladesh. Therefore this study aimed to conduct knowledge, attitude, and practices among adolescent girls in Sylhet division in Bangladesh.

To explore in-depth understanding and lived experiences of girls attitude and practices during menstruation, this study was conducted qualitative research using phenomenological study design. In-depth interviews were taken from adolescent girls aged over 15 years old, guardians, and school teachers in four districts in Sylhet division. Both rural and urban areas were selected purposively. Besides this, structured observation was conducted to find out infrastructural capacities of selected areas.

The study found that most of the girls had no proper knowledge before menarches. Findings show that menstruation affect girls study and cause of school absenteeism. Still, most of the girls in urban and rural areas faced socio-cultural taboos by their family members. Proper menstrual hygiene practices found very low in rural areas in Sylhet Division. School teachers were found reluctant and feel discomfort to discuss MHM issues in the classroom. Most of the educational institutional found lack of separate toilet, adequate water supply, enough disposal systems, and sanitary pads availability for girls through observation.

Effective and culture-sensitive intervention like a campaign, awareness building workshop, seminar for teachers and guardians, financial support should provide by GoB in both rural and urban institutions.

Keywords: Menstrual hygiene management, KAPS study, adolescent girl, Sylhet division

SS/2018/2/25 Organizational diversity towards Social unity: An anthropological survey on potentials of ethnic organizations to redefine social cohesion in CHT

Dr. Chowdhury Farhana Jhuma, Associate Professor and Sanjay Krishno Biswas, Assistant Professor

Abstract

Key Issue: This research evaluate the outcome of ongoing organizational activities pattern in CHT, considering the issues of a) Identifying the major loops (characteristics) on indigenous local level organizations in ensuring their rights and responsibilities, b) Tracing the visible role of ‘grass root’ organizations and their proposed activities and changes of the policy, c) Sectors of relationships of local organizations with larger organizations and d) Find out the missing links of development priorities and potentiality of ethnic organizations in CHT.

Aim: Here the interest of the research is to outline the macro organizational development as a strategy shift in CHT, specifying the period after late 90’s and onward. The inclusion of fashioning margin’s rights, the research wants to focus on the frequency of self-sustaining grass root organizations in major ethnic communities in CHT and their embodied need among local sector.

Method: Grounding participatory approach, the secondary source will provide the gradual data compilation on local ethnic organization. The study area of Chittagong Hill Districts (Rangamati, Bandarban and Khagrachari) will be managed through stratified and purposive sampling for selected 3 organizations/ 2 Upazillas from each district. The study population will consist about 8 – 10 people per organization cumulating gatekeepers, beneficiaries and government officials, and 36 In-depth Interview, 1 Case History from each organization, 3 Focus Group Discussion (FGD), and Checklist will be the specific qualitative techniques of data collection.

Result: The screening of organizational profile through sectorial and relational categorization of issues i.e., factors of genealogical aspects of local ethnic organization, functional and governing aspects and equation of sustainability aspects will explain the need and function of decentralization of GRO (Grass Root Organization) in CHT.

Analysis: Modeling of Panel and descriptive survey outputs with the matrix and diagrams shows the long term, vibrant and contemporary concern of addressing CHT cohesion scenario.

Conclusion: Outlining the awareness and self-driven initiative of indigenous people in organizational form in CHT, can explain the contemporary bilateral changes in policy endorsement and absorbing pattern. Along this the, formation of new identity can be traced by the analysis of the function of small-scale ethnic organization in CHT.

SS/2018/1/12 Climate change in blockbuster studies: The Philosophy of consensus gentium

Md. Mizanur Rahman and Sayeef Ahmed, Assistant Professor

Dept. of English, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

SS/2018/1/13 The development of English language skills of SUST students: A case study

Professor Dr. Himadri Sekhar Roy

Dept of English, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

In order to meet the demands of the current world for multiple purposes, SUST has made English language courses compulsory for all the students. The Department of English has been offering particular English language courses for a semester as the target to sharpen the language proficiency of the students of 28 departments. To examine the four skills randomly, the researcher made a testing module. Around 200 students from different departments were examined twice. The first exam was held in the very beginning of the first year -first semester to detect the existing language

skills. The second exam was held in first semester of second year to find out the gained language level. The results what we get from different tests give us a clear picture that the students after attending language courses are doing better in writing area. They are comparably doing better in reading area too. But they are unable to develop in listening and speaking area. So out of these four skills, listening and speaking skills should be given more emphasis so that our students will be linguistically competent enough. The classroom atmosphere should be created in such a manner by which four skills will be dealt with equal importance. The infrastructure what will be required needs to be ensured so that the main objectives of the courses will be obtained. Without proper equipment, it is almost impossible to enhance linguistic capability. If the university administration can ensure the practice of all four skills equally in the classroom, the outcome will be better and the target of implementing these language courses in the university will be acquired successfully. An English Language skilled manpower is a must if the present scenario of the world is considered. The Govt. of Bangladesh has already taken different initiatives to fulfill the demand. Shahjalal University of Science and Technology has the same motto to produce the graduates who will be able to take the challenge.

SS/2018/2/29 Students' use of off-class hours in campus and its effectiveness: A case study on the Development of English Students at SUST

Professor Dr. Muhammad Alamgir Toimoor and Professor Dr. Hossain Al Mamun

Dept of English, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

This research project intends to explore the effectiveness of the off-class hours' activities and engage the English Department students in it. Since higher Education demands serious devotion and commitment and to be educated has been always a hard and challenging affair, our students even ten years back looked upon education with almost a religious devotion; whereas, the same at current times see it as a means to procuring certificates to apply for jobs and make money. The real purpose of education is to build an ethical mindset with a solid platform of enduring knowledge backing it up remains a failure. Bringing the students back on track has become a struggling issue. Inspiring them, berating them in the classrooms, and grading them tough have turned out to be ineffectual. In the process, it has been noticed that the students have not only lost interest in learning, they also have lost the ability to concentrate on intricate issues discussed in a 50-minute class! They, as we have observed, are suffering from lack of: a. inspiration to learn, b. ability to focus, c. capacity to assimilate bits of pieces of information to form a holistic knowledge, and d. keeping the information in mind for long. With a view to resolving those issues, we have come to realize that the first thing we should focus on is that we inspire them to read the prescribed texts in off-class hours while they are in campus and engage in fruitful discussions on it so that they remain enthusiastic, focused, and keep the information in mind so that they can implement it in practical life forming an ethical platform.

Technical Session–III

(For Dept. of MAT&OCG)

Date: September 26, 2019 || Time: 1:00 PM – 3:30 PM

Session Chair: Prof Dr Md Elias Uddin Biswas

Resource Person: Prof Dr Md Rashed Talukder

PS/2017/24 Mathematical model and analysis on dengue and chikungunya Transmission in Bangladesh

Professor Dr. Md. Anowarul Islam and Professor Dr. Md. Aminul Haque

Dept of Mathematics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Dengue and chikungunya diseases are the major public health problems in Bangladesh. The effect of these diseases was more virulent over the country. Until now a limited literature is available for the study of these diseases in Bangladesh, and mostly all the studies are done only by the empirical way and as medical case studies. There is no development of mathematical modeling to investigate the dynamical behaviors of the diseases in Bangladesh. As a consequence, it is highly required to develop and to use the mathematical modeling technique for exploring the dynamics of the diseases outbreaks and analyzing their stability criterion. The concept of a compartmental technique is used to develop the mathematical model. In this project, a compartmental mathematical model has been proposed that describes the transmission of dengue and chikungunya diseases. Nonlinear incidence rates are considered for the disease transmission and the system of nonlinear differential equations are developed to represents the model. In addition, the treatment term has been used in the model. Disease-free and endemic equilibrium points are calculated and with the help of basic reproduction number the stability of the model has been analyzed. Numerical simulations are performed based on the real data collected from several health institutes of Bangladesh. Both analytical and numerical results provide the pattern about the dynamics and the treatment effects of the both diseases in Bangladesh.

PS/2017/25 Numerical simulation of non-newtonian blood flow through stenosed artery

Professor Dr. Ashraf Uddin and Dr. Kausari Sultana, Associate Professor

Dept of Mathematics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Blood flows through the arteries and deposition of fatty materials in the artery, known as arterial stenosis, reduce the cross-sectional area. Arterial stenosis changes the normal flow behavior of blood and increases the possibility of having a heart attack and brain strokes. Thus, it is important to understand how blood flow behavior changes due to arterial stenosis. This study aims to understand how the behavior of blood flow changes with different area reductions and inlet flow patterns (i.e. parabolic and pulsatile) of the artery. More specifically this study aims to understand the effects of Reynolds number on blood flow with spiral velocity, analyzing the behavior of pulsatile blood flow through axisymmetric artery with single and multiple stenosis as well as to examine the performance of turbulence model for blood flow simulation. The artificial geometrical model of the stenosis in the blood vessel was created by using the cosine curve formula. After applying the Reynolds time-averaging techniques, the Reynolds averaged Navier–Stokes (RANS) equations are used as the governing equations for blood flow motion. To choose a better model, simulations were performed for $k-\omega$ and $k-\varepsilon$ models. The well-known Carreau model has been used to capture the non-Newtonian behavior of the flow. Initially, a numerical simulation has been carried out with varying Reynolds numbers to investigate the effect of spiral flow in the artery due to stenosis. This investigation showed that

the blood flow parameters (i.e. pressure, axial velocity, radial velocity, tangential velocity, turbulent kinetic energy, and wall shear stress and eddy viscosity) significantly changes with the change of Reynolds number. To examine the performance of turbulence model, simulations were performed with 75% area reductions in the arteries using two turbulence models (i.e. $k-\omega$ and $k-\epsilon$). Findings show that $k-\omega$ model has a better performance comparing to $k-\epsilon$ model to predict the behavior of blood flow. Numerical simulations of pulsatile transitional blood flow through axisymmetric stenosed arteries showed that the fluid properties peaked in an occurrence at the stenosis for both in the artery with single and double stenosis. The magnitudes of fluid properties increase with the increase of the area reduction. The present study offers insights on how the basic properties of blood flow changes with the different area reduction of the human artery. Thus, this study will serve as a guideline to deal with the heart disease, especially with the heart attack due to arterial stenosis.

PS/2017/27 Theory of semi lattices and its subclasses

Professor Dr. Shamsun Naher Begum and Himadri Shekhar Chkraborty, Assistant Professor

Dept of Mathematics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

In this project, we study annihilator ideals in 0-distributive semilattices. Firstly, we give a necessary and sufficient condition for a prime ideal of a 0-distributive semilattice to be an annihilator ideal. We proved Stone type separation theorem for annihilator ideal of 0-distributive semilattice. Then we show that if every prime ideal of a 0-distributive semilattice is an annihilator ideal, then the set of all prime ideals is an antichain. We also prove that the set of annihilator ideals of a 0-distributive semilattice is Boolean. We give a characterization of the set of annulets to have the smallest element. We also show that the set of annulets of a 0- distributive semilattice form a sublattice of the lattice of annihilator ideals which is Boolean. Finally, we introduce the concept of AP-morphism. We prove that for every ideal of a 0-distributive semilattice there exists a homomorphism whose kernel is the annihilator of the ideal.

PS/2017/28 Theory of ordered sets as generalization of lattice theory and its application to searching techniques

Professor Dr. Md. Rashed Talukder and Mohammad Salah Uddin, Assistant Professor

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Abstract

Increasing the efficiency in searching methods when only partial information about the ordering of the elements is known has become an important research area. In this project, we mainly aim at the study of different decomposition methods of partially ordered sets (posets) which has direct application to searching techniques. In this connection, we study the theory of posets as a generalization of lattice theory. We define and use the properties of block of 0s, block of 1s and complete blocks of 1s of poset matrix. We obtain some characterizations of a special subclass of posets known as series-parallel posets. We also highlight the fact that these characterizations of series-parallel posets induce some computational aspects of decomposing graded posets as well as of searching techniques.

PS/2017/29 Analysis of a particular class of piecewise linear equations with wired dynamics

Dr. Pabel Shahrear, Associate Professor and Professor Dr. Md. Mizanur Rahman

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Abstract

We present a simple negative feedback system to introduce the class of models that we study. In this work, transcription factors are both produced and destroyed continually. Each transcription factor has a threshold and as it passes the threshold, the production of other transcription factors to which it input are either turned on or there is no effect: what happens in each case depends on the particular control functions assumed. We have studied the impact of Lyapunov exponent and its relevance to the study of sensitive dependence to initial conditions. We also give a simple example that demonstrates that the Lyapunov exponent alone is not adequate to understand the long-time dynamics in a simple system. The examples in this project illustrate situations in which a positive Lyapunov exists even though the dynamics approach a limiting value. Finally, we present numerical evidence of a more complicated system that has interesting long-term dynamics that we term “collapsing chaos”. This is a good result we have achieved in this project. As the number of genes and interactions in a network increase, the number of network parameters increases even more rapidly. Therefore, even though many intelligent computing techniques for parameter approximation have been proposed, the solution to this multi-dimensional problem remains to be found. Dimension reduction is one strategy applied to the four-dimensional system. Eigenvalues of such system have a negative real part and numerical results have ties with the differential equation where the logical state is embedded in it.

PS/2017/30 Study of gamma rings for the advancement of algebra

Professor Dr. Md. Mahbubur Rashid and Professor Dr. Sujoy Chakraborty

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Abstract

We study some concepts of gamma modules through the study of gamma rings and derive some of their properties which are necessary for defining radicals for such algebraic structures and for getting some structure theorems. Some connections between maximal ideals in the gamma rings and those in the associated classical rings are characterized. We establish some more important results in gamma modules within the scope of our study.

PS/2018/1/09 Algorithms for decomposing posets into terms and factors through poset matrix

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Dept of Mathematics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

We give algorithms for decomposing finite posets into terms and factors. We also highlight a fact that the aforementioned decomposition techniques of graded posets induce some computational aspects of posets in finding linear extensions of posets. The dimensions of the adjacency posets for graphs are now being used for characterization of planar graphs and planar networks. Since, determining dimension of a poset depends on linear decomposition of that poset, the theory of decomposition are being studied by many authors for discovery and implementation of more efficient algorithms for decomposing posets into their linear extensions. Our idea is that, being able to decompose a poset into its direct terms, ordinal terms and direct factors must give efficiency in decomposing posets for finding all the possible linear extensions of that poset. In this research, particularly, we develop algorithms for decomposing series-parallel posets into direct terms and ordinal terms. Here we use poset matrix as a representative of finite poset.

PS/2018/2/18 Study on domain integrals and automatic mesh generation- An attempt to develop software for solving engineering problems

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Abstract

This study considers the one- and two-dimensional domain integrals and automatic mesh generation employing higher order elements for enhancing the implementation of the finite element method. We wish first to present, for the one-dimensional domain integrals the explicit formulae in order to easy computation of element matrices. Then, we attempt to present formulae for the two-dimensional domain integrals. Since the triangular elements are suitable to discretize the domain, we stress on developing formulae for the triangular domain integrals. Finally, we opt to develop a general algorithm in order to generate h- and p- version meshes for an arbitrary (convex or concave or curved) domain. So that one can choose either lower order triangular elements for the generation of h-version meshes or higher order triangular elements for p- version fine meshes of the problem domain based on the choice of the refinement. Next attempt is to develop a MATLAB computer code based on the algorithm in order to collect the coordinates of the global nodes, element connectivity and display the meshes. We wish further to develop a computer code incorporating the domain integration formulae to compute element matrices for each element of the mesh, assemble the element matrices to form the global matrix and then the solution of the physical problem

PS/2018/2/19 Representation of 0-Modular p Algebras

Professor Dr. Shamsun Naher Begum and Dr. Chandrani Nag, Associate Professor

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Abstract

In this paper, we study 0-modular p-algebra. In 0-modular p-algebra L every element $x \in L$ can be represented in the form $x = x_0 \wedge (x_1 \vee x_2)$ where $x_0, x_1, x_2 \in D(L)$, the set of all dense elements in $\langle L; \wedge, \vee; 0, 1 \rangle$. We also characterize that

if a 0-modular p-algebra contains the \vee -element modular and non-distributive sublattice M_3 , then $M_3 \leq F_a$ for some $a \in B(L)$, the set of all closed elements in $\langle L; \wedge, \vee; 0, 1 \rangle$. We observe that all subdirectly irreducible pseudocomplemented distributive lattice has been found by H. Lakser but in 0-modular p-algebras there is no subdirectly irreducible representations on $\langle L; \wedge, \vee; 0, 1 \rangle$.

PS/2018/2/20 Large Eddy Simulation of turbulent flows in some benchmark problems by using different sub-grid scale and wall stress models

Professor Dr. Md. Ashraf Uddin

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Abstract

Large Eddy Simulation (LES) has been demonstrated to be a useful research tool for understanding the physics of turbulence as well as an accurate and sophisticated predictive method for flows of engineering interest. The recent important issues for LES are numerical method and SGS modeling. The aim of this research project is to develop a fluid simulator based on LES and this numerical code will be designed to perform a coupled simulation in engineering problems. However, before applying to the practical problems, it is necessary to examine the effectiveness and performance of the LES through the benchmark problem which other researchers have examined. Since the appearance of small-scale tube-like eddy or vortex in turbulence is universal so these vortical structures in the computed flow field will be visualized and the characteristics of this small-scale structure should be analyzed. Therefore, the objective of our present research is to develop a fluid simulator based on LES and then the effectiveness and performance of different LES approaches will be examined through the benchmark problem in turbulence. The performance of LES will be examined using different SGS models such as Standard Smagorinsky model, Dynamic Smagorinsky model, scale similarity model, etc. To achieve this goal, we have performed LES in plane turbulent channel flow and this

paper presents results of comparative study of LES. The LES is performed by using a finite difference method of second order accuracy in space and a low-storage explicit Runge-Kutta method with third order accuracy in time. In the LES for subgrid-scale (SGS) modeling, Standard Smagorinsky Model (SSM) and Dynamic Smagorinsky Model (DSM) are used. Essential turbulence statistics from the two LES approaches are calculated and compared with those from direct numerical simulation (DNS) data. Comparing the results throughout the calculation domain, in this simulation it has been found out that SSM performs better than DSM in the turbulent channel flow simulation. Flow structures in the computed flow field by the SSM and DSM are also discussed and compared through the contour plots and iso-surfaces.

PS/2018/2/21 Comparison of Picard and Newton iterative schemes in the finite element modeling for one-dimensional variably saturated-unsaturated flows

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Abstract

Numerical simulation of saturated–unsaturated flows is an important problem in many branches of science and engineering. These include soil science, agricultural engineering, environmental engineering, and groundwater hydrology. Modeling of fluid movement in variably saturated-unsaturated porous media usually results in systems of highly nonlinear parabolic partial differential equations which are not solvable analytically unless unrealistic and oversimplifying assumptions are made regarding the attributes, dynamics, and properties of the physical systems. Such mathematical relation is described by the Richards’ equation, which was formulated by applying unsaturated Darcy’s law and continuity equation. Picard and Newton techniques are the most popular iteration methods for solving the nonlinear equation governing flow in variably saturated-unsaturated porous media. In this study, different test cases will be presented and analyzed for different aspects of the performance of the two iterative methods along with the different factors that can affect their convergence and efficiency, including problem size, spatial and temporal discretization. We have developed and presented a computationally simple and efficient finite element algorithm that can solve a wide variety of one-dimensional variably saturated-unsaturated flow problems. Computer code is ready to run that will be able to solve the one-dimensional Richards’ equation with an accurate mass balance and it will converge rapidly to the theoretical/exact solution. Adaptive time-stepping schemes and under-relaxation formulas will be adopted for alleviate the computational burden. To assess robustness, stability and accuracy of solution for an extensive diversity of cases including dry systems and large surface/subsurface interaction fluxes. Verification and application examples will demonstrate the need for a rigorous, fully-coupled solution to the set of equations, for complete hydrologic-cycle analysis.

PS/2018/3/36 Translating Ocean into Economics: Modelling marine spatial planning scenarios for Blue Economy Development in the northern Bay of Bengal

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²Dept of Oceanography, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

For the expansion of economics activities in the coastal water in Bangladesh a proper spatial planning is missing. Considering the recent focus of the Bangladesh government on Blue Growth a long-term strategy promoted by Marine Spatial Planning (MSP) to support sustainable growth of economic activities in the marine environment is required. Thus, using the environmental data sets from the maritime area of Bangladesh, the main focus was to identify the

suitable areas for the expansion of specific economic activities. A pair-wise comparison matrix was used for weighting the controlling factors of economic activities and then to integrate the estimated suitability score for economic activities expansion based on controlling factors. In this phase of the project we focused on the suitability score development for the sea weed culture development in the maritime area of Bangladesh. We found that the east of south-east coastal area of Bangladesh is most suitable area for sea weed culture. North of the south-east coastal area and south-west coastal area were found moderately suitable while rest of the area were found as not suitable area for sea weed culture. Our study will serve as a guideline to establish sustainable Blue Economy in Bangladesh.

Technical Session–IV

(For Dept. of CHE)

Date: September 26, 2019 || Time: 03:30 PM – 7:00 PM

Session Chair: Prof Dr Syed Shamsul Alam

Resource Person: Prof Dr Md Mizanur Rahman

PS/2017/01 Label free single molecule detection of troponin 1 by AFM study: Virus nanoparticles as AFM tip

Professor Dr. Md Abdus Subhan and Professor Dr. Md Mahbulul Alam

Dept of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

PS/2017/02 Electrochemical detection of total arsenic and building up of arsenic map of different zones of Bangladesh including Sylhet area

Professor Dr. Mohammad Abul Hasnat and Md. Masum Talukder, Assistant Professor

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Abstract

Pd nanoparticles were electrochemically immobilized on Pt surface in presence of sodium dodecyl sulfate (SDS) molecules to study electrokinetics of arsenite oxidation reactions and corresponding sensing activities. The X-ray photoelectron spectroscopy (XPS) analysis showed that on the Pt surface, Pd atoms exists as adatoms and the content of Pd (0) and Pd (II) were 75.72 and 24.28 at. %, respectively, where particle sizes were in the range between 61 to 145nm. The experimental results revealed that catalytic efficiency as well as charge transfer resistance (at the redox potential of Fe (II)/Fe (III) couple) increased with an increasing order of Pt<Pt-Pd<Pt-Pd_{sds}. A Pt-Pd_{sds} electrode exhibited open circuit potential (OCP) at 0.65 V in acidic condition, however, while 50.0 mM NaAsO₂ was present, the OCP value shifted to 0.42 V. It has been projected that the As(III) oxidation proceeds using a consecutive pathway; As(III) → As(IV) → As(V). After optimization of the square wave voltammetric data, a limit of detection of As(III) was obtained as 17.35 and 2.67 nM, while the surface modification of the Pt surface was executed with Pd particles in absence and in presence of SDS surfactant, respectively. Finally, real samples were analyzed with excellent recovery performance.

Key words: Convolution voltammetry; Cyclic voltammetry; Rate constant; Transfer coefficient ;Reaction mechanism; Real sample analysis

PS/2017/04 Comprehensive Characterization of Bioactive compounds from Kalanchoe crenata for Anti-Microbial Activities

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Abstract

Background: Infectious diseases are a common and major threat to human health and wellbeing, . the invasion of a host by agents whose activities harm the host's tissues that is, they cause disease and can be transmitted to other

individuals that is, they are infectious. The present study *Kalanchoe crenata* (Crassulaceae) leaves extract was tested for antibacterial activity against various bacteria isolated from environmental sources.

Methods: Different parts of *Kalanchoe crenata* (root, stem, leaf, and flowers) were identified and collected from Sylhet area of Bangladesh and were separately shade dried, finely powdered using a blender, and subjected to extraction following the method of solvent. The extract was tested for antibacterial activity by disc diffusion method. Antibacterial assay was performed at 0.1 mg/ml, 0.5 mg/ml and 1.0 mg/ml concentrations.

Results: Significant antibacterial activity was reported of the plant extract. Our study reflects that the extract obtained from *Kalanchoe crenata* (Crassulaceae) shown strong antibacterial activity.

Conclusion: Bioactive compounds from *Kalanchoe crenata* can be serve as a very good source for the invention of new therapeutic agents to kill pathogenic bacteria.

PS/2017/11 Synthesis, X-ray crystal Structures, photoluminescence studies and bioactivities on M(II) complexes of the bidentate N, S chelating legends derives from dithiocarbazates

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²Dept of Physics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

A series of neutral bis-chelated Ni(II) and Cu(II) complexes with a new Schiff base ligand derived from S-octyldithiocarbazate and 4-methylbenzaldehyde was prepared and characterized. The Schiff base acts as a single, negatively charged bidentate ligand forming stable neutral metal complexes with metal having a square planar coordination, as supported by magnetic and spectroscopic data. Single crystal structures of NiL₂ and CuL₂ complexes have been determined by single crystal X-ray diffraction showing that in both complexes the two Schiff base ligands are coordinated to the metal ion as uninegatively charged bidentate ligands *via* the azomethine nitrogen and the thiolate sulfur atoms in a trans planar arrangement. Metal-mediated fluorescence quenching is observed on complexation of HL with all metal ions. Finally, the anti-bacterial activity of these compounds was evaluated against three pathogenic gram-negative organisms. The free ligand and all the newly synthesized complexes were tested for their antibacterial activity against three pathogenic gram-negative organisms. Only Ni(II) complex showed a moderate activity against *Escherichia coli*, but the free ligand HL as well as copper(II) complex did not reveal any antibacterial activity against the tested organisms.

PS/2017/32 Cost effective removal of Pb (lead) by using bio-adsorbent

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Abstract

Removal of lead (Pb) from aqueous solution was investigated in this project keeping in mind about the cost of remediation. Different biodegradable adsorbents were developed and their physicochemical properties were studied thoroughly. Under this project, domestic and agricultural discarded waste materials were utilized as an adsorbent to make the method cost effective. Biodegradability of adsorbent got priority owing to develop sustainable mitigation strategy. Carbonaceous and cellulosic wastes were selected and treated after collection, then these were used for our current study to remove toxic metal Pb from aqueous solution. Batch adsorption studies were conducted by using these developed sorbents. Adsorptive removal capacity was investigated at different pH to find out a suitable pH for this removal method. The data were well fitted with the Langmuir isotherm and other parameters found suitable for

the favorable adsorptive removal of Pb from the aqueous solution by these developed sorbents. Estimation of Pb was carried out by the solvent extraction method as Pb-dithiozone complex in the dichloromethane solvent media. UV-Visible spectrophotometric method was used in this project for the quantitative determination of Pb.

PS/2018/1/01 Development of Electrochemical Sensor for Paracetamol Using Thiocyanate Adlayer-Coated Gold Electrode

Professor Dr. Md. Rezwana Miah and Mr. Md. Saiful Alam, Assistant Professor

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Abstract

The adsorption of thiocyanate (SCN^-) onto the polycrystalline gold [Au (poly)] electrode in alkaline media was investigated using cyclic voltammetric and open circuit potential measurement techniques. Both the measurements showed that SCN^- underwent spontaneous oxidative adsorption onto the Au (poly) electrode surface. The SCN^- -adsorbed Au (poly) [$\text{SCN}_{(\text{ads})}|\text{Au (poly)}$] electrode was applied towards the electrochemical oxidation of paracetamol (PR) in alkaline media. The voltammetric signal of PR oxidation at the $\text{SCN}_{(\text{ads})}|\text{Au (poly)}$ electrode improved to a sharp and well-shaped peak current. The peak current was assigned only to the oxidation of PR. On the other hand, oxidation of PR at the bare Au (poly) electrode was very sluggish and took place simultaneously with the oxidation of the electrode surface itself and the current for the oxidation of PR thus could not be separated. The sluggish oxidation of PR at the bare Au (poly) electrode was attributed to the irreversible harmful adsorption of the anionic PR in alkaline media. While the improved and stable response at the modified electrode was obtained due to the effective blocking of the adsorption of PR at the surface of the electrode by the SCN^- -adlayer. The anodic transfer coefficient of PR oxidation at the $\text{SCN}_{(\text{ads})}|\text{Au (poly)}$ electrode was obtained as 42. A calibration curve was made over a large concentration range of PR and the reaction kinetics was found to follow a first-order kinetics. The sensitivity of the $\text{SCN}_{(\text{ads})}|\text{Au (poly)}$ electrode was higher than that of the bare Au (poly) electrode. The amperometric studies also suggested the higher activity of the $\text{SCN}_{(\text{ads})}|\text{Au (poly)}$ electrode towards the oxidation of PR. The fast and simple *in situ* fabrication technique of SCN^- -adlayer onto the Au (poly) electrode surface may be advantageously utilized for developing sensor for the purpose of detection of PR.

PS/2018/1/03 Fabrication of Flat Carbon Electrolyte for Hydrogen Transport in All Solid State Battery

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Abstract

In all solid battery a solid electrolyte is needed to permit the proton from the anode to cathode. Such a solid electrolyte has been developed from flat carbon material, the graphene oxide (GO) herein, the solid electrolytic property of bulk graphite oxide (GO'), acid leached graphene oxide (GO-H), and flat film of GO on comb electrode was measured by impedance study. The oxidized form of graphene (G) is a perfect candidate for proton conduction, as it possesses flat structure with extended polar functional groups. The proton conductivity can be improved by increasing the functional sites, flexibility of interlayers and devising composite by incorporation of hydrophilic groups at the GO interlayer. GO is a well-known electronic insulator, but for proton conduction we observed the reverse trend and it exhibited super ionic conductivity. The hydrophilic sites present in GO as -O-, -OH and -COOH functional groups attract the protons which propagate through hydrogen bonded networks along the adsorbed water film. The proton conductivity for GO' and GO-H at 100% humidity was $\sim 10^{-4}$ and $\sim 10^{-5} \text{ S cm}^{-1}$ respectively whereas for GO it is high with nearly $10^{-2} \text{ S cm}^{-1}$. This finding indicates the possibility of GO based perfect two-dimensional proton conductive materials for application in fuel cell, sensors and so on. The measured conductivity displayed the trend $\text{GO} > \text{GO}' > \text{GO-H}$. The

conductivity of GO is 2-3 orders in magnitude than GO'. The E_a value, complying with Grotthuss mechanism indicates practical application of GO in future. Besides, present evidence indicates the possibilities of better result in multilayer LB (Langmuir Blodgett) films of epoxy rich GO. The conduction mechanism in nanosheet and powdered sample is significantly different. For nanosheet assembly σ value originates from in plane protonic movement whereas for bulk sample there supposed to have significant contribution from conductivity across the plane. The flat and solid rigid shape of GO indicates its supremacy over other solid electrolyte like nafion, sulfuric acid derivatives and phosphoric acid. GO is inexpensive, nontoxic and green. Thus, GO is expected to be used in all solid battery.

PS/2018/1/04 The Synthesis of Schiff base ligands having NNO and NSO group and their Zn(II), Cu(II) and Sn(II) complexes and investigation of their biological activity

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Abstract

A new (E)-N-cyclohexyl-2-(2-hydroxy-4-methoxybenzylidene) hydrazine-1-carbothio amide (H2CMBCA) Schiff base ligand has been synthesized with N, S and O coordinating sites and has been chelated to Sn(II), Cu(II) and Zn(II) metal ions. The Na[Sn(CMBCA)·Cl], Na[Cu(CMBCA)·Cl] and Na[Zn(CMBCA) Cl] are square planar complexes. All the compounds are characterized with melting point, UV- Visible spectroscopy, FT-IR spectroscopy and ¹H and ¹³C NMR spectroscopy. The antibacterial activities of H2CMBCA and the metal complexes were screened for their antibacterial properties against two bacteria, i.e. Escherichia coli (Gram-negative, ATCC 25922), and Staphylococcus aureus (Gram-positive, ATCC 12600) via disc diffusion method and broth dilution method using ampicillin as the standard antibiotic. In the broth dilution method, Na[Sn(CMBCA)·Cl] exhibited significant antibacterial activity against E. coli and S. aureus with minimum inhibition concentration (MIC) of 12.5 and 6.25 µg mL⁻¹, respectively Na[Zn(CMBCA) Cl] also showed antibacterial activities against E. coli and S. aureus with MIC value of 27 µg mL⁻¹, while Na[Cu(CMBCA)·Cl] showed lesser activity with MIC values in the range of 50-100 µg mL⁻¹. In the disc diffusion method, the complexes showed significant antibacterial properties against both E. coli and S. aureus, whereas the ligand did not show notable properties.

Key words: Carbothioamide Schiff base; Antibacterial activity; Transition Metal Complex.

PS/2018/1/05 The effects of organic surface treatment by p-aminophenyltrimethoxysilane on the photostability and UV shielding effects of TiO₂ nano-particles

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Abstract

The effects of organic surface treatment using N-phenylaminoprpyltrimethoxysilane to reduce the photocatalytic activity of titanium dioxide are reported. TiO₂ which is widely used as ingredients for sunscreens is a semiconductor oxide and shows photocatalytic activity. Absorption of radiation by TiO₂ causes the production of reactive oxygen species which can promote the degradation of organic components present within the sunscreen formulations. This study is aimed to protect the components of sunscreen formulations from the photocatalytic processes induced by TiO₂ UV absorption. The surface characterization studies with FT-IR, XPS, and CHN elemental analysis provided evidence that surface of TiO₂ is successfully modified by PAPTMS. Moreover, from the BET surface area measurements, it is indicated that PAPTMS modified particles induces a remarkable change of the surface property from hydrophilic to hydrophobic. Hydrophobization decreases the amount of water on the particle surface and thereby lowers the content

of HO^- , HO^\bullet and HO_2^\bullet ; with a consequent increase of the photostability. The Photocatalytic activity measurements results showed that the PAPTMS modified TiO_2 particles have the most optimal optical properties, viz. low photocatalytic activities and high UV light shielding ability that are required quality for use in sunscreen materials.

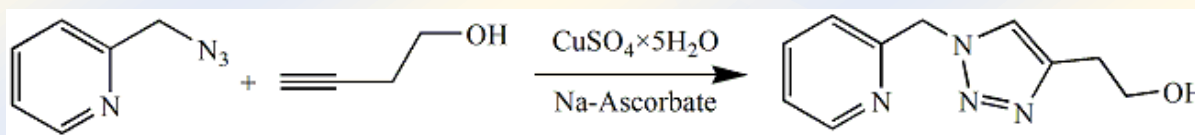
PS/2018/2/14 Design, Synthesis, and Characterization of a series of water soluble triazole ligands for transition metal complexes

Dr. Md. Mahbubul Alam, Professor and Md. Masum Talukder, Assistant Professor

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Abstract

In this research work, the author synthesized a water soluble triazole ligand by the Cu-catalyzed azide alkyne cycloaddition reaction. The synthesis consists of three different reactions. In the first reaction, the dehydrohalogenation of 2-(chloromethyl)pyridine hydrochloride in presence of Na_2CO_3 in water at 10-12 pH gave 2-(chloromethyl)pyridine which was characterized by ^1H NMR spectroscopy. In the second reaction, 2-(chloromethyl)pyridine was reacted with NaN_3 using TBAHS in dichloromethane-water solvent produced 2-(azidomethyl)pyridine. The product was characterized by ^1H NMR spectroscopy. Finally, prepared 2-(azidomethyl)pyridine reacts with 3-butyn-1-ol in presence of Cu catalyst ($\text{CuSO}_4/\text{Na-Ascorbate}$) gave water soluble triazole ligand **1** (Scheme 1). The ligand **1** was yellow oil, purified by column chromatography(silica gel; $\text{MeOH}:\text{DCM}=2:8$) and characterized by FT-IR (liquid) and ^1H NMR spectroscopy.



Scheme 1 Synthesis of 2-(1-((pyridin-2-yl)methyl)-1H-1,2,3-triazol-4-yl)ethanol (ligand **1**).

The water soluble 2-(1-((pyridin-2-yl)methyl)-1H-1,2,3-triazol-4-yl)ethanol (ligand **1**) employed as chelating ligand to prepare Co(II)-triazole complex. $\text{Co}(\text{PF}_6)_2 \cdot 6\text{H}_2\text{O}$ reacts with ligand **1** in methanol to give the yellowish green complex (Fig. 1) which has been characterized by FT-IR. Further characterizations of metal complex are under investigations.

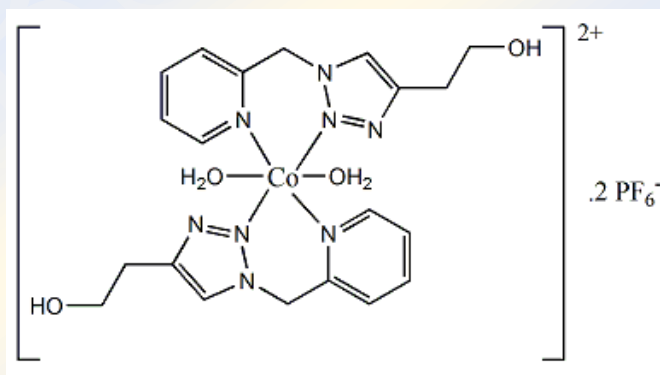


Figure 1 Structure of $[\text{Co}(\text{ligand } 1)_2(\text{H}_2\text{O})_2](\text{PF}_6)_2$ complex.

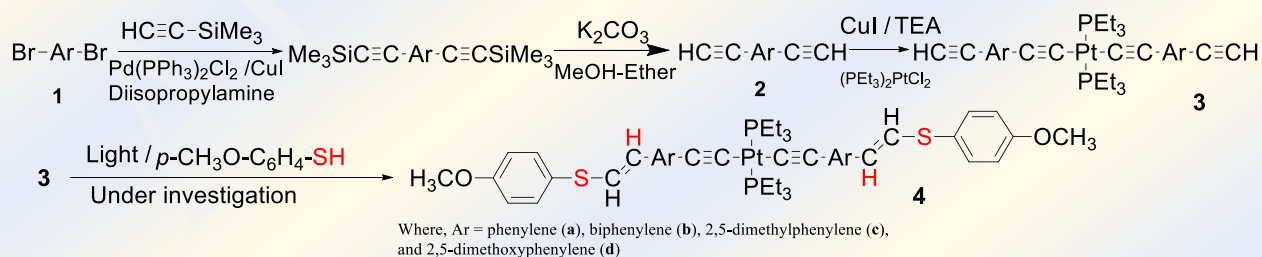
PS/2018/2/15 Design, Synthesis, Characterization, and study of Optical Properties of a series of new *p*-Anisolythiol-Functionalized Platinum (II) Bis (Alkenylaryalkynyl)

Dr. Md. Mostafizur Rahman, Associate Professor and Dr. Dipen Debnath, Professor

Dept of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

A great deal of interest has been devoted to the synthesis of new π -conjugated systems in materials chemistry, owing to their potential applications in electronic and electro-optical devices. Although most of the work in this field has focused on conjugated materials that are comprised of organic building blocks, there has been increasing interest in conjugated organometallic materials and their material properties including nonlinear optical effects, organogelators, molecular wires, liquid crystallinity, electrical conductivity, and photovoltaic behavior which differ from those of conventional organic materials. Among them, the platinum(II) phosphine bis-alkynyl system, with its simple square planar geometry, has been widely explored. Recently, we have reported the palladium catalyzed synthesis of a novel sulfur-containing *trans*-platinum(II) bis(alkenylaryalkynyl) complexes having two phenylthio moieties in each alkenyl backbone and photochemical synthesis of selenium-containing *trans*-platinum(II) bis(alkenylaryalkynyl) complexes having two phenylseleno moieties in each alkenyl backbone. Although the radical addition of hydrothiolation of a terminal alkyl/arylacetylene is well-precedented in synthetic organic chemistry, it has not been well reported with regard to compounds containing metal complexes. In this project, the author initiated a plan to investigate the possibility of introducing *p*-anisolythiol (*p*-CH₃O-C₆H₄SH) into the terminal triple of *trans*-platinum(II) bis(alkynylaryalkynyl) complexes, *trans*-[(Et₃P)₂Pt{C≡C-Ar-C≡CH}₂], (**3**) (where, Ar = phenylene, biphenylene, 2,5-dimethylphenylene, and 2,5-dimethoxyphenylene), to generate newly designed functionalized *trans*-platinum(II) bis(alkenylaryalkynyl) complexes, *trans*-[(Et₃P)₂Pt{C≡C-Ar-CH=CH(SC₆H₄-OCH₃-*p*)₂}] (**4**) (where, Ar = phenylene, biphenylene, 2,5-dimethylphenylene, and 2,5-dimethoxyphenylene), having one *p*-anisolythio moiety in each alkenyl backbone. It is expected that the newly designed functionalized *trans*-platinum(II) bis(alkenylaryalkynyl) complexes having one *p*-anisolythio moiety in each alkenyl backbone will be achieved good polarizability which ultimate increase optical properties. These conjugated new organic sulfur functionalized *trans*-platinum(II) bis(alkenylaryalkynyl) complexes will be characterized by FTIR, ¹H NMR, ³¹P NMR, ¹³C NMR spectroscopy & mass spectrometry, and optical properties will be measured by absorption & emission spectroscopy. Complexes **2a**, **2c**, **3a**, and **3c** were synthesized in good yield. The synthesized complexes were characterized by IR spectroscopic analysis [1-2].



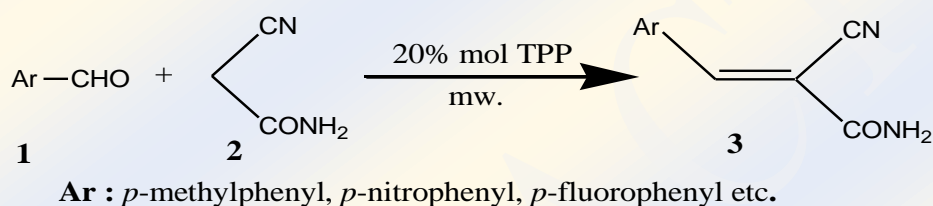
Compounds **2a**, **2c**, **3a**, and **3c** were synthesized in 70, 65, 80, and 75% yields, respectively.

PS/2018/2/16 Microwave Assisted an Efficient and Green Procedure for the Synthesis of Olefinic (unsaturated) Arylidene Compounds by Reaction of Active Methylene Compounds with Carbonyl Compounds using TPP or BiCl₃ or NH₄OAc as a promoter

Professor Dr. Md. Mizanur Rahman

Abstract:

The application of MW irradiation to provide enhanced reaction rates and improved product and it proves quite successful in the formation of carbon–heteroatom and carbon–carbon bonds. An efficient and solvent free-approach for Knoevenagel condensation of substituted aldehydes and active methylene compounds under microwave irradiation catalyzed by Triphenylphosphane (TPP) have been investigated. Several arylidene derivatives viz. 2-cyano-3-(4-nitrophenyl) acrylamide(3a), 2-cyano-3-(3-nitrophenyl) acrylamide(3b), 2-cyano-3-(4-hydroxyphenyl) acrylamide(3c), 2-cyano-3-(4-fluorophenyl) acrylamide(3d), 2-cyano-3-(*p*-tolyl) acrylamide(3e) were prepared by Knoevenagel condensation of cyaoacetamide with corresponding aldehydes in presence of triphenylphosphine (TPP) as catalyst . The reaction proceeds smoothly under mild and solvent-free conditions and the products are obtained in excellent yields as compared to conventional methods and reduce the use of volatile organic compounds. The structures of the condensation products have been established on the basis of their IR and ¹H NMR data.



PS/2018/2/17 Fabrication, Characterization of Quantum Dot-Dye sensitized Solar Cells

Professor Dr. Md. Nizam Uddin,

Dept of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

The vast uses of fossil fuels, causing environmental pollution and global warming, have led us to focus on the renewable energy sources, like the sun, for the future [1,2]. Among the renewable energy sources, solar cells have attracted a great interest as a solution to this situation [2]. The third-generation solar cells represented by dye-sensitized solar cells (DSSCs) and organic semiconductor solar cells [2-4]. Considering high cost and environmentally-harmful waste of other solar cells, DSSCs have been considered as one of the most promising photovoltaic technologies because they are generally made from inexpensive and nontoxic components, and can be designed in a diversity of colors and transparencies [2,5-6]. A typical DSSC consists of transparent conductive substrates, a nanoporous TiO₂-coated photoanode, dye, electrolytes, and a counter electrode (CE). The CE is one of the key components, which catalyze the reduction of I⁻/I₃⁻ and collect electrons from the external circuit.

Highly conductive reduced graphene oxide (rGO) with good electrocatalytic ability for reducing triiodide ions (I₃⁻) can be a promising catalyst and can function as the CE for TiO₂ working electrode based DSSCs. In this study, GO thin films were prepared on glass substrate by the drop coating method, and was reduced further to rGO through a facile thermal reduction process. Thermal rGO shows better electrocatalytic ability mainly due to its (i) high standard heterogeneous rate constant for I₃⁻ reduction and (ii) considerable electrochemical surface area. The corresponding DSSC shows a higher cell efficiency (η) of 1.98% than that of the cell with a GO-based CE (η =0.3%) and Graphite based CE (η =1.43%). Also, the photocatalytic activity of rGO was observed in visible light and UV-light. In addition, it was also found that TiO₂ film working electrode was reusable in dye sensitized solar cell.

PS/2018/3/27 Promotion of composite Materials to enhance catalytic activities pertaining to environment Related Reactions

Professor Dr. Abul Hasnat and S M Nizam Uddin, Lecturer

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Abstract

FeS₂-CNT nanocomposites were synthesized and immobilized on a GCE surface to investigate the electrocatalytic conversion of 4-amino phenol (4-AP) molecules into p-quinone molecules in the aqueous medium. The reformed electronic properties (in terms of lowering of band gap energy and charge transfer resistance), as well as improved surface area, offered FeS₂-CNT NCs to enhance redox reaction of 4-AP molecules in comparison with FeS₂ alone. The 4-AP molecules undergo coupled two-proton and two-electron transfer quasi-reversible redox reaction with symmetry factor of 0.55 and standard rate constant (k^0) of 0.8 cm s⁻¹. Here, quinoneimine is generated as an intermediate which is later converted into quinone via an irreversible hydrolysis reaction. The best catalytic performance can be obtained at the pH value of 7.0.

Keywords: FeS₂-CNT; 4-aminophenol; catalysis; kinetics; transfer coefficient; Voltammetry

PS/2018/3/28 Adsorptive removal of toxic chromium (Cr) from tannery waste effluent by using low cost bio-degradable sorbents and re-using this recovered Cr for other purposes

Professor Dr. Ahmed Jalal Farid Us Samad and Ms Rehana Pervin, Assistant professor

Dept of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Domestic and agro based waste materials were collected and after some modifications, these were processed further for the utilization as an environmental benign sorbents. Physicochemical properties of these developed sorbents were investigated to utilize as a sorption media for toxic chromium (Cr). Quantitative estimation of Cr concentration was performed spectrophotometrically using diphenylcarbazide as a complexing agent. The first challenging task was to find out the reproducible working range of the newly set up UV-visible machine (Shimadzu-1900 model, Japan) and this was found workable within a very narrow working window (1-3 ppm range). After finding this reliable range, Cr estimation for the batch studies were performed confidently. In this project, biodegradability of adsorbent got priority due to their environmental benign nature. Rodophyta and Mined coal showed the best result whereas rice husk exhibited satisfactory performance for Cr removal from aqueous solution. Their thermodynamic and kinetic studied are keep going on and also adsorption models will be studied next for drawing fruitful conclusion. On the basis of the present observation and findings, we could recommend these as a potential candidate for the removal of Cr from the tannery waste effluent. Further advance analysis is keep going on to recover and reuse the adsorbed Cr for economic benefit.

Key words: toxic metals, biodegradable, adsorbent, batch experiment.

PS/2018/3/29 Fabrication of Hybrid Carbon Nanotubes-Polymer Nanocomposites for Sustainable Flame Retardant Textiles

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²Dept of Chemical Engineering and polymer Science, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

In this report, we discussed the preparation of metal oxides (CuO and Fe₃O₄) particles that are intended to functionalize with oxidized multiwall carbon nanotubes (MWCNTs) and subsequent mixing with the polymer, polystyrene (PS) to prepare CNTs/polymer blend. Oxidation of MWCNTs was accomplished by using a mixture of sulphuric acid/ nitric acid and characterized primarily by FT-IR spectral data analysis. Experimental data i.e.; SEM-EDS, FT-IR, XRD showed the successful preparation of CuO and Fe₃O₄ nanoparticles. CuO particles and CNTs were individually dispersed in PSS matrix using chloroform as solvent. FT-IR and UV-vis spectra revealed the homogeneous dispersion of CuO and CNTs in PS. Currently, chemical attachment of as prepared metal oxides with oxidized MWCNTs is continuing in our lab. Further experiment will be carried out to investigate the thermal property of the CNT/metal oxides/PSS composite.

PS/2018/3/30 Sustainable Utilization of waste paper sludge (Hypo Sludge) in Bangladesh Construction Industry

Professor Dr. Syed Shamsul Alam

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Abstract

As a polluter, paper and pulp industry is among the top. Tremendous amount of wastes is generated from paper mill industries and are being dumped at nearby places creating a big distraction. For a greener and sustainable future, we have to develop innovative ways to save fuel and mitigate carbon footprints therefore develop alternative ways by which building materials can be modified. Paper sludge consists of minimum amount of silica, magnesium and considerable amount of lime, which is the main property of cement. So, the disposal and pollution problems can be reduced to greater extent by replacing the cement at considerable ratios using paper sludge from paper industries. This project work examines the possibility of using waste paper sludge as partial replacement of cement for new concrete. In this study waste paper sludge was partially replaced as 5%, 10%, 15% and 20% in place of cement in concrete for M-25 mix and tested for its compressive strength, tensile strength, water absorption and dry density up to 28 days of age and compared with conventional concrete. From the results obtained, it is found that waste paper sludge can be used as cement replacement up to 5% by weight and particle size less than 90µm to prevent decrease in workability.

Keywords: Paper sludge, Waste management, Cement, Workability

Technical Session–V

(For Dept. of STA)

Date: September 26, 2019 || Time: 03:30 PM – 7:00 PM

Session Chair: Prof Dr Sabina Islam

Resource Person: Prof Md Ahmad Kabir

PS/2017/12 Devastating flood of April 2017 in haor area of Mithamoin Upazilla, Kishoreganj - how much impacts of climate change on the livelihoods of the people?

Professor Dr. Azizul Baten and Professor Dr. Md. Kabir Hossain

Dept of Statistics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

This study analyzes the impacts of climate change on the livelihoods of the people and determines the factors that significantly affect farmers' adaptation using logistic regression analysis in wetland (or *Haor*) area of Mithamoin Upazilla under Kishoreganj in Bangladesh. The 230 individuals are interviewed from the study area. Among them only 52.2% farmers are aware of climate change. The people of Khoishore village are affected by riverbank erosion and lost their property and infrastructure. The possession of own farming land is found significant for practicing homestead gardening and tree plantation. Their education level is significant for farmer's adaptation changing crop calendar and there is severe negative impact of climate change on crop production, significantly motivated to duck rearing, and to follow weather forecast. While the people of Dalargaon and Hasimpur village are suffered from riverbed fill up due to heavy sediment carried by flash flood and seasonal flood. For Dalargaon village, possession of own farming land is found significant for the adaptation strategies of job switching, introducing modern and effective seed and changing crop calendar. Family size significantly influences the adaptation practice of taking loan from bank, NGO or local money lenders. Yearly income significantly influences the adaptation of fishing and the signatory education level is found demotivated of using modern and effective seed to their land. The impact of climate change on fertility of land significantly motivated to homestead vegetable gardening; the climate change perception influences to change their crop calendar and to adopt the duck rearing. For Hasimpur village, yearly income significantly influences practicing modern and effective seed; the people with lower education level switch their job more significantly than the people with higher education and vice-versa. Government and NGO's should take immediate steps to build up sustainable flood control embankments to prevent the damage of flash flood in Haor area and to promote different sustainable and effective adaptation practices.

Keywords: Climate change impacts, Adaptation practices, Logit regression analysis, Wetland communities, Bangladesh.

PS/2017/14 Obesity and Food Habits of Primary School Going Children: A Longitudinal Study

Professor Dr. Mohammad Ohid Ullah and Professor Dr. Md. Nazrul Islam

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Abstract

Childhood obesity has become a serious public health problem because of its strong association with adulthood obesity and the related adverse health consequences. Many cross-sectional studies have been done on the prevalence of overweight and obesity; however, to the best of our knowledge, no longitudinal study has been carried out in Sylhet city. Therefore, the aim of this study was to reveal the health status and food habits of primary school going children in this city based on a longitudinal study. Initially we built a cohort of 94 primary school going children in Sylhet.

We collected information from the children by visiting the primary schools as well as households at three time points. That is, the information was collected from the same children at the initial time (T0), after six months (T6) and after twelve months (T12). Principal Component Analysis (PCA), Multi-factor Analysis (MFA) and Linear Mixed model (LMM) have been applied to analyze the data. It is found that the rate of overweight has decreased among the male children and the rate of obese has increased among the female children. This means that obese male children changed their food habits after six months but female did not control fatty food. It indicates that female children have a tendency to keep themselves at home and to like indoor game most which may cause the risk of obesity. Food habits revealed that over time obese and overweight children consumed more carbohydrates, protein and junk foods than others and most of the obese children ignored fruits and vegetables. The results of LMM show that BMI of male students are comparatively less than female students' over the study period of time. Taken together, we conclude that overweight and obese children are increasing and male children are becoming less obese than female over time. Although the level of obesity is not so high, proper steps should be taken to reduce the existing rate; otherwise the problem could be severe in the future as obesity is one of the major causes of cardiovascular diseases, nonalcoholic fatty liver diseases, and hypertension etc. This study may be able to make awareness in the society about the obesity and its associated diseases; afterwards it may be able to reduce the obesity associated diseases in future in regional and national level.

Keywords: Obesity, Food habits, Primary school going children, Sylhet city and Longitudinal study

PS/2017/16 Exploring the pattern of children's disability in Sylhet Division

Professor Dr. Md. Shahidul Islam and Professor Dr. S. M. Khurshid Alam

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Abstract

Psychological or physiological deterioration, which hinders a person from living a conventional lifestyle, is termed as disability. This study assesses the pattern of disability of children up to 12 years in Sylhet division of Bangladesh. This cross-sectional study is conducted with 399 children up to 12 years old with disabilities in Sylhet division. Their socio-economic condition, birth history, physical and mental challenges, health related data was collected. Descriptive analysis has been employed. The sample consists of approximately one third girls and two third boys with a median age of 2.14 years. Most of the families (58.9%) are poor. Approximately 87.7% have microcephaly with lower weight percentage of 79.2%. The significant disabilities are cerebral palsy (82%), autism (10.10%), down syndrome (2.5%), epilepsy (6.1%) lack of normal cognition (98.7%), abnormal gross motor (82%) etc. This study along with association rule mining provides a deeper understanding of patterns of disabilities and their reasons. The finding can be utilized to undertake awareness, treatments and policies for disabled children.

PS/2017/17 Evaluating capacity for climate change adaption in food productivity through local knowledge in the north eastern region of Bangladesh

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²Dept of Public Administration, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Environmental disasters floods, tropical cyclones and heat waves may enhance the vulnerability of the country due to climate change. A lot of scientific research revealed floods and cyclones as major concerns for Bangladesh especially

in agriculture. The frequency and intensity of the floods have increased over the years in our country. Crop-switching characterised preferred farm-level adaptation strategies to alleviate adverse effects of climate change. Rice, the dominant crop in Bangladesh, accounts for more than 90% of total cereal production covering 75% of Bangladesh's total cropped area. A hybrid is the first-generation offspring of a cross between two genetically diverse parents. Hybrids show a 15-20% of yield advantage giving higher economic returns. The area under hybrid rice rose 3.5 percent year-on-year to 6.35 lakh hectares in the immediate boro season. Hybrids have substantially higher yield than inbred rice's under severe lowland stress. The high production rate of hybrid crops has inspired farmers to produce more and the beneficial part in these crops are ready for harvest a week before other crops. A cobb-douglas stochastic frontier production model with farm specific inefficiency effects model had been used to investigate the factors affecting the technical efficiency along with farm specific effects and environmental awareness on efficiency. Non-parametric data envelopment analysis also had been done in this study. The primary data had been collected randomly from three thanas, under Sunamganj district of Bangladesh. To investigate the factors affecting the technical efficiency of rice growing farmers. The results showed that the coefficient of age, experienced in cultivation, land condition, contact with extension personnel were significant at 1% level significance. The coefficient of environmental awareness has a significant positive role in increase production but institutional access has negative impact on production. The results suggest that these rice growing farmers have the potential to increase output greater than the increase in their input to attain constant returns to scale.

Keywords: Cobb-douglas, Stochastic Frontier Production, Inefficiency effects, Environmental awareness

PS/2018/1/10 Nutritional Status of the Rural Aging in Sunamganj District based on BMI

Professor Dr. Mohammad Taj Uddin and Dr. Ahmad Kabir, Professor

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Abstract

Background: This aged population is projected to be doubled in Bangladesh by the end of the next decade. Though the percentage is increasing only a few aged people can live a healthy life. Most of the elderly are suffered from malnourished problem. Malnutrition is one of the main reasons for the frail health condition among elderly. It is noticeable that various diseases, impaired physical and mental condition is common for malnourished elderly. So, the aim of this study is to assess the nutritional status of rural aging in Sunamganj district of Bangladesh.

Methods: A total of 400 respondents have been selected for this study from the rural area of Sunamganj district during June to August in 2018 by multi-stage sampling. The respondents are the person aged 50 years and above. Body Mass Index (BMI), Mini Nutritional Assessment – Short Form (MNA- SF), Descriptive statistics, logistic regression, t-test, Chi-square test has been used for data analysis.

Results: This study reveals that 69% elderly have normal nutrition status, 15% are underweight and 12% are overweight and only 4% are obese. So, the obesity rate is very low and negligible. It is about 69.8%, 16.7% and 13.6% elderly are well-nourished, undernourished, and overweight or obesity respectively in female category. On the other hand, in male category 68.9%, 14.7% and 16.4% have well-nourished, undernourished, and overweight or obesity respectively. So, the female is more overweight or obese than male. The analysis shows that education, occupation, family type, income, diabetes, BP, sleeping disorder are significantly associated with nutritional status.

Conclusion:

The elderly needs extra care and medical facilities. As they grow old their body becomes frail. The results of MNA demonstrate that the maximum elderly have malnutrition. The rural area of Bangladesh is a serious victim of it. This piece of works may be helpful for the policymakers to improve the nutritional condition of the elderly.

PS/2018/1/11 Quantitative Measure of Healthy Aging in Sylhet City: A Frailty Index Approach

Professor Dr. Md. Nazrul Islam

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Abstract

Background: Aging is a sure event of an individual having natural death at the end part of normal human lifespan. Biological age is a good indicator of healthy aging process. This issue was first addressed in developed countries but now it is a leading public health concern in developing countries. Many older people in Bangladesh lead their lives with poverty and health complexities. An important issue in public health sector is to assess the elderly health for making sustainable aged health policies. That's why this study focuses to facilitate the elderly health status by assessing the biological aging among the urban aged people in Sylhet City Corporation, Bangladesh.

Methods: The analysis included a random sample of size 400 elderly persons, aged 55 or more that has been collected from the Sylhet City Corporation area in Bangladesh. A frailty index (Tilburg Frailty Indicator) having 30 indicators has been computed for each elderly. With these frailty indices, the health status of the aged person has been classified into different categories (No Frail, Vulnerable, Frail and Most Frail). The Chi-square test of association and binary logistic regression has been carried out to find the influential socio-demographic variables related to frailty.

Results: The mean frailty score is 0.28 (± 0.117) and frailty phenotype categories are: 21.5% No frail, 43% vulnerable, 32.3% frail and 3.3% most frail. The age, marital status, occupation and religion of the elderly are significantly ($p < 0.05$) associated with the frailty. Female, illiterate and Muslim elderly are frailer than their counterparts.

The observed mean chronological and biological age is found 63.6 (± 8.73) years and 63.39 (± 3.73) years respectively. Overall, the gap between CA and BA found insignificant ($p > 0.05$) but it showed statistically significant ($p < 0.05$) for gender and religion basis comparison.

Elderly shifting probability to the upper age groups are showed higher among the pre-elderly age group whereas the old and oldest elderly showed the higher probability of shifting to the lower age groups. Shifting to the higher biological age group from chronological age indicates comparatively poor health status of elderly and vice-versa. From this shifting behavior, it is observed that pre-elderly health is more vulnerable than the others.

Conclusions: Biological aging has become a major health condition related to frailty as well as health deficits. This assessment of healthy aging through biological aging will be helpful for public health policymakers in Bangladesh.

Keywords: Elderly, Health complexity, Frailty, Biological aging, Public health, Bangladesh

PS/2018/1/12 Identifying factors associated with course drops among in SUST

Professor Dr. Mohammad Shahidul Islam

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Abstract

Course drop means the situation where a student fails in a course. It can happen because of poor performance of the student in exam paper. However, sometimes students do it purposefully, out of fear that they will get a bad grade, in a hope to do better, next time he participates in the exam. Our aim is to fit a model of number of course drops and identify the factors associated with it among the students in SUST. We have employed state of the art statistical techniques to model the number of course drops and identify causes associated with it. Primary data from 471 students, currently studying in different departments of SUST were collected. We employed Logistic Regression and Negative Binomial Regression identifying factors associated with course drops among students in SUST. We found that

students' HSC institute and background, faculty, residence, gender and any family member having chronic/acute disease are some of the factors that highly influence a student to drop or not drop courses. This study provides a deeper understanding of why a student drops a course. The finding can be utilized to undertake proper steps and measures to reduce the course drop among the students of SUST.

PS/2018/1/13 Surface and Ground Water in the Vicinity of Sylhet City, Bangladesh: Assessment of Quality and Association Based on Multivariate Statistical Techniques

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Abstract

Most of the residents of Sylhet city depend on the groundwater supply provided by the Sylhet City Corporation (SCC). Hence, the quality of groundwater distributed by SCC is vital for the health and the daily uses of the residents of the city.

Although there is major concern regarding the quality of groundwater in this region, the number of researches based on hydro-chemical and inferential studies of groundwater quality is very low here. This study provides an overview of groundwater condition with respect to different water quality parameters. It also has tried to identify the vital sources that control the groundwater resource in SCC area.

Hydro-chemical assessment has been done based on different well-known diagrams. Descriptive statistics have been computed for each parameter and correlation analysis has been used to assess the overall groundwater quality and the degree of linear relationship between parameters. Multivariate statistical techniques have been used to interpret the water quality of the selected pumps and to provide some meaningful results that are not possible while investigating the data at a glance.

The study has found that Mg-Na-Ca-Cl-HCO₃ is the hydro-chemical facies that dominates in the groundwater of SCC area. The overall quality of groundwater is not harmful for drinking purposes as well as for irrigation purposes. The average concentrations of major ions in groundwater of SCC area are in the following order: cations: - Magnesium (28.43) > Sodium (11.45) > Calcium (8.47) > Potassium (1.36), while anions: - Bicarbonate (87.70) > Chloride (37.20) > Sulphate (1.80) > Nitrate (0.95). Three factors have been extracted that have effects on the hydrochemistry and quality of groundwater of SCC area. The factors have been identified as “fresh water and halite minerals interaction”, “anthropogenic influences”, and “anthropogenic-rocks interaction effect”. The groundwater quality gradually improves from the eastern to the western part of the city. Thus, urbanization and agricultural activities are not too responsible for water quality.

The authority should refrain from supplying groundwater from the eastern part of the city. To avoid TDS content, alternative sources for water should be searched and managed. A further detailed study is needed based on all possible parameters and all pumps under SCC.

PS/2018/2/23 Extent of lifestyle and heritability effects on cancer Bangladesh perspective

Dr. Mohammad Ohid Ullah, Professor

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Abstract

Cancer is one of the major killer diseases throughout the world. The burden of cancer is increasing very rapidly day by day, largely due to an increasing unhealthy lifestyle. It is a major health problem in developed countries and second highest cause of death in developing countries. Some cross-sectional studies have been conducted on lifestyle and clinical pathological changes of cancer patients based on Sylhet city. However, to the best of our knowledge no study has been done based on longitudinal aspect considering whole Bangladesh, therefore, we aimed to conduct a cohort/longitudinal study to know the extent of lifestyle and heritability effects on cancer in Bangladesh. For this study, we selected a number of cancer patients by using simple random sampling from each division/strata and created a cohort in each division. Factor analysis was used in the collected initial dataset. We found total 384 cancer patients in eight different hospitals in eight divisions during December, 2018 to March, 2019, where there are 192 male and 192 female patients. Spending approximately one week in each division and using a semi-structured questionnaire, we have already collected initial data. It was found that male patients are mostly suffering from throat, lung and stomach cancer and female patients are suffering from breast, cervical and ovary cancer. Among the variables of heritability dimension, most important factors were found cancer disease of brother followed by father. Among variables of lifestyle dimension, most important factors were found beef/mutton, smoking and chips/chocolate/ice cream. Indicates changing lifestyle is needed to reduce the cancer diseases in future. Taken together, the findings in this study may be able to make awareness in the society about the cancer, afterwards it may be able to reduce the cancer diseases in future in regional, national and international level.

Keywords: Cancer, Lifestyle, Longitudinal study, Survival data, Bangladesh

PS/2018/2/24 Disaggregate level maternal health care indicators in Sylhet division: An Application of Area-level Small Area Estimation Method

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Abstract

National level indicators of maternal health often hide the real scenario across a country. In order to construct a maternal health indicators map, accurate estimates of the indicators are required at very small spatial scales, typically the administrative units of a country or a region within a country. Although comprehensive data on maternal health indicators are collected in national surveys, the small-scale estimates cannot be calculated using the standard estimation methods employed in national surveys, since such methods are designed to produce national or regional level estimates, and assume large samples. Small area estimation method has been widely used to find such micro-level estimates. Due to lack of unit level data, area level small area estimation methods (e.g., Fay-Herriot method) are widely used to calculate small-scale estimates. In Bangladesh, a few works have been done to estimate district and sub-district level maternal health status. The Bangladesh Demographic Health Survey covers all districts but district wise sample sizes are very small to get consistent estimates. In this research, Fay-Herriot Model has been used to calculate district and sub-district wise estimates with efficient mean squared error. The Bangladesh Demographic Health Survey 2011 and Population Census 2011 are utilized for this study. The considered SAE estimator has been applied to estimate prevalence of maternal health care indicators at district and sub-district levels with their accuracy measures. The estimated district level prevalence's by the Fay-Herriot estimator are almost similar to the design-based direct estimator with lower estimated RMSE as expected. The Fay-Herriot estimators seems better at the district and sub-district level compared the corresponding direct estimator.

Keywords: Maternal Health Indicators; Small Area Estimation; Fay-Herriot Model; Mapping.

PS/2018/2/25 Evaluation of Performance Efficiency of Primary teachers on ICT use in Sunamganj District of Bangladesh

Professor Dr. Kabir Hossain

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Abstract

This study would like to get on the contextual analysis of primary school performance of slow progress Sunamganj district aiming to assess teachers' preference, perceptions on the effectiveness of ICT integration along with the challenges faced in using ICT in teaching - learning process. Simple random sampling technique was used to select the ultimate sampling unit govt. primary schools to gather ICT information and performances of the schools, infrastructural facilities, quality of education and class room performances. Some preliminary information about the structure and facilities of the govt. primary schools show that only 6% of the schools are model school, 50% school belongs to less than 33 decimal area, 56% have no playground, 75% have no boundary wall for their protection, near about two third schools have 5 or less class rooms, 81% claimed that they have been suffering from insufficient class rooms, 60% have no sufficient bench for sitting, 44% school have only less than 5 teachers, 88% enjoy electricity and 75% mentioned they have no transport facilities. Output of ongoing critical analysis using Stochastic Frontier model will be presented after completion of the analysis.

PS/2018/2/26 Evaluation of rice farm's efficiency and adaptation through local knowledge and community-based knowledge: A case study of Bangladesh

Dr. Kanis Fatema Ferdushi, Assistant Professor and Professor Rahmat Ali

Dept of Statistics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

NOT SUBMITTED

PS/2018/2/37 Climate Vulnerability, Adaptive Capacity and Food Security: A study of Wetland-Communities in Sunamganj, Bangladesh

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Abstract

Climate vulnerability and poverty is very sensitive to the wetland community of developing countries. The aim of this study is to assess the climate vulnerability, adaptive capacity, and poverty level of four villages nearby the Kacharia Haor area of Bishwambarpur upazilla in Sunamganj district. Both primary and secondary data are used for this study. A total of 423 well-structured questionnaires were interviewed and 2 focus group discussion was made to collect data from the respondents to serve the objectives. The linear trend model will be used to overview the actual trends of climate change events. Right now, livelihood vulnerability index was used to measure vulnerabilities of one of the selected villages. Adaptive Capacity Index and Livelihood-based Adaptation Index to climate risks will be constructed for the wetland (Haor) communities. Probit regression analysis will be employed to evaluate the impact of adaptation practices on poverty levels. The result showed that wetland community of Alipur village are most vulnerable to natural and climate variation and the value was found 0.846. Secondly, they were vulnerable to health with the index value 0.758. Overall vulnerability index was estimated 0.506 which means the people of the study area was moderately vulnerable.

Keywords: Climate change, Vulnerability, Adaptation strategies, Poverty, Wetland community, Sunamganj.

PS/2018/2/35 Heterogeneity and the impact of depression on health-related quality of life among patients with Type 2 diabetes living in Sylhet City Corporation: An Application of trajectory modeling techniques

Dr. Md. Atiqul Islam, Assistant Professor and Dr. Lutful Alahi Kawsar, Associate Professor

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Abstract

Background: The nature and directionality of the association between depressive symptoms and subsequent diabetes course remain unclear. Measuring the Health-related Quality of Life (HRQoL) is also an indicator to understand the burden of diabetes. Therefore, the aim is to examine the association of depressive symptoms, T2D and QoL, and explore the potential underlying associated biopsychosocial risk factors of patients in Sylhet city.

Methods: Data were extracted from the baseline samples of an ongoing prospective longitudinal cohort study of T2D patients in Sylhet City Corporation. The target sample size at the baseline survey was 369. However, we have achieved 50 samples until now. The sample was selected who tested the glycated hemoglobin level (HbA1c) at the time of data collection. Depression was measured using the PHQ-9, and QoL was measured using WHOQoL-BREF questionnaires. A simple linear regression model was applied to find the effect of T2D on depression and two multiple linear regression models were fitted for each of physical and psychological HRQoL. SEM and path models were applied to find the direct and indirect relationships among the outcomes.

Results: The mean \pm SD of HbA1c of diabetes patients was found 9.68 ± 5.19 mmol/mol. About 38.64% of diabetes patients were mild depression, 34.09% were minimal, 15.91% were moderate-severe, 6.82% were moderate and 4.55% were severely depressed. The result indicates that the HbA1c level (T2D) was significantly ($p = 0.031$) contributed to the change of Depression, meaning that T2D has a positive effect ($\beta = 0.305$) on depression. Additionally, T2D has no direct effect on QoL in terms of physical health and psychological HRQoL. However, T2D has a direct effect on depression, which suggests that T2D has an indirect relationship with physical and psychological HRQoL through Depressive symptoms. SEM and Path models demonstrated that the extent of the relationship between two paths, T2D to depression and depression to physical and psychological HRQoL, respectively. This path model showed a significant ($\beta=0.37$, $p=0.007$) direct effect of T2D on Depression. The second path was also significant showing that there is a direct effect of depression on psychological HRQoL ($\beta=0.16$, $p=0.002$).

Conclusion: Depression is the most common psychiatric disorder observed in the diabetes community. Almost half of the T2D patients were mild to severely depressed in Sylhet city corporation. The prevalence of T2D in Sylhet was the highest in the middle class and the lowest among the richest patients. T2D has a significant direct effect on depression and indirect effect on both physical and psychological HRQoL.

Technical Session–VI

(For Dept. of GEB)

Date: September 26, 2019 || Time: 03:30 PM – 7:00 PM

Session Chair: Prof Dr A. Z. M. Manzoor Rashid

Resource Person: Prof Dr Md Shamsul Haque Prodhan

LS/2017/02 **Molecular Characterization of Flavonoid Compounds from *Tridax procumbens* for Anti-Arthritis Drug**

Professor Dr. Md Abdullah Al Mamun¹ and Md Belal Hossain Sikder², Associate Professor

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²Dept of Food Engineering and Tea Technology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Tridax procumbens has been used as medicinal properties among local natives for dropsy, anemia, asthma, ulcer, urinary problems, gastric problems and body pain. Recently, we have demonstrated that *Tridax procumbens* flavonoids (TPF), could accelerate osteoblasts differentiation and bone formation by increasing osteoblasts differentiation related markers, such as ALP, osteocalcin, type 1 collagen, Runx2, osterix, BMP-2, BMP-4 and BMP-7. TPF also suppressed M-CSF-RANKL-induced osteoclasts differentiation and bone resorptive activity by reducing the expression of osteoclasts differentiation related markers, including TRAP, cathepsin K, MMP-9 and MMP-13 in mouse cultured osteoclasts. However, the beneficial effects of TPF in rheumatoid arthritis remain unclear. The present study, a collagen-induced arthritis mouse model was used to identify the possible effects and mechanisms of TPF on arthritis *in vivo*. Herein, we found that the treatment of CIA mice with TPF significantly reduced arthritic symptoms and improved erosion. The expression of pro-inflammatory cytokines and proteins levels, C-telopeptide fragments of type I collagen and white blood cell (WBC) count in CIA mice were significantly reduced compared with control group. Our results demonstrated that TPF ameliorated arthritis symptoms CIA mice, suggesting that TPF may be a potential therapeutic agent for treatment of bone related diseases like rheumatoid arthritis.

Keywords: Anti-Arthritis drug, collagen-induced arthritis, flavonoid compounds

LS/2017/03 **Biochemical and Molecular characterization of hilsa shad, *Tenulosailisha* for natural stock management in Bangladesh**

Professor Dr. Md Faruque Miah and Dr. Md. Jahangir Alam, Associate Professor

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Abstract

Biochemical and molecular characterization of hilsa shad, *T. ilisha* is a fairly latest practice related to natural stock management and sustainable production. This study was considered with some specific objective such as molecular identification of the species, biochemical and nutritional, cytogenetics and molecular genetics-based population study whereas two populations such as marine and freshwater habitats were considered. Proper identification of species is very much essential for stock improvement, though morphological ambiguity was observed to identify a species molecular tools are most appropriate for confirm the species and thus, in this research 16S rRNA universal primer was used to accurate identification of *T. ilisha* compare with morphological characteristics considering external features, morphometric and

meristic traits. 16S rRNA marker was identified the species with specific molecular standards where bands were observed in *T. ilisha* at the position of 53bp length in all the individuals. Different biochemical parameters such as crude protein, total fat, total carbohydrate, moisture and ash were measured among the populations of marine (Saint Martin) and freshwater (Chandpur), and it was observed that nutritional quality was found better in marine (St. Martin) population than freshwater (Chandpur). Based on RAPD assay it was observed that poor genetic diversity was observed in both the populations, however, comparatively higher genetic diversity was observed in marine population than freshwater. Based on restriction digestion using AgeI and ApaI enzymes, mitochondrial ATPase 6 gene produced unveiled a moderate-high diversity among the individuals acquired from of the environments, notwithstanding, assorted diversity was determined slightly higher among the individuals collected from Saint Martin's island, i.e., the marine environment. This study produces important insights into the genetic status of hilsa in the natural stock of Bangladesh, which could be regarded radix knowledge for hilsa aquaculture endeavors. However, these findings are not sufficient to know the biochemical and molecular status of this fish; therefore, it was needed more research using different approaches of cell and molecular study using more populations.

LS/2017/04 On-site detection of CaC₂ used for artificial ripening of fruits

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Abstract

Calcium carbide (CaC₂), frequently used artificial fruit ripening agent is currently banned in many developing countries due to its carcinogenic property and diversified health hazards to the fruit consumers, traders and adulterators. The difficulty in elemental analysis, diffusional property of Ca(OH)₂ and incapability of tracing residual acetylene gas make the CaC₂ detection system more complex. To mitigate this challenge, we are reporting (probably for the first time) a simple, low-cost, paper-based strip for the on-spot detection of CaC₂ by the non-expert users (consumers). The strip detector operates following the acid-base indicating chemistry and responds by showing the visual color change in presence of CaC₂. Among the tested indicators, phenolphthalein and red cabbage extract respond with the CaC₂ concentrations in the order of 10 μM. The critical level of CaC₂ concentration on fruit surface could be ~20 nM. We have succeeded to determine the very low concentration of ~1 nM CaC₂ using methyl red indicator. Amazingly, the methyl red strip is also able to trace the CaC₂ directly on the fruit surface by changing its color from pink towards the yellowish gradient. Therefore, our strip-based CaC₂ detection system could be a fruitful tool for the determination of fruit adulteration.

LS/2017/06 Study the impact of consanguineous marriage to accumulate heritable connective tissue diseases in Bangladeshi population

Professor Dr. Mohammad Jakir Hosen and Dr. Md. Shakhinur Islam Mondal, Assistant Professor

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Abstract

Consanguineous marriage is the practice of marital union between two individuals who are related as second cousins or closer, especially the 1st cousins, which often leads to an increased birth prevalence of infants with severe recessive disorders and obstetric complications. This custom is most frequently seen in Muslim communities and being a Muslim dominant population, consanguinity is not unfamiliar in Bangladesh. However, there is a huge dearth of knowledge on its association with genetic and reproductive consequences. Hence, a survey with standard questionnaire

was channeled among 1st degree consanguineous families in randomly selected 102 locales of 58 districts of the country. The type of consanguinity, effect on the offspring, public health status, extent of awareness, and medical information of the families were documented precisely. Autosomal recessiveness of medical conditions were determined using pedigree and data analysis were analyzed using different statistical programs and compared with control subjects. In the studied samples, the mean prevalence of consanguinity was 7.1%. Our findings revealed that sudden infant death rate and abortion/miscarriage rate in the consanguineous families were 13.9% ($p < 0.0001$) and 11.8% ($p < 0.0001$) respectively, which is significantly higher compared to the controls. A number of medical conditions, including genetic disorders like hemoglobinopathies were found with significantly higher prevalence in the consanguineous children. General attitude and perception toward consanguineous marriage was rather indifferent among the studied population and very few people were concerned about the burden of consanguinity. The outcomes suggest that, impact of consanguinity of heritable genetic conditions are not uniform and it essences the need for root-level genetic counseling from premarital to postnatal levels in Bangladesh.

LS/2017/07 Molecular identification of plant parasitic nematodes from different tea states in Sylhet city and their control strategies by using indigenous plant extracts

Professor Dr. Md. Kamrul Islam and Dr. Asif Iqbal, Associate Professor

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Abstract

Tea is one of the most popular and lowest cost beverages found globally. In Asia, Bangladesh is one of the tea producing country. Nematodes are roundworms in the Phylum Nematoda; some nematodes can harm tea plants cause economic losses in tea production. In this study, identification of root knot nematode by morphological and molecular methods, random profiling of nematodes in different tea garden of Sylhet city was observed. Nematodes were extracted and identified under inverted light microscope based on their morphological characters which is mainly the presence or absence of stylet. Out of four tea gardens, it is observed that Malnichora tea garden has highest number of parasitic and non-parasitic nematodes. Genomic DNA was extracted from nematodes of different soil samples of tea garden. A forward and a reverse primer had been used in the mitochondrial gene coding for cytochrome oxidase subunit II and in the 16S rRNA gene of root knot nematodes (*Meloidogyne* spp.). Among six soil samples, nematodes from Malnichora tea garden had partially confirmed the presence of root knot nematodes (*Meloidogyne* spp.) based on approximately 1.7kb, 1.1kb and 0.52kb length base pair of 16S rRNA gene. Present experiment also observed the efficacies of different parts of medicinal plant extracts to control parasitic nematode in tea garden. As biological nematicide viz Arjun (*Terminalia arjuna* L.) leaves and barks, Datura (*Datura metel* L.) leaves, Tridhara (*Tridax procumbens* L.) leaves and Castor (*Ricinus communis* L.) leaves were used for extraction. Aqueous and acetone extract doses of these plants (0.5g/100ml, 1g/100ml, 2g/100ml and 4g/100ml) were evaluated in the present study. It was detected that acetone extracts from Arjun barks had significant killing the nematodes than the other extracts of plant part ($p < 0.001$). The order of toxicity of the plant extracts in distilled water were as follow: Arjuna (bark) > Castor > Datura > Tridhara > Arjuna (leaves). In acetone extract the order of toxicity were: Arjuna (bark) > Datura > Castor > Tridhara > Arjuna (leaves). The application of Arjun barks as a botanical pesticide for future use against parasitic nematodes is highly promising. This study will aid in further characterization of different tea garden parasitic nematodes and different plant extracts for filed apply in controlling parasitic nematodes in future.

LS/2017/015 Development of simultaneous saccharification and fermentation (SSF) Technique for production of bio-ethanol from potato peel and rice straw

Professor Dr. S M Abu Sayem and Zianul Faruque Joy, Lecturer

Abstract

Due to the non-renewable nature, cost and high-emission of carbon dioxide, the use of conventional petroleum-based fuel for energy generation became a serious concern globally. Alternatives like renewable biomass for ethanol production has been targeted for meeting up the ever increasing energy demand. Moreover, the economical production requires an easily available supply of inexpensive raw materials. Every day a huge amount of kitchen wastes, hazardous in nature, are dumped in Bangladesh which can be utilized to generate ethanol. This will help in generating value added products from zero value or hazardous products. Thus, the present research work focused on bioethanol production from waste potato peel and rice straw as they contain significant amount of starch. Three key steps are involved in bioethanol production from potato peel and rice straw- liquefaction of starch to dextrins, saccharification of dextrins to glucose and fermentation of glucose to ethanol. However, due to the presence of high percentage of lignin in rice straw, liquefaction stage from rice straw was found impractical which ultimately limit the production of ethanol. Traditionally for liquefaction and saccharification of starch, commercial enzymes such as α -amylase, amyloglucosidase etc. are used. This study replaced the need of commercial enzymes with the isolation of *Aspergillus niger*, an amylolytic fungus. Simultaneous saccharification and fermentation (SSF) of potato peels was carried out with coculturing *A. niger* and *Saccharomyces cerevisiae*. Following the isolation of *A. niger*, three parameters - substrate concentration, inoculum size of *A. niger* and inoculum size of yeast were optimized sequentially to enhance bioethanol production. Fermentation medium containing 15% (w/v) substrate produced 9.15% (v/v) ethanol after 6 days of incubation at 30°C in static condition. This substrate concentration was further utilized to optimize inoculum size of both organisms and the result showed that 8% *A. niger* and 10% *S. cerevisiae* yielded 11.7% (v/v) ethanol in the fermentation medium with a yield of 0.615 g ethanol/g of substrate. Comparative experiments with 15% (w/v) substrate concentration between fermentation in static and agitated condition (110 rpm) resulted a 16.83% increase in ethanol production when agitation was applied. In future, isolation of potential fermenting microbes, their characterization and utilization can complete the picture and can scale up the process for large scale production.

LS/2018/1/02 Paper-based device for culturing and profiling of microbes through drug sensitivity test

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Abstract:

In current days, different microorganisms are being antibiotic resistant from the frequent exposure of antibiotics of pharmaceuticals. Selection of antibiotics (or drugs) for the treatment of microbes-related health issues, Drug Susceptibility Test (DST) is usually performed by Kirby-Bauer method. However, this method is not cheap and faster enough in the case of suitable antibiotic (or drug) screening. To combat this challenge, we are reporting a simple paper-based micro device for rapid profiling of microbes (e.g. bacteria) on the basis of drug resistance. The device operates following the Resazurin based assay indicating the color change from pink to blue for living and dead cells respectively. We succeeded to culture bacteria and monitor their sensitivity to different drugs on the paper substrate where respective semisolid media were formed. Five different antibiotics were loaded on the paper in different concentration against different bacteria such as *Escherichia coli*. The specific colored (blue) zone of inhibition was observed from the reaction of PrestoBlue® cell viability reagent with the dead cells. The length of the altered color

was corresponding the sensitivity to the specific drug. Thus, we are progressing to develop a paper-based device for the rapid profiling of bacteria on the basis of drug sensitivity.

LS/2018/1/03 Genetic Diversity Analysis of Native Orange (*Citrus reticulata*) of Sylhet Region through Molecular Markers

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Abstract

Citrus reticulata (commonly known as orange) is widely cultivated in different districts of Sylhet division and diversity analysis of local orange using molecular markers will help to investigate the genetic relationship among local orange cultivars and ideal parents' selection for quality improvement. To evaluate genetic variation among fifteen *Citrus reticulata* genotypes collected from Sylhet division, a total of twenty-two RAPD and ten SSR markers were used. Genomic DNA of collected samples were extracted by modified CTAB method and PCR based method was utilized. Data analysis of RAPD markers revealed that OPA01 marker scored highest number of bands (65) and Polymorphism Information Content (PIC) varied from 0 to 0.98 with an average of 0.85. Among the SSR markers, CAC33 marker scored highest number of bands (44) and TAA15 marker was found to be most informative marker as it scored highest number of alleles (9) in total. The highest PIC value (0.663) of SSR markers was observed by marker CT19. The Unweighted Pair Group Method of Arithmetic Means (UPGMA) dendrogram of RAPD markers revealed that Desibar and Bari orange 2 varieties were very distantly related to the rest of the other cultivars. Cleopatra, Bari orange 1 and CR Jai 214 orange genotypes were found almost identical with each other. The UPGMA dendrogram of SSR markers also showed significant result where the highest genetic distance observed between Desibar and Bari orange 2 variety. Cleopatra and CR Jai 214 cultivars were found almost identical. This study could be very promising for further research and improvement of local *Citrus reticulata* genotypes.

Key words: Dendrogram, Diversity, Marker, RAPD, SSR, UPGMA, PIC.

LS/2018/1/04 Production of Biodiesel by *Lipomyces starkeyi* from the Residual Biomass of Agro-industrial and Municipal Solid Wastes

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Abstract

NOT SUBMITTED

LS/2018/2/08 Evaluation of production performance, carcass quality and immunological parameters in broiler chickens using onion (*Allium cepa*) and garlic (*Allium Sativum*) extract as growth promoters

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Abstract

The experiment was carried out to investigate effect of onion, garlic extract and probiotics on growth performance and carcass traits of Cobb 500 broilers. A total of 150 broiler chicks were randomly divided into five dietary groups such as i) medicated commercial (positive control) (ii) non-medicated commercial (negative control) (iii) non-medicated diets supplemented with 0.75% onion, (iv) non-medicated diet with garlic extract and (v) Diet supplemented with 1% probiotics for a period of 4 weeks. Mature weight (4 weeks) and growth rate were measured to assess the growth performance of the studied birds. The final body weight and growth rate of the group fed with non-medicated control diet were lower than those fed with 0.75% onion, 0.75% of garlic and 1% probiotics supplementation. In the case of carcass traits, the relative weights of various organs such as liver, spleen, bursa of fabricius, and abdominal fat were not affected by dietary treatments.

In conclusion, the onion extracts exerted significantly higher growth-promoting effect when added in Cobb 500 broiler diets ($P < 0.05$), reflecting the potentials of onion extracts as an alternative growth promoter to replace antibiotics in commercial broiler industry. However, further study is needed to reveal the specific compound(s) or mechanisms triggering growth acceleration due to supplementation of onion and garlic extracts.

LS/2018/2/09 In vitro Inhibition of Key Enzymes Linked to Diabetes by Protein Extracts from Piper betle Leaves: A Nobel Approach to Manage Diabetes Mellitus

Professor Dr. Jahangir Alam

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Abstract

Diabetes mellitus is a metabolic disorder that is characterized by chronic hyperglycaemia with disturbed carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin actions or both. One therapeutic approach for treating diabetes is to decrease the absorption of glucose through the inhibition of the carbohydrate hydrolyzing enzymes like α -amylase, α -glucosidase, invertase etc. Present study was aimed to investigate the inhibitory potentials of the key digestive enzymes α -amylase and α -glucosidase by the betel leaf (*Piper betle*) extracts to manage diabetes mellitus including the study on the mode of inhibition of the enzymes. For this study, two varieties of betel leaf viz. deshi and khasia, were taken in mature and premature stage. In case of α -amylase inhibition, premature deshi betel leaf extracts showed the highest inhibition. However, in case of α -glucosidase inhibition, premature khasia betel leaf extracts showed the highest inhibition. Acarbose is a commercially available antidiabetic drug which showed almost similar α -amylase and α -glucosidase inhibition potential. The betel leaf extracts performed significant enzyme inhibitory potential but they did not degrade the enzymes which was confirmed by SDS-PAGE on α -amylase. The mode of enzyme inhibition of betel leaf extracts was assessed using Lineweaver–Burk plots. In constant V_{max} value, higher K_m values for the inhibition of each extracts compared to control (no inhibition) indicating competitive inhibition. Structure of the betel leaf extracts might be predicted with FTIR analysis. A sharp peak at the range of 3250-3450 cm^{-1} and 1630-1760 cm^{-1} indicated the presence of O-H stretch of carboxylic acid and amino group for each extract suggesting the extracts would be protein compound. This study would open a new window for the researcher to develop new antidiabetic agent which would be cheap and side-effect less.

LS/2018/3/11 Production and Characterization of Biomaterials from Scylla serrata for Control Delivery of Drugs to Induce Osteoclast Differentiation and Bone Regeneration

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Abstract

Bone morphogenetic proteins (BMPs), which belong to the transforming growth factor (TGF)- β super-family, are essential for embryogenesis and skeletal development. They are responsible for fracture repair and regeneration of bone defects. Among the BMPs, BMP-2 is one of the most potent factors involved in bone formation *in vivo*. Clinical trials of BMP-2 have demonstrated its role in accelerating bone regeneration during both fracture healing and spinal fusion but in order to take advantage of BMP-2 effects, carrier systems are essential. The chitosan scaffold has already been shown to be a biodegradable and biocompatible active polymer would be a desired biomaterial for control release of BMP-2 or other drugs in locally induced osteoblasts differentiation and bone regeneration. Chitosan usually is produced from crab or shrimp processing waste (shell) using conventional chemical process through converting chitin to chitosan by alkaline deacetylation. Chitosan is obtained by removing enough acetyl groups ($\text{CH}_3\text{-CO}$) for the molecule to be soluble in most diluted acids with great potential for wide range of uses due to its biodegradability, biocompatibility, non-toxicity and versatile chemical and physical properties. The aim of the present work was to utilize mud crab byproducts through extracting and characterizing crustacean chitosan and to evaluate its physiochemical and biological properties to control and sustainable local drug delivery. Primary osteoblasts were used to investigate the effects of BMP-2 release from chitosan on BMP-2-induced-osteoblast differentiation. The delivery of BMP-2 from chitosan induced-osteoblast differentiation was significantly higher compared to control. Our data suggest that chitosan could enhance the stimulatory effects of BMP-2-induced osteoblast differentiation and bone regeneration.

Keywords: Bone morphogenetic protein, controlled release, mud crab chitosan, osteoblast differentiation, bone regeneration

LS/2018/3/12 Crack the Molecular mechanism of β -thalassemia disease in Bangladeshi Population

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Abstract

β -thalassemia is an autosomal recessive disorder and the most common inherited disease worldwide with a wide geographical variation in incidence. It is characterized by a genetic deficiency in the synthesis of beta-globin chains resulting microcytic hypochromic anemia. Despite the fact that Bangladesh lies in the world's thalassemia belt and ~6000 thalassemic children are born each year, there is a huge lack in the knowledge regarding the prevalence and etiology of this disorder in Bangladesh. A retrospective survey was channeled and acquiesced socio-demographic data, complete blood counts, serum ferritin levels for 62 probands extensively. Beside that HBB mutation spectrum of 12 patients was screened using multiplexed ARMS-PCR technique. The present study observed the prevalence of β thalassemia is 2.19/10,000 live births which was elevated to 16.96/10,000 live births in consanguineous families. A number of sociodemographic factors including family income status, consanguinity, were found to associate with β thalassemia. Moreover, an elevated erythrocyte sedimentation rate and lower counts of erythrocytes as well as hemoglobin levels were observed. The serum ferritin level was assessed unusually high in the thalassemia patients compared to healthy individuals. Mutational analysis revealed seven different mutations in the HBB gene of 12 probands, where Del 619bp was the highest in frequency followed by HbE Cd 26 (G \rightarrow A). Remarkably, our molecular screening revealed the presence of 4 Mediterranean mutant alleles which is new findings for Bangladeshi population; may refers to the heterogeneity of mutations in the population. The outcomes of the study provide partial information on the prevalence of β thalassemia in Bangladesh and novel insights into the mutation spectrum of the disease in Bangladesh. This study also supports the use of M-ARMS PCR as an alternative technique of Sanger sequence for the

development of efficient and low-cost thalassemia screening program. However, a more comprehensive study with large cohort of molecular screening is required to assess the complete scenario of the thalassemia in Bangladesh.

LS/2018/3/13 Phyto-pharmacological assessment of indigenous medicinal plants for anti-diabetic and anti-cholesterol potentials

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Abstract

Diabetes mellitus is a disease characterized by hyperglycemia caused by the impairment of insulin secretion, insulin action or both. A chronic increase in glucose levels can lead to macro- and microvascular complications such as heart disease, hypertriglyceridemia, nephropathy and neuropathy. To investigate antidiabetic effect of methanol extracts of leaves of *Moringa oleifera*, *Mentha spicata*, *Syzygium cumini*, *Dillenia indica*, *Calotropis gigantea*, methanol extracts of seed of *Syzygium cumini* and raw extracts of *Gynura procumbens* leaves in alloxan induced diabetic mice. In this study, hyperglycemia was induced in mice by intraperitoneal injection of alloxan monohydrate (150 mg/kg). The antidiabetic activity of all selected medicinal plant extracts was evaluated by using control and diabetic induced mice at doses of 300 mg/kg (dose 1) and 550 mg/kg (dose 2) daily. Only raw extracts of *G. procumbens* leaves were administered at doses of 12.5% (v/v) and 25% (v/v) respectively. All treated doses of plant extract were orally administered in experimental mice. Fasting blood sugar (FBS) and body weight were monitored at 7 days interval after induction of diabetes. It was observed that all plant extracts showed more or less antidiabetic activity. Among the seven plant extracts, *M. spicata* leaves, *S. cumini* seed and *G. procumbens* raw extracts of leaves highly significant ($P < 0.001$) level of blood glucose reduction in both doses when compared with diabetic control mice. Present study also showed the significant ($P < 0.05$) improvement of body weight by the treatment of *M. oleifera*, *G. procumbens* and *C. gigantea* leaves extracts (28.65 ± 0.25 g, 24.95 ± 0.25 g and 34.60 ± 0.60 g respectively) in dose 2 during the 28 days of experiment. On the other hand, *M. oleifera* and *G. procumbens* extracts showed higher antidiabetic activity to reduce blood glucose level < 7 mmol/L in dose 2. Therefore, this study suggests a promising use of these plants for treatment of diabetes.

LS/2018/3/14 Production of Recombinant Cellulase and Protease Enzymes by Using Organic Municipal Solid Wastes

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Abstract

Microbial cellulases and protease have wide spread industrial applications in various industries including textile, paper and pulp, biofuel production, food and beverage industry, brewing, tannery, cosmetics, pharmaceutical and agriculture. Cellulase production by four fungal isolates identified by 18S rDNA sequencing was optimized. Bio-stoning of denim and decolorization of commercial direct textile dyes were successfully done with the crude cellulase from these fungal isolates. Genome-wide analysis in the pertinent species of fungal isolates revealed that the genomes of *A. oryzae*, *A. fumigatus* and *A. flavus* had 23, 25 and 22 cellulase genes, respectively. Three cellulase encoding genes (endo- β -1, 4-glucanase, glucan 1, 3- β -glucosidase and mannan endo-1, 4- β -mannosidase) were isolated from the genomic DNA of the *Aspergillus* isolates by PCR and further confirmed by DNA sequencing. Bioinformatics analysis showed that the glucan 1,3- β -glucosidase, endo- β -1,4-glucanase and mannan endo-1,4- β -mannosidase of the isolates bears 80-95% identity with that of *A. flavus* and *A. oryzae*, respectively. Full-length open reading frame (ORF)

of endo β -1, 4 glucanase gene was sequenced whereas glucan 1, 3- β -glucosidase and mannan endo-1, 4- β -mannosidase genes were partially sequenced. Seventeen mutants of *B. subtilis* AKAL7 were selected based on proteolytic clear zone ratio on the skim milk agar (SMA) media and named as E2, E3, E5, E11, E17, E20, E21, E26, E29, E34, E37, E39, E42, U2, U3, U5 and U10. E29 showed highest protease activity among other mutants and the wild strain. The statistical Plackett–Burman design predicted peptone, yeast extract, MgSO_4 , pH and temperature as the significant factors among eight independent variables in the basal media for the production of alkaline protease. The response surface methodology (RSM) determined the optimal concentration of peptone (4.311 g/L), yeast extract (5.184 g/L), MgSO_4 (0.493 g/L), pH 9.95 and temperature 30.76°C for maximum production of protease (731.145 U/ml). The experimental protease level obtained 702.5 U/ml, which is ~4-fold of that produced with the basal media, validated the predicted values of RSM. A total of 75 alkaline serine protease sequences from different species of *Bacillus* were retrieved from the GenBank and characterized with bioinformatics tools. Degenerate primers were designed based on the conserved region for amplification of protease gene from the *B. subtilis* AKAL7. Polymerase chain reaction amplified ~1300 bp protease gene from *B. subtilis* AKAL7. Study is going on to clone the ORF of endo β -1, 4 glucanase gene and to find the full ORF sequence of glucan 1, 3- β -glucosidase and mannan endo-1, 4- β -mannosidase genes.

LS/2018/3/15 Molecular ecology to compare salinity adaptation of hilsa shad, *Tenualosa ilisha* for control production in Bangladesh

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Abstract

Molecular characterization of hilsa shad, *Tenualosa ilisha* is one of the most important issues to know the adaptive mechanism of this fish for managing sustainable and artificial production and conservation. In this study, ecology based some cellular, molecular and genetic researches are performing for understanding adaptation in diverse ecological habitats particularly in low salinity. According to the work plan and based on the objectives, different activities like sample collection, physico-chemical parameters of the water, blood collection and preservation, plasma ions, plasma proteins and osmoregulatory chloride cells etc. were observed from three ecological habitats like river (Kirtankhola, Barisal), salt (Kuakata) and brackish water (Bhola). Physicochemical parameters of the water like TDS, TSS and salinity was found highest value in sea water comparing the others whereas BOD, COD and OD found relatively similar. Plasma ions like Na^+ , K^+ and Cl^- as well as ALT, AST and cortisol were observed and found more in salt water derived samples then fresh or brackish water whereas the amount of proteins were found lowest in Kuakata considering the other two. Histopathological analysis of gill, kidney and intestine demonstrates that Barisal individuals show the model migratory structure, whereas, Kuakata samples shows deviated architectural views, and Bhola samples were quite similar as Barisal. Different other plasma compositions such total CO_2 , and several serum proteins like serum cortisol, albumin, globulin and total protein levels were measured from the blood of harvested fish collected from three ecologically habitats. Research is going on smoothly and a manuscript is going to prepare based on the above findings of the first-year research with more analysis.

Technical Session–VII

(For Dept. of PAD, PSS and BNG)

Date: September 28, 2019 || Time: 10:00 AM – 12:30 PM

Session Chair: Prof Dr Md Kabir Hossain

Resource Person: Prof Dr Zayed Sharmin

SS/2017/03 **Quality of Community clinic health service delivery, Sylhet: Does Management matter?**

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Abstract

Background: Community clinic (CC) is the lowest unit of health administration which provides essential health services to rural remote population in Bangladesh. Efficient management is one of influential factors for delivering quality health services. This study deals with how management contributes to quality of CC health services at remote areas.

Methodology: Qualitative and quantitative data through In-depth interview (20), focus group discussion (18) and survey questionnaire (60) have been approached for understanding management role in CC health care from the two selected rural administrative unit in Sylhet. The respondents are health care managers, field health professionals, elected officials, committee members and the service users.

Results: The findings of the study show that poor responsibility of health officials are highly responsible to weak supervision and monitoring which lead to poor quality health. Coordination with stakeholders are not strong as required for effective health services which contributed to poor health outcomes. In addition, lack of motivation of some vital health professionals affect quality CC health services.

Quantitative findings show that the challenges of management in the CCs are poor supervision (32.20%) and poor responsibility (20.03%) as 51.7 % respondents claim that health care managers visit CC once a month which is not sufficient for quality health care. In addition, monitoring system is weak because of weak managerial role (23%, poor initiative (22%) and poor understanding (47%). Data also shows that only 44% are satisfied with existing health service.

Conclusion: Various management challenges contribute to unsatisfactory health care. Health service can be satisfactory through effective decentralization, ensuring accountability and strengthening organizational and financial capacity.

SS/2017/25 **Coping and Resilience of the people Hit Through the Recent Flash Flooding in Sunamganj District**

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Abstract

The inhabitants of Sunamganj district suffer from flash flooding, often more than once a year. Heavy rain and huge flood water coming from the other side of the border generally causes flash flooding in the district of Sunamganj. It is a perennial problem that makes the inhabitants suffer endlessly year after year. The flash flooding which hit

Sunamganj district during the last week of March, 2017 was enormously devastating as most of the families lost many of their materialistic assets, most importantly their earning sources. This study basically aims to investigate most affected areas of their life, government and nongovernment interventions for their protection and coping and resilience strategies they adopted in the face of flash flooding. Two-upazilla of Sunamganj district namely Sullah and Tahirpur were identified as most affected and therefore were purposively selected for this study. Five villages, 3 from Sullah upazilla and 2 from Tahirpur upazilla were purposively selected from the most affected villages in both the upazillas. Different methods and techniques like survey, in-depth interview, focus group discussion (FGD), observation and content analysis were used to collect the relevant data. Hundred households from 5 villages were selected for socioeconomic survey using cluster sampling technique. In-depth interview technique was used to interact with 25 household heads, two union-council chairman and 3 school teachers purposively selected from 5 villages to extract in-depth data relating to their coping and resilience process. Moreover, 10 FGDs, one with housewives and one with community leaders in each 5 villages were conducted to have better understanding of the situation emerged from flash flooding. Relevant literatures were extensively reviewed to understand the ground reality as well as substantiate the findings of the study. The findings show that their standing crops were entirely damaged, lost income sources and had to starve for quite some time. Non-availability of drinking water and damaged sanitation system made the overall situation worse. Many of the affected families had to migrate to some cities for ensuring livelihood. Affected families were forced to sell their livestock, jewelry etc. for their mere survival. Moreover, the schooling of the children was stopped for few months, communication system was worsened. Although government and some non-government organizations extended their helps in many ways during the time of crisis, something concrete needs to be done to either stop or avoid frequent flash flooding in the region. The affected people are still not heart-broken; they live with dreams and hopes and await a better future

SS/2018/1/14 Procedural Justice, Police Legitimacy and Public Support for Policing: Understanding Public Perceptions

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Abstract

This paper evaluates the public perceptions on procedural justice, police legitimacy and public support for policing. Police is the government agency empowered to enforce the law and order. Procedural justice and police legitimacy is now a new paradigm in modern policing. Procedural justice includes provision of citizen's participation in decision making, ensure neutrality in justice, citizens treated with dignity and respect. Police legitimacy is the extent to which citizens have trust and confidence on police and public view the police as legitimate. To control crime and maintain public and social order, police should follow the principles of procedural justice which lead them to become legitimate and therefore citizen extend their support to police. But when police disregard procedural justice, they become illegitimate and people have alienation, defiance and non-cooperate with the police. The analysis is based on a probability-based sampling survey conducted among 753 respondents within the area of Sylhet Metropolitan Police (SMP) in 2019. A series of socio-demographic and contextual variables are modeled in an effort to explore their relative influence on citizen perceptions of procedural justice, police legitimacy and public support for policing. The results from the binary logistic regression models indicated that the socio-demographic factors, such as gender, age, education, and income were found to be significant predictors of procedural justice, police legitimacy and public support for policing. In addition, those who are satisfied with the visibility of police and feel safe in their neighborhood showed a significantly better perception towards of procedural justice, police legitimacy and public support for policing. Although asking bribe to citizen responsible for negative public evaluations of the police. But positive public person towards police can be restored when police provide services without creating hassles to the citizens and

charging extra money, change their colonial mindset, provisions of adequate accountability mechanisms for their misdeeds, and political consensus of both ruling and opposition party on non-interfere in policing activities. Future policing research should not only assess the public perception but also test the impact of the three dimensions of police (i.e., Procedural justice, police legitimacy, public support) on one another. Police officials in SMP and elsewhere should seriously consider seeking out and/or developing training curricula that teach and promote fair and just practices.

Key Words: Procedural justice, police legitimacy, public support, and satisfaction

SS/2018/1/15 Improving the e-Health Service Delivery through Community Clinic at Rural Level in Bangladesh

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Abstract

Over the past decade, the rapid advancement in Information and Communication Technology (ICT) has experienced tremendous change in health sector in many countries including Bangladesh. The “idea” of e-health is about achieving better health, better decision-making, better communication, better prices, and better access to health information and care including transfer of health communication, services, surveillance or treatment through the use of digital way. The major focus of the study is to identify the problems of e-health service by the community clinic and to know about the challenges to improve the service delivery in effective way by using methodological triangulations of mixed method. For conducting the study primary data has been collected from the community clinics situated under Shunamganj Sadar Upazila by using multiphase sampling method. Qualitative data has been collected through semi structured interview schedule from the CHCP of 15 community clinics and quantitative data has been collected through coded interview schedule from the 150 service recipients’ clinics by using probability sampling technique from research area. The service recipients have fairly bad knowledge (51.3%) about e-health service and their medium of taking health service and information is CHCP (95.3%) rather than specialized doctors and they give them medicine and treatment according to the manual. Telemedicine service has not been introduced yet in the community clinics. The main barriers and challenges of rural community clinics are the service provider professionalism and behavior (Eigen value 3.080, Variance: 23.689), shortage and long distance of community clinics; deficient of ICT and other infrastructures; and shortcomings of giving services. These four components are basically influence the e-health service system of community clinics under Bangladesh. These barriers and challenges may be resolve by introducing proper service guidelines, techniques, human resources, ICT infrastructures, training to both officials and service recipients in the community clinics then the dream of giving health service through e-techniques to the rural backward people can achieve.

SS/2018/2/34 Accessibility and Affordability to Public Health Care Delivery for Urban Poor People, Sylhet

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Abstract

Health is considered as constitutional and fundamental right for general people in Bangladesh. Due to poor socio-economic conditions, income disparities, and socio-cultural barriers, many poor people have limited accessibility in health services and also unable to afford quality health care. The objective of this research is to examine the factors associated in accessibility and affordability of poor people to health services. This is an explanatory research;

qualitative and quantitative data are used from the 150 respondents' approaching simple random sampling in Sylhet city. Descriptive statistics is used for analyzing field data. A partial finding of this research demonstrates that the lowest earners 38% receive health service from the government hospitals and they spend Tk.1000-2000 monthly for health services. 59% respondents said that they receive services through financial hardship, 44%, 38%, and 47% agree that they are unable to visit doctor, medical test, and purchasing prescribed medicine respectively. Gender and religion are not highly relevant cause for accessibility health care, but education is one of the important factors in health care accessibility. Data also shows that among the respondents, 21% satisfied and 42% dissatisfied with health services. With reference to bureaucratic complexity and corruption, the majority of respondents are agreed that these are obstacles for getting health services. The recommendations of this research include good behavior with patients, poverty reduction, and ensuring efficient and accountable health service management in health administration.

SS/2018/3/41 Access to Child Health care in Rural Areas of Bangladesh: A Study of Kanaighat Upazila

Professor Anwara Begum and Mohammad Shahjahan Chowdhury, Assistant Professor

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Abstract

NOT SUBMITTED

SS/2017/07 Adaptation to climate Change: Role of Social Network in HakalukiHaor in Moulvibazar district, Bangladesh

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Abstract

The study areas inhabitants have been struggling by some consequences of climate changes. The poor villagers are expected to feel substantial effects of climate change impacts, in multiple and catastrophic forms for their human and livelihood survival. Observations of role of social network to climate risk adaptation in action, as presented here from research in three different rural, flood prone Hakaluki Haor attached villages under three different Upazila of Moulvibazar district named Voolarkandi of Barlekha, Judishtipur of Fenchuganj and Bhukshimoil of Kulaura, Bangladesh provide valuable information about how much need the role of formal and informal social networks, and key individuals who assist in real time coping and adaptation to climate change unpredictability of the community. The study found the future viewpoint, past and present flood experiences, and the functioning of social networks, leaders/key individuals, NGO workers work and role to build up social networking in the village through individual interviews. Hakaluki haor has lots of climate risk vulnerability. Among these vulnerability flood, flash flood and haor waves are most common in the hakaluki haor area. People of Hakaluki haor suffered massive crop damage every year because of floods and haor waves. At the same, it found that a significant number of the respondents don't have any clear understanding about social capital due to hard core poverty. Yet, bridging social capital leads to resilient and more adaptable community networking. From the experiences of the study it may comment that, the adaptation policy could save villagers from sudden flood situation if it works strategically and properly. At the same, good management of leadership (Key individuals' role) could provide ability to adapt different environmental crisis like sudden flood in the haor basin area like Hakaluki haor. So, every suffered local community need to develop their locality based strategies to survive. This study has been followed by social survey method. The data collection technique of this study has covered both qualitative and quantitative technique.

SS/2018/2/30 Bridging the Gap between Service Delivery of Local Government Authority and Public's Demand: A Case Study on Sylhet City Corporation

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Abstract

The traditional governance systems have been criticized by the scholars as ineffective, insensitive, inefficient and often hostile to the people they are supposed to serve and on the other hand, reducing the gap between the government and the people, public officials are expected to assure the quality service and deliver more precisely. The Citizen's Charter, as one of the strategies of New Public Management, aims at providing quality services within a particular timeframe and reducing the gap between government and people.

Our research project attempted to evaluate the issue of good governance of Sylhet City Corporation, one of the major local governments in Bangladesh. A study found that more than half of its clients was not satisfied with its services and recommended its improvement that calls for re-inspection of service delivery strategies of local government. The research project intended to revisit this issue by an empirical in-depth analysis and tries to bridge the gap between service delivery of local government organization and public's demand. The core objective of the study was to measure the quality of service delivery provided by the Sylhet City Corporation in terms of public demand including to identify the rights of citizens of the city in light of citizen charter; find out the causes of the gaps and thus provide the policy recommendations for minimizing the gap as identified in the study.

A pilot survey has been conducted with a specific set of questionnaire and data collected from 50 households. The pilot survey suggested that this study to reach to an understanding that will explore the actual phenomenon of good governance in the context of local government of Bangladesh especially in Sylhet City Corporation area. Pilot survey revealed that the Sylhet City Corporation might not follow its citizen's charter and people are not getting promised services. Inhabitants of the corporation are also not aware of their rights and many of them don't even know or heard about Citizen Charter. People don't know what are the facilities and services the city corporation provides them. Survey suggested that there is a lack of transparency, accountability in the activities of Sylhet City Corporation. Finally, the issue of good governance of Sylhet City Corporation might not comply with the standard criteria as the whole country is lagging behind to deliver the quality services.

SS/2018/2/31 Impact of e-Governance on Socio-economic Development in Hoar Region of Bangladesh: A Study on Union Digital Center

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Abstract

The study has highlighted impact of e-governance on socio-economic development in haor region of rural Bangladesh. The term e-governance has been adapting within public administration through digitalization process. The government of Bangladesh has taken different initiatives to implement e-governance from central administration to field administration. Union Digital Center (UDC) is a part of e-governance initiatives taken by the government of Bangladesh. The study has focused on assessment of the contribution of e-governance by which brought social and economic advancement of rural people especially haor area in Bangladesh. The study has been followed mixed approach. UDC beneficiaries (service recipients) are considered as unit of analysis. Interview schedule has been used to collect data or information in the studied area. Data analysis has been conducted by the assistance of Statistical

Package for Social Sciences (SPSS). The partial findings of the study, at present birth registration fees have been increased compare to before introducing UDC. Around 138 BDT had to pay for birth registration certificate in average before commencement of UDC. On the other hand, about 256 BDT has been paid as birth registration fees in average after introducing UDC. In respect of time consumption, around 151 minutes had spent for birth registration certificate in average before introducing UDC whereas only 49 minutes have been spent in average after inauguration of UDC. Similarly, for the collection of birth registration certificate, number of visits had about 3.57 times before beginning of UDC service but now it requires number of visits are around 1.42 times

SS/2018/2/32 Adapting to climate change in Bangladesh: The role of Social capital

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Abstract

Bangladesh is one of the extremely gamble countries, highest accessible to climate change because of her geographic position, socio-economic system and reliance on environmental resources. As stated in 'Global climate risk Index 2019, Bangladesh position seventh between the countries, severely damaged by outmost climate effects in 20 years since 1998. In 2018, 407 peoples died in Bangladesh because of highly climate relevant effects- flood, landslide, storms and cyclone in Bangladesh.

Rajnagar Upazila, one of the highly climate vulnerable Upazila in Moulvi Bazar district. It has eight unions. Among the eight unions, Kamarchak union was severely affected by flash flood of 2017. More than 20,000 peoples of the Kamarchak union were directly affected by this flash flood. Hundreds of families took refuge in unused buildings, schools or moved to their relative houses after their villages were inundated of this flood.

Adaptation can substantially curtail many substantiated threatening effects of whether change and the danger of many vital vulnerabilities. The IPCC express adaptation has alteration in natural or civilized structures in reaction to existing or wonted atmospheric stimulation or their impacts, controlled damage or abuses constructive possibilities. Different kinds of adaptation could be marked, along with anticipatory and responsive adaptation, and autonomous and projected adaptation.

There is a huge prospective for social networking in the societies to frame their adaptive ability especially during the catastrophe and make overturned adaptation preventive action. Social networking regulated the continuity and viability of the three types whether change adaptation widely by the IPCC. They are structural, social and institutional adaptations. Structural adaptations are construction works like building sea walls or sewerage arrangements. Social adaptations are implemented including demands of unsafe societies in mind like building of a community toilet along with the cooperation of local peoples, society leaders and Non-Governmental Organizations (NGOs). Institutional adaptations are also hierarchical and policy familiarized like mandating subsidized housing wealth ownership for small earning inhabitants.

Social capital captures the character of human link and explain community-based outcomes. This study provides the overview of the concept of social capital and discuss it in relations to the adaptive capacity in the face of climate change impacts in Kamarchak union, Rajnagar Upazila, Moulivi bazar district, Bangladesh.

SS/2018/2/33 An Investigation of Environmental and Social Effects of Stone Quarrying in Jaflong in the Sylhet, Bangladesh

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Abstract

This study investigates environmental and social effects of stone quarrying industries of Bangladesh. To investigate the research question, this project takes the Jaflong area of the Sylhet district for case study. Jaflong is an ecologically, economically and strategically important place in the Sylhet region. Jaflong is a hill station, natural and mineral resourceful zone and the home of the Khasi people. For natural beauty it attracts tourists from home and abroad for its natural beauty. However, the natural beauty and life and livelihoods of the Khasi people are at risk due to stone quarrying led environmental degradation in the last decades. The fieldwork found that there is a myth in this area e.g. Jaflong is identified with 3Bs (Beauty, Boulder and Betel leaf/nut). These 3Bs are at risk due to stone quarrying. An exploratory approach to social research is used to investigate the environmental and social effects stone quarrying. Purposive sampling which is known as judgmental sampling too is used to select 30 respondents. To gather the primary data this study uses an in-depth interview which is a useful qualitative data collection technique. This study found that a number of proximate causes and underlying driving forces of the stone quarrying leads the social and environmental effects in the habitats of Khasi people. The current countrywide construction boom generates huge demand of stones where the Jaflong area is of its major supplier. This high demand has encouraged the stone miners to turn to mechanized quarrying in place of manual quarrying. They have started to excavate stones from the river bank, hills and hillocks and forest lands. The absence of clear demarcation of the quarrying sites, no limits to extraction and the lack of enforcement of law are the contingent factors in mechanized quarrying. The miners invented a dredger with shallow, locally available machines to excavate stones from the ground. These dredging machines are locally called *Booma Machines*. Sometimes, the labourers manually collect the stones through the cutting down of hills and digging of lands on the river banks and arable lands. Consequently, the hills and hillocks at Jaflong are systematically destroyed as a direct outcome of unregulated stone quarrying. On contrary, the Khasi people of a number of punjis at Jaflong, including Sengram, Nokshiar, Prothapur, Borla, Lama and Mukam, have become subjects of dispossession due to the practice of unregulated stone quarrying.

SS/2018/1/06 প্রমিত-বাংলা ও সিলেটি উচ্চারণ বৈচিত্র : একটি ভাষাতাত্ত্বিক অধ্যয়ন (Pronunciation Diversity of Standard Bangla & Sylheti: A Linguistic Study)

Professor Dr. Md. Abdur Rahim and Md. Zahangir Alam, Assistant Professor

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Abstract

সিলেটি ভাষার ইতিহাস সুপ্রাচীন এবং এর উচ্চারণ পদ্ধতি স্বাতন্ত্র্যমণ্ডিত। বর্তমানে সিলেট বিভাগের অন্তর্গত সিলেট, মৌলভীবাজার, হবিগঞ্জ, সুনামগঞ্জ জেলার মানুষের মধ্যে কিছু কিছু উচ্চারণ পার্থক্য সত্ত্বেও সমগ্র সিলেটের উচ্চারণে এমন কিছু সাধারণ বৈশিষ্ট্য রয়েছে যাদের অনুসরণে তাকে সিলেটি উচ্চারণ বলে চিনতে আমাদের কষ্ট হয় না। প্রমিত বাংলার সাথে তুলনা করে দেখা গেছে যে প্রমিত বাংলার মতো সিলেটি বাংলাতেও সাতটি মৌলিক স্বরধ্বনি রয়েছে। তবে তাদের উচ্চারণ বৈচিত্র্য রয়েছে। যেমন : অ>আ অকথা>আকথা, অকর্মা> আকামা। অ>ই আসল>আসলি, পরল>পিন্‌ল/পিন্‌দিল। ও>উ চোর>চুর, তোমার>তুমার। এ>ও খালে>খালো, জলে>জলো, ডালে>ডালো। আ>অ্যা দাও>দ্যাও, নাও>ন্যাও। আ> অ খারাপ> খরাপ, দালাল> দলাল। আ> এ টাকা> টেকা, বাঁকা> বেকা।

চীনা ভাষার মত সিলেটি ভাষা সুরনির্ভর ভাষা (tonal language) নয়। সিলেটি ভাষায় যা পাওয়া যায় তা হচ্ছে- গা (শরীর), *গা (ঘা), বালা (হাতের বালা), *বালা (ভালো)। এক্ষেত্রে মহাপ্রাণ ঘোষস্পর্শধ্বনি ঘ ঝ ঞ ড ঙ মহাপ্রাণতা হারিয়ে বিপরীত স্পর্শধ্বনি (গ' জ' ড' ঙ' ব') হিসেবে উচ্চারিত হয়। খ ধ্বনি সিলেটিতে মহাপ্রাণ নয়, আরবি خ'র মত; ছ ধ্বনি s কিংবা س এর মত; জ-এর উচ্চারণ z কিংবা ز ধ্বনির মত; ফ মহাপ্রাণ নয়, এ ধ্বনি f বা ف-র মত শোনা যায়। আরবি س, ز, ف এবং ইংরেজি s, z, f শিঙ্গধ্বনি বা শ্বাসজাতধ্বনি (fricative sound) কিন্তু প্রমিত বাংলায় ছ, জ এবং ফ স্পর্শধ্বনি (plosives)। শব্দের আদিতে শ থাকলে হ উচ্চারিত হয়, শব্দের মাঝে বা শেষে থাকলে হয় না। যেমন : শেষমেশ → হেশমেশ, শকুন → হকুন, শনকি → হানকি, শামুক → হামুক,

শালা → হালা, শ্বশুর → হউর, শাশুরি → হরি, বাঁশ → বাশ, হাসা → আঁশা, হতাশ → উঁতাশ। শব্দের আদিতে হ সাধারণত অ উচ্চারিত হয়, শব্দের মাঝে বা শেষে হ সাধারণত বিলুপ্ত হয়। যেমন : হাকিম → আঁকিম, হাড্ডি → আঁড্ডি, হালুয়া → আঁলুয়া, হাসি → আঁশি, অহংকার → অঁংকার, আহাজারি → আঁজারি, তহবিল → তঁবিল, মহাজন → মাঁজন। অনেক আরবি ফারসি ইংরেজি তথা বিদেশি শব্দের প্রথম হ এর উচ্চারণ বজায় থাকে। যেমন : হক, হাওয়া, হরেক, হায়া, হাশর, হিন্দি, হাফপ্যান্ট।

সিলেটি রূপমূল ও প্রমিত বাংলার রূপমূলের মধ্যে উচ্চারণগত ব্যাপক পার্থক্য ও বৈসাদৃশ্য রয়েছে। প্রমিত বাংলা শেখার জন্য বাংলা উচ্চারণের সূত্রাবলি সম্পর্কে সম্যক ধারণা লাভ করা প্রয়োজন। বাংলা উচ্চারণের সূত্রাবলি অনুশীলনের মাধ্যমে প্রমিত উচ্চারণ শেখা সম্ভব বলে আমরা মনে করি।

SS/2018/2/26 সিলেটের লোকসংগীত: অন্বেষণ ও বৈশিষ্ট্য নিরূপণ, শ্রেণিকরণ ও কবি-পরিচয় এবং ভাবসম্পদ বিচার

ড. মো. জফিরউদ্দিন, সহযোগী অধ্যাপক এবং মো. মাসুদ পারভেজ, সহকারী অধ্যাপক

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Abstract

চর্যাপদকে বাংলা ভাষার আদি গান বা সংগীত হিসেবে বিবেচনা করলে সিলেটকে বাংলা লোকসংগীতের প্রধান জন্মদাত্রী ভূমি হিসেবে অভিহিত করা সম্ভব। প্রাচীনকালে বৌদ্ধসিদ্ধাচার্যদের প্রধান বিচরণক্ষেত্র যেমন ছিল সিলেট, তেমনি সিদ্ধাদের পদে প্রাচীন সিলেটের ভূগোল, লোকসংস্কৃতি, লোকায়ত জীবন, ধর্ম-দর্শন ও ভাব-ভাবনার প্রতিফলন রয়েছে বলে পণ্ডিতেরা মত দিয়েছেন। সিলেট ভৌগোলিক, ঐতিহাসিক, রাজনৈতিক, অর্থনৈতিক ও সাংস্কৃতিক দিক থেকে বাংলার অন্যান্য জনপদ থেকে স্বতন্ত্র বলে এখানকার উপভাষাও বিশেষ ধাঁচের। বলাবাহুল্য সিলেটি উপভাষা বাংলা ভাষার প্রধান একটি উপভাষাও। এই উপভাষাটির বিশেষ বৈশিষ্ট্য শুধু ধ্বনিতত্ত্ব, রূপমূলতত্ত্ব, বাক্যতত্ত্ব বা বাগর্থতত্ত্বের দিক থেকে নয়, বরং এর গৌরব উপভাষায় রচিত অনন্য সাধারণ লোকসাহিত্য-সৃষ্টির জন্যও। ভাবে ও প্রকরণে সিলেটের লোকসাহিত্য বিপুলবৈভবের এবং প্রাণপ্রাচুর্য ও বিশ্বজনীনতায় বিশ্বসাহিত্যের অংশীদার। রবীন্দ্রনাথ তাঁর হিবাট বক্তৃতায় শুধু এর স্বীকৃতি দেননি, তারও আগে ম্যাকস মুলার, জর্জ আব্রাহাম গ্রিয়ার্সন, রোঁমা রোঁলা প্রমুখ বিদ্বানরাও এর গুণকীর্তন করেছেন। সিলেটের লোকসাহিত্য বাংলা ভাষা ও সাহিত্যকে বিশ্বদরবারে পৌছাতে গুরুত্বপূর্ণ ভূমিকা পালন করেছে।

বাংলা লোকসাহিত্যের ঐতিহ্যসূত্রে সিলেটের লোকসাহিত্যও বৈচিত্র্যে-ভরা। কিন্তু সিলেটের লোকসাহিত্যের বিশেষ প্রবণতা এর কাব্য ও সংগীতধর্মিতা। বাংলা সাহিত্যের জন্মকাল থেকে সিলেটের লোকসাহিত্য তথা লোকসংগীত রচনা ও চর্চা হয়ে আসছে এবং এই লোকসংগীত নানা জনসংস্কৃতি ও ধর্মের প্রভাবে কখনো প্রভাবিত ও কখনো আবার স্বকীয়ও। এই প্রভাব ও স্বকীয়তা একইসঙ্গে আঙ্গিক ও ভাবগত। আবার ঐতিহাসিক কারণে নানা জনপ্রবাহ, ধর্ম ও বর্ণের মিশ্রণে সিলেটের লোকসংস্কৃতি যেমন মিশ্র ঘরানার, সেই সূত্রে সিলেটের লোকগানও মিশ্র আঙ্গিকের ও তত্ত্বদর্শনের ধারক। এছাড়া বৌদ্ধসাধনতত্ত্বের সঙ্গে বাউল, বৈষ্ণব ও সুফিতত্ত্বের প্রতিফলন সিলেটের লোকসংগীতের প্রধান আকর হিসেবেও চিহ্নিত। আর এসব তত্ত্বদর্শনের সঙ্গে যুক্ত হয়েছে সর্বমানবীয় ভাব ও সর্বজনীন চেতনাপ্রবাহও। আঙ্গিক ও রীতির দিক থেকে পদ, গীত, গীতি, টপ্পা, ঠুমরি, ধুয়া, মালজুড়া যেমন আছে; বিষয়গতভাবে বাউল, ধামাইল, ব্রত, ভট্ট, বিয়ে, ঘাটু, ডোরা, গাজি, হাজিরাত, উলটা ও আচিরাত গান, বেদবাইদ্যার গীত, হিরালি গান, আরি, জারি, সারি, ভাটিয়ালি গান, প্রেমমত্ত, বাউলতত্ত্ব, দেহতত্ত্ব, মারিফতি, ফকিরি, জালালি, বৈষ্ণবতত্ত্ব, সুফিতত্ত্ব ও লোকবৃত্ত ছাড়াও নানা বিষয়ের গান লোকসংগীতকে বিচিত্রমুখী করে তুলেছে।

এইসব পরিপ্রেক্ষিতে সিলেটের লোকসংগীতের ব্যাপক অন্বেষণ প্রয়োজন এবং এর বৈশিষ্ট্যনিরূপণ প্রয়োজন। প্রয়োজন বিচিত্রভাবে বিচার করে এর সুষ্ঠু শ্রেণিকরণ। প্রত্যেকশ্রেণির সত্ত্বার্থ নিরূপণের সঙ্গে সঙ্গে প্রত্যেক প্রকার সংগীত যেসব পরিস্থিতি ও পরিবেশে যাওয়া হয় তার তথ্যউপস্থাপন করা। এমননি প্রত্যেক কবির পরিচিতিসহ তাদের রচনা পরিচয় জ্ঞাপনও। সবশেষে যে কারণে সিলেটের লোকসংগীতের ভুবনজুড়াখ্যাতি, এব ভাবের জগৎ তার উন্মোচন করা। নানামুখী ভাবের গান, নানামুখী দর্শন সিলেটের লোকসংগীতে যুগ যুগ ধরে জনপদের মানুষের জীবনভাবনার সারাৎসার বলেই মনে করা হয়। তাদের জীবনদর্শন বিশ্বমানবের জীবনদর্শনের সঙ্গে কিভাবে সম্পর্কিত ও বিশিষ্ট তারও একটি মূল্যায়ন জরুরি।

এসব দিক বিবেচনা করে বর্তমান গবেষণায় সিলেটের লোকসংগীত সার্বিক অন্বেষণ ও বৈশিষ্ট্য নিরূপণ, শ্রেণিকরণ ও কবি-পরিচয় এবং ভাবসম্পদ বিচারের চেষ্টা করা হয়েছে।

ARSLINETS

Technical Session–VIII

(For Dept. of PHY & GEE)

Date: September 28, 2019 || Time: 10:00 AM – 12:30 PM

Session Chair: Prof Dr Mohammad Iqbal

Resource Person: Prof Dr Nazia Chawdhury

PS/2017/20 Optical and electronic properties of semiconducting polymers for organic photocells

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Abstract

Solution processed polymer solar cells (PSCs) composed of bulk heterojunction structure are widely studied and investigated configuration of solar cells. In this thesis, the research has been conducted on polymer-polymer solar cells. The polymers are regio-regular Poly 3-hexylthiophene 2,5-dyl (P3HT) as the donor polymer and polynaphthalene-bithiophene (N2200) as an acceptor polymer. Organic semiconducting polymers or materials offer low fabrication cost, lightweight, mechanical flexibility, tunable bandgap of the materials, easily processed over large area and are environment friendly. This research work is concerned with the mechanism and physics of organic photovoltaic, their fabrication processes and the characterization of the devices and materials that are used. Bandgap of these polymers are calculated using Tauc plot with the help of optical absorption spectra of the polymers. Quenching of the PL intensity of the blend of the polymers conclude the charge transfer behavior of the donor polymer to the acceptor polymer. The ability of a solar cell to convert sunlight into electricity is characterized by power conversion efficiency (PCE). The current-voltage (I - V) characteristics and external quantum efficiency (EQE) are measured. My fabricated solar cell made with 12 mg/ml active material with methanol treatment and no annealing shows 0.36% PCE and 45.0% fill factor also shows maximum short circuit current (J_{sc}) 1.76 mA/cm². Maximum 12% external quantum efficiency (EQE) is obtained of this device.

PS/2017/21 Status of quantum information near black holes due to Wigner rotation

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Abstract

We have introduced the Wigner rotation. We have derived the formula of Wigner rotation in flat space and curved space. We have calculated the numerical values of Wigner rotation for both cases. The graph of the Wigner rotation with respect to different velocities has plotted. We have explained how rapidity space provides a geometric approach to the Wigner rotation and the Thomas precession. We have also explained that Thomas-Wigner rotation occurs due to boost angle θ and velocity. Black hole, Schwarzschild Black Hole, Kerr Black Hole and Reissner-Nordstrom black hole have been explained. The formula of Wigner rotation in Schwarzschild Black Hole has been derived. We have calculated the numerical values of Wigner rotation in Schwarzschild Black hole. The graph of the Wigner rotation in the case of Schwarzschild Black hole with respect to different velocities of a moving object has been plotted. Quantum information is very excited field, quantum information dissipated near the black hole. The curvature of space-time caused a Wigner rotation on the spin of a particle in curved space-time. The formula of Wigner rotation in Schwarzschild Black Hole will be helpful for understanding the status of Quantum Information near Black Holes due to Wigner Rotation.

PS/2017/22 Elongated dependence of the c axis on the critical concentration of x in $\text{Ni}_x\text{Zn}_{1-x}\text{Cr}_2\text{O}_4$

Professor Dr. Shamsun Naher Begum and Muhammad Omar Faruk, Assistant Professor

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Abstract

ZnCr_2O_4 compound is well known to show the frustration of the spin structure. At room temperature this compound has cubic structure with space group $\text{Fd}\bar{3}\text{m}$. At 12 K, ZnCr_2O_4 distorts to break symmetry of the degenerated frustration spin states by the spin-Peierls-like phase transition, accompanying with the anti-ferromagnetic ordering and the crystal distorted from cubic to tetragonal with $c < a$ with space group $\text{I}\bar{4}\text{1}/\text{amd}$. On the other hand, NiCr_2O_4 compound has cubic structure with space group $\text{Fd}\bar{3}\text{m}$ at above 310 K and undergoes a Jahn-Teller [JT] phase transition from cubic to tetragonal with $c > a$ with space group $\text{I}\bar{4}\text{1}/\text{amd}$. To investigate the elongation dependence of the C-axis, on the critical concentration of x in $\text{Ni}_x\text{Zn}_{1-x}\text{Cr}_2\text{O}_4$, X-ray diffraction measurement were performed for $x = 0.2, 0.4, 0.5, 0.6$ and 0.8 . We have observed that the clear elongation occurred when $x = 0.6$.

PS/2017/23 Non-monotonic Potential Description of the Cross section, Vector, and Tensor Analyzing Powers of the $^6\text{Li}+^{12}\text{C}$ Elastic Scattering at 30 and 50 MeV

Professor Dr. Sakawat Hossain and Dr. Sarwat Binte Rafiq, Associate Professor

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Abstract

This work illustrates, for the first time, the analysis of tensor analyzing powers (T_{20}, T_{21}, T_{22}) along with the differential cross-section (CS) and the vector analyzing power (iT_{11}) for the polarized $^6\text{Li}+^{12}\text{C}$ elastic scattering at 30 and 50 MeV within the framework of an optical model (OM) using microscopic shallow non-monotonic (NM) potentials. The NM potential is generated from the energy-density functional (EDF) formalism [Brueckner et al., Phys. Rev., **168** (1968) 1184] using a realistic two-nucleon interaction incorporating Pauli exclusion Principle. The shallow NM potential can describe the experimental angular distributions of CS and analyzing powers of the elastic scattering data satisfactorily. The OM analysis of the data at this energy does not indicate their sensitivity on the nuclear matter

PS/2018/2/22 Relativistic wave packet generation with application to nanophysics

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Abstract

Usually, free particles in quantum mechanics are represented by plane waves which span the whole space and as such to overcome the handling difficulty, one constructs wave packets of states through superposition of many plane waves. Wave packets are not automatically eigenstates of Schrodinger or Dirac equation but they satisfy these equations. In literature, there are some examples in nonrelativistic quantum mechanics, where eigenstates are localized wave packets.

In our work, we use a modified Dirac equation whose eigenstates are wave packets. So, this extends the theory to relativistic quantum mechanics. We have solved our modified Dirac equation in all three dimensions and found that all solutions are localized wave packets. This is really an achievement.

The 2D solutions of the modified Dirac equation are applied to graphene quantum dots (GQD) and we have found very illuminating results. It was known that GQD's are nanoscale atoms. Our finding is that the electrons in the

graphene quantum dot possesses both positive and negative energies and the energy levels are discrete and harmonic oscillator like. So, one goal of our research is fulfilled.

The localized wave packets we have found from the modified Dirac equation are then allowed to evolve in space and time. We have found that, in accordance with one or two reports in literature, the probability density of time evolved Dirac wave packets have two prongs and these two prongs move in opposite directions. The one Gaussian wave packet which moves right is of large amplitude and the one which moves left is of lower amplitude. There is also interference term in the probability density which behaves like a trembling motion and usually called zitterbewegung. So, we have found the zitterbewegung too.

In conclusion, we have found a modified Dirac equation whose solutions are localized wave packets and which evolve in space-time as expected. In future, we shall expand our work to the field of signal processing with the 1D solution of the modified Dirac equation.

PS/2018/3/32 Management of Radioactive Low and Intermediate Level Wastes (LILW) in Bangladesh

Professor Dr. Md. Shah Alam

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Abstract

Site selection study is very important task for radioactive waste management and scientifically selected site provides protection from detrimental effects of radiation, till desired period of time. A comprehensive methodology along with GIS and MCA techniques were used over Bangladesh to detect potential regions for near surface disposal because this disposal option was justified for LILWs management in Bangladesh. The seven main data criteria were divided into nineteen sub criteria and shapefiles of these sub criteria were used as raw data. The shapefiles were prepared using grading scale 0-5, which indicates exclusion areas to most suitable areas respectively. The relative importance weight of each sub criteria was evaluated by experts, afterwards SAW method was implemented to produce final suitability map. Finally, 4.68% (6920 square km) and 15.09% (22272 square km) of the study area was selected as most suitable and suitable respectively for near surface disposal in Bangladesh. This study provides adequate guideline for the decision makers of Bangladesh regarding LILWs management and helps to initiate further detail study at regional and local scale.

PS/2018/3/33 Investigation of Exciton Dissociation in Organic Semiconductors

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Abstract

Exciton dissociation at donor–acceptor interface is one of the key processes that determine the energy conversion efficiency of organic photovoltaic cells. Organic semiconducting polymers and molecules exhibit charge transfer from donor to acceptor material after the absorption of light or photon energy greater than the π - π^* gap. Materials such as regioregular poly(3-hexylthiophene-2,5-diyl) (P3HT) is widely used as an electron donor (p-type) and polynaphthalene bithiophene (N2200), a nonfullerene, used as electron acceptor (n-type) material in organic optoelectronic device fabrication. Another most used organic semiconductors are the fullerene derivatives such as phenyl-C₆₁-butyric acid methyl ester (PC₆₁BM) and small gap fullerene-ethyl nipecotate (C₆₀). In solution processed bulk heterojunction photovoltaics, P3HT:PCBM blend is the most studied material system. PL spectroscopy of P3HT:N2200, P3HT:C₆₁ and P3HT:C₆₀ blend solutions were measured at different concentration and different

excitation energy. The PL spectra of the blends were used as an indicator of how well excitons can diffuse to a donor-acceptor interface. PL Quenching has been observed in these blends.

PS/2018/1/06 Migration Pattern and Adaptation Techniques to Natural Hazards Outside the Coastal Embankment of Bangladesh, the Case Study of Barguna District

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Abstract

The coastal area of Bangladesh frequently affected by natural hazards. It is identified that Bangladesh is stand in sixth position in the world amongst disastrously affected countries (Eckstein et. al., 2017). Due to that reason, people of this zone regularly needed to migrate and adapt to the unfavorable environment.

The main objectives of this study are observed the migration scenario outside of the coastal embankment of Barguna Sadar Upazila as well as identified the adaptation strategies which followed to face the hostile situation.

In order to deal with these objectives, conducted a field survey based on the socio-economic conditions viz. population, literacy rate, housing structure, occupation, food consumption, sources of water supply, and communication system of the study area, as well as origin and destination place, causes, and types of migration. Along with that, observe, what strategies are followed in the study area to protect themselves from catastrophic disasters.

All of these necessary data collected through a questionnaire survey, in-depth interview, focus group discussion and field observation. Besides, secondary data collected from the Naltona and Baliatali Union Parishad offices.

The descriptive and inferential statistical techniques are used to analyze the data.

It is found from the collected data that 504.28 people live in every square kilometer of the study area and the sex ratio is 100:101. It is estimated that the percentage of dependency population is 29.7%. It is identified that the literacy rate of the project area is 48.13%. It is noticed from the field observation that most of the participants (90.3%) of the study area are the owner of a one-storied house which mainly built by Nypa Palm, tall reed, bamboo, wood, and tin. It is evaluated from the primary data that about 96.87% of respondents are engaged with the professions which directly related to natural resources likely fishing, boatman, etc., and almost 95% can supply sufficient food throughout the year through these jobs. It is observed that the main source for drinking water is deep-tube well, but the number is insufficient in the study area. It is analyzed from the available data that for every 150 to 200 households, there is identified only one tube well which is spotted in the inside of the coastal embankment. The average distance from every residence is 2.08 km. The communication system is found to be a fragile condition during the period of field inspection. There is no pave road, as well as the condition of these roads are rough.

It is calculated from the primary data that about 35% respondents migrated in the study area because of shifting of riverbank in the upper part of Naltona Union, environmental degradation after catastrophic disasters, misunderstanding with the family members, available land near the seashore, plenty of job opportunities, and chance to live with same class of people. There is only in-migration identified rather than out-migration. The habitants, who migrated from the other area, permanently lived here to lead their daily livelihood.

It is spotted that respondents of the study area held native adaptation techniques to deal with the adverse environment. As salinity intrusion is high outside of the coastal embankment, so participants only do fishing or boatman jobs. After an awful disaster, to overcome from the initial shock, they are forced to sell their land or domestic animals, as well as take a loan with high interest from the moneylenders. Along with that, in the few families, women and children are

compelled to take a risky job, as earning persons of the family members lost their working efficiency because of injured in the disaster. Sometimes, the respondent's relatives favor them to overcome their disastrous condition. It is evaluated from the participant's opinion that they regularly emerged the basement of house to protect themselves from the initial wave of storm surge and flood water, as well as plant vegetation around the house to protect it from the gusty wind. Respondents stated that after a dreadful disaster, they took shelter on the coastal embankment. That time, with the aid of governments and various NGOs, they can lead their life with great difficulty. It is also identified that they are migrated from the degraded area to protect themselves from the unhygienic conditions.

PS/2018/1/07 Assessment of Ecological Threat to the Coastal Wetland of Bangladesh: The Case Study at Sonadia Islands, Cox's Bazar

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Abstract

Background: The North-eastern coastal region of Bangladesh, especially Sonadia Island at Moheshkhali of Cox's Bazar is a natural habitat for numerous wildlife and birds along with man-made mangrove and non-mangrove forests. The island also covers an area of 102 sq.km including salt production fields, shrimp culture farms, plain agriculture lands, human settlements etc. The island was declared as an 'Ecologically Critical Area' in 1999 to make a safe home for various rare species. Though the ecosystem is adversely affected due to increasing rate of anthropogenic disturbances.

Aim: This study aims to assess the present ecological situation in terms of sensitive ecosystem and socio-economic benefits as well as clarify and analyze the role of nature and human which are responsible for creating imbalance in ecology at Sonadia Island.

Methodology: To achieve the specific objectives of this study, both primary and secondary data had been collected by field study, satellite image collection and from record books. A semi-structured questionnaire survey from 200 respondents of the local people had been conducted to find out the present status of the Sonadia island, human-nature relationship and the factors affecting the ecosystems of the island. Water and soil samples were collected from eight (8) different points to assess the hydro-chemical status of the island. To quantify the change of vegetation cover along with its shoreline satellite images of 1980, 1990, 2000, 2010 and 2019 (with 10 years interval) had been analyzed using GIS and Remote Sensing techniques.

Expected outcome: from the study it is expected that ecosystem is in high level of threat due to loss of their natural habitat system, human activities, change in hydro-chemical properties of water etc. From the primary study of the satellite images, it was found that the natural vegetation cover and vegetation density of the Sonadia island had been changed significantly through the years. This change in vegetation is directly impacting on the ecosystem.

PS/2018/1/08 Environmental Sustainability Analysis of Stone Quarrying and Crushing Activities at Jaflong, Sylhet

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Abstract

This study aims to analyze the environmental sustainability and the impacts of stone quarrying and crushing activities at Jaflong, Sylhet. Environmental sustainability seeks to improve human welfare and fulfill human needs without

degrading the environment and it's the ability to maintain the qualities of the physical environment. Quarrying and crushing activities constitute a major threat to the environment in the study area. For the analysis of environmental sustainability, four environment components (water quality, air quality, land degradation and sound level) were considered in this study. For the water quality assessment, water quality parameters (Turbidity, TS, TSS, TDS, BOD, DO, PH and EC) have been selected and tested in the laboratory. For air quality assessment Particulate matter (PM 0.3-10 μ m) was measured. Landsat images of 1999, 2004, 2009 and 2019 were used for LULC analysis and sound level meter was used to measure sound level at quarrying and crushing sites.

The results show that, the average values of water quality parameters in post-monsoon season are DO 8.33 mg/l, BOD 1.8 mg/l, Turbidity 411.75 ETU, EC 60.31(19.99 ms/cm), PH 7.61, TS 86.01 ppm, TSS 1.12, TDS 84.88 ppm and in monsoon season DO 9.00 mg/l, BOD 2.85 mg/l, Turbidity 341 ETU, EC 63.82(19.99 ms/cm), PH 7.55, TS 47.78 ppm, TSS 0.675, TDS 47.11 ppm. Water quality of the study area in the post-monsoon period was higher above the permissible limit than in the monsoon period. In quarrying and crushing sites particulate matter 0.3 μ m and 0.5 μ m were found in the air at a large number and, 5.0 μ m and 10 μ m were found at a very lower number. The research result showed that land cover and landscape changes and caused land degradation. From 1999 to 2019, the LULC trend showed that vegetation decreased and increased Barren land. The mean sound level at quarrying and crushing sites were 87.74 dB(A) and 86.89 dB(A) that exceed acceptable sound level.

The study found that the present process of quarrying and crushing is not environment-friendly as it degraded the component of the environment and become a major threat to the sustainability of the environment. To maintain the environmental sustainability of the study area conserving resources, preventing pollution, minimizing waste, restoration of land needed to maintain the sustainability of the study area. Environmental regulations and laws must be enforced by government agencies, local communities and non-governmental organizations for the protection and preservation of the environment.

Technical Session–IX

(For Dept. of CEP & CEE)

Date: September 28, 2019 || Time: 10:00 AM – 12:30 PM

Session Chair: Prof Dr Md Mizanur Rahman

Resource Person: Prof Dr. Mohammed Mastabur Rahman

AS/2017/12 Improvement of nitrogen (ammonium, nitrite and nitrate) removal from wastewater through nitrification and gentrification

Professor Dr. Md. Salatul Islam Mozumder and Mohammad Shaiful Alam Amin, Assistant Professor

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Abstract

This study evaluates the nitrification and denitrification process for the removal of nitrogen from wastewater in a single chamber mixed culture bioreactor. Generally, nitrification and denitrification are conducted separately in two reactors. Oxygen is essential for nitrification and substrate is for denitrification which is strongly inhibited by oxygen. In a single chamber mixed culture nitrification-denitrification process, both oxygen and substrate were needed and played a significant role on the performance of the process. Oxygen and organic substrate played a very significant role on biological nitrogen removal from wastewater as well as nitrification-denitrification in a single chamber mixed culture bioreactor. High oxygen concentration increased the nitrification rate while low concentration was favorable for denitrification. Organic carbon source enhanced the denitrification as well as nitrogen removal efficiency through the increasing the conversion rate of nitrate to nitrite and then to nitrogen gas. The activities of anaerobic heterotrophs on nitrite (XH,NO₂) was the main responsible to remove the nitrogen from waste water as nitrogen gas. The maximum nitrogen removal as nitrogen gas was at low oxygen and high organic substrate concentration. At low oxygen and organic substrate, there was nitrite accumulation due to the presence of mainly ammonium oxidizing bacteria (XAOB). At high oxygen concentration there was nitrate accumulation which was not significantly affected by the presence of organic substrate. However, oxygen and organic substrate increased the sludge production and decreased the sludge volume index (SVI). Low SVI at high MLSS indicates the dense sludge that is desired for high settling velocity.

AS/2017/15 Semiconductor Photo catalytic Process: A Sustainable Technology for the Treatment of Textile Dye Containing Wastewater

Professor Dr. Md. Tamez Uddin and Mitun Chandra Bhoumick, Assistant Professor

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Abstract

In recent decades, the industrial waste produced from chemical, textile, metallurgical and mining industries are mostly responsible for contamination of water. The wastewater disposed to the water basins without treatment or ineffective treatment sometimes brings about disaster to people, plants, rivers and the eco-system as a whole. Most of the effluent treatment plants (ETP) of textile industries use conventional methods such as biological and chemical method. Both methods produce large volume of sludge which itself requires treatment. In this context, semiconductor based photocatalysis can be suitably pertained for the photocatalytic removal of organic pollutants because it can mineralize dye molecules into CO₂, H₂O and mineral acids without producing secondary pollution. In this regard, nanoporous ZnO/SnO₂ heterojunction nanocatalyst was prepared by a straightforward one step polyol method. The resulting nanocatalysts were characterized by X-ray diffraction (XRD), nitrogen adsorption-desorption analyses and scanning

electron microscopy (SEM). The ZnO/SnO₂ photocatalyst was made of a mesoporous network of aggregated wurtzite ZnO and cassiterite SnO₂ nanocrystallites. The photocatalytic activity of the prepared ZnO/SnO₂ photocatalyst was investigated by the degradation of methylene blue dye under UV light irradiation. The heterostructure ZnO/SnO₂ photocatalyst showed much higher photocatalytic activities for the degradation of methylene blue dye than those of individual SnO₂ and ZnO nanomaterials. This behavior was rationalized in terms of better charge separation and the suppression of charge recombination in the ZnO/SnO₂ photocatalyst because of the energy difference between the conduction band edges of SnO₂ and ZnO as evidenced by the band alignment determination. Finally, this mesoporous ZnO/SnO₂ heterojunction nanocatalyst was stable and could be easily recycled several times opening new avenues for potential industrial applications.

AS/2018/1/03 Hexavalent Chromium Adsorption and Reduction in Aqueous Phase with Adsorbent

Humayun Ahmed, Assistant Professor and Md. Delowar Hossain, Lecturer

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Abstract

In last decade, a number of researcher had conducted huge research on Cr(VI) adsorption for seeking efficient and economical adsorbent for the removal of chromium from aqueous system. Hexavalent chromium could be reduced to the trivalent state using various reductive agents or it might be removed from solution by surface-active adsorbents. In this study, both of these methods were evaluated using tea waste and water hyacinth as an adsorbent and changing the pH of the medium. The methods were also investigated with changing initial hexavalent chromium concentration and contact time. Batch mode process was applied to find out the amount of adsorption and reduction within the system. A significant amount of hexavalent chromium was reduced to trivalent chromium at pH 2. In this pH, 10-15% hexavalent chromium was reduced and more than 80% chromium was adsorbed on to the adsorbent. The adsorption density and the amount of reduction increased with initial concentration and also with contact time. The suitability of Langmuir adsorption isotherm to the equilibrium data was investigated for the Cr(VI)-adsorbent system. From the Langmuir parameters the actual adsorption capacity was found and that was 48.54 mgg⁻¹ for tea waste and 7.66 mgg⁻¹ for water hyacinth. Adsorption of chromium (VI) was followed the Freundlich isotherm; means producing multilayer adsorption system and followed Pseudo 2nd order kinetics. The adsorption capacity was higher for the activated carbon and lower water hyacinth. A model was developed based on mass transfer during adsorption and reduction, which was calibrated and validated with independent experimental datasets. Poor model validations were found and more study was required to find out the real adsorption- reduction mechanism.

AS/2018/2/19 Pathogenic waste treatment by Electroporation-A noble technique development

Professor Dr. Engr. Salma Akther and Md. Anisur Rahman, Lecturer

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Abstract

As a biological entity, pathogen or infectious agents such as bacteria and viruses cause severe illness to its host- human body. These pathogenic wastes are remarkably found in hospital waste which pose a serious threat to surroundings as they are hardly vulnerable to the existing treatment method. Among the various practiced methods, open dumping, landfilling, incineration, autoclave and microwave treatment are familiar, but these methods have several drawbacks and are not environment friendly. Therefore, pulsed electric field also known as electroporation has been proposed as

a novel treatment method for treating pathogenic waste. Electroporation is a simple biophysical approach where a short burst electric pulsed is applied on biological cell or tissue to create pores on the membrane or cell wall. When the radius of the pores reaches at the critical value, it is called irreversible electroporation and cell membrane/wall are damaged or deformed permanently. In this study, an electroporation device is designed and fabricated for studying the electro-kinetic behavior of pathogen inactivation. The solution of test microorganism such as yeast and *Escherichia coli* were kept under field intensity of 6 kV/cm, 12 kV/cm and 18 kV/cm. The observation confirmed that there was an increase in microbe's inactivation with increased field strength, and the death kinetics of microbes followed Weibull distribution function. Compared to *E. coli*, yeast showed complete inactivation under field strength of 6 kV/cm with time duration of 180 second. In terms of energy consumption, this method proved to be less energy demanding compared to other disposal methods. Overall, findings of this study suggest electroporation technique as a suitable alternative method for the treatment of pathological waste.

AS/2018/2/20 Removal of arsenic by adsorption process using activated carbon derived from agricultural waste

Dr. Muhammad Zobayer Bin Mukhlis, Assistant Professor and Mitun Chandra Bhoumick, Assistant Professor

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Abstract

In the present study, activated carbon were produced from peanut shells using KOH as activating agent and its ability to adsorb arsenic from aqueous solutions was studied. The prepared adsorbent was characterized by N₂ adsorption-desorption isotherms. Point of zero charge (pHpzc) of prepared activated carbon determined by solution drift method was about 6.5. The batch adsorption experiments were carried by varying operation parameters such as pH and dose. The adsorption capacity was greatly influenced by solution pH and an acidic media was favorable for the adsorption of arsenic onto activated carbon. The equilibrium adsorption data were well fitted to Langmuir isotherm model and maximum adsorption capacity was obtained to be 4.7 mg/g. Considering high dye adsorption capacity, activated carbon prepared from peanut shells can be used as a promising low-cost adsorbent for the removal of arsenic from aqueous solution.

AS/2018/2/21 Development and Characterization of electrically conductive thermoplastic polymer composite and their Optimization

Dr. Md. Mostafizur Rahman, Assistant Professor and Professor Dr. Mohammed Mastabur Rahman

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Abstract

This study focuses on the preparation of conductive polymer composite using conductive polymer and non-conductive polymer as matrix. Conductive polymer polyaniline (PANI) was synthesized under this study, and conductive polymer composite was prepared using various conductive dopants. Polyaniline was synthesized following chemical oxidative polymerization method in acidic medium and doped with ZnCl₂, MgCl₂, CuCl₂ with various composition. The synthesized PANI was characterized on the basis of electrical properties (Conductivity and capacitance), and the effect of dopant was evaluated. The experimental result showed that the electrical conductivity increases with increasing the dopant concentration. CuCl₂ was found the best dopant for the PANI on the basis of electrical conductivity. CuCl₂ doped PANI showed highest electrical conductivity of 35 S/m at dopant concentration of 0.5 M. The test sample was characterized by different techniques such as Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron

Microscopy (SEM) and Energy Dispersive X-ray (EDX) spectroscopy. Surface morphology was investigated by SEM with EDX. Doping of the metal ions has been confirmed by FTIR and EDX analysis.

In case of non-conductive polymer matrix, polypropylene was used as matrix and conductive metal fillers like Zinc, Tin and its alloy were added to impart electrical properties. In this study, different metals such as Zinc and Tin were incorporated with Polypropylene matrix at various compositions. Alloy of Zn and Sn were prepared and incorporated with Polypropylene (PP) matrix to study the effect of the alloy and pure metals on electrical conductivity. The composites were evaluated on the basis of conductivity, capacitance, and reactance. The experimental results show that the electrical conductivity of the composites increases with the increment of filler concentration. Percolation limit of Zn/Sn Alloy-PP composite was found at 30% filler concentration, whereas that limit was found at 40% filler concentration for Zn-PP and Sn-PP composites. Conductive polymer composite has high prospect to be used in the preparation of supercapacitor, powered batteries, energy storage, compound sensor, and in numerous other applications.

AS/2018/3/34 Biomethane production from organic waste portion of municipal solid waste through dry fermentation: process design, optimization, modeling using MATLAB and scale up

Professor Dr. Abu Yousuf and Md. Shahadat Hossain, Lecturer

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Abstract

The world is confronting huge energy crisis caused by over population, industrial development and modernization and unprecedented reliance on fossil fuels for ages. Therefore, it has become the utmost importance of present time that stakeholders clearly perceived the global energy crisis as well as addressed the issue through suitable scientific approach. Dry fermentation is an anaerobic digestion process which has gained attention among scientific communities for laboratory scale and pilot level studies for biomethane (bio-energy) production from municipal solid waste because of reduced cost and potential byproducts utilization from this process. In this study, three types of inoculum pattern such as single layer, multilayer and spiral were studied to decrease the retention time. A set of dry fermenters were designed and fabricated to digest municipal solid waste with varying inoculum pattern. A reactor having submerge fermentation was also running as a control. The temperature was maintained at 17°C, 30°C and 37°C. The highest biogas (biomethane) production was observed in the multilayer inoculum pattern at 37°C temperature.

AS/2018/3/35 Development of heterostructure metal oxide nanoparticles for electrochemical sensor and photocatalytic degradation of organics

Professor Dr. Tamez Uddin

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Abstract

The discharge of toxic organic compounds into environment without any kind of treatment are causing serious health hazard in the neighborhood, damaging fertility of the land, killing fishes and aquatic lives. Therefore, it is very important to detect and measure the quantity of the toxins in wastewater before releasing to environment in order to protect the environment and health. Among different methods, electrochemical methods have received considerable attentions in the detection of organic toxins. In this context, a highly selective chemisensor for 2-nitrophenol detection was fabricated using ZnO/RuO₂ nanoparticles (NPs) synthesized by impregnation method. The as-synthesized NPs were characterized through UV-vis diffuse reflectance spectroscopy, X-ray photoelectron spectroscopy (XPS), Field

emission scanning electron microscopy (FESEM), Energy dispersive X-Ray spectroscopy (EDS), FTIR and X-ray diffraction (XRD). A glassy carbon electrode was modified with as-synthesized ZnO/RuO₂ nanoparticles and utilized as chemical sensor for the detection of 2-nitrophenol. The fabricated sensor exhibited excellent sensitivity (18.20 $\mu\text{A}\mu\text{M}^{-1}\text{cm}^{-2}$), good reproducibility, short response time (8.0 s.), the lowest detection limit (52.17 ± 2.61 pM) and long-term stability in aqueous phase without interference effects. Finally, the fabricated sensor was validated as 2-NP probe in various environmental water samples at ambient conditions.

AS/2018/3/36 Automation and control of nitrification to enhance ammonium-nitrogen removal

Professor Dr. Md. Salatul Islam Mozumder and Mohammad Shaiful Alam Amin

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Abstract

Nowadays, nitrogen removal is very important in terms of water pollution control. The nitrogen pollutants in wastewater are either ammonium (NH₄⁺) or organic nitrogen compounds which are ultimately converted to ammonium through hydrolysis. Biological nitrification-denitrification over nitrate is considered as an efficient process characterized by a relatively easy operation and moderate costs. It is generally used for the treatment of wastewater containing low nitrogen concentration (<100mgNL⁻¹). Treatment of ammonium rich waste-water with high organic load through nitrification and denitrification is still under development. Extensive dissolved oxygen (DO) concentration measurement and control strategy is required to enhance the efficiency of nitrification and denitrification. The robust DO control strategy is required to maintain the oxygen concentration at its optimal level. Beside this, nitrification-denitrification process is an exothermic reaction, needs to control temperature properly for the maximal nitrogen removal, otherwise it inhibits the microbial activities as well as reduce the process efficiency.

The control strategy to control the dissolved oxygen and temperature were properly designed and constructed. The control loop was properly implemented in the nitrification bio-reactor. Moreover the growth medium has a significant effect on this process. Most effective growth medium for the nitrification was the is Blaszczyk's Growth medium (Medium 2) due to high content of PO₄⁻³. High content of Cl⁻¹ inhibit the nitrifying organism and stimulate the microbial decay. Therefore medium with high content of Cl was not suitable for the nitrification process.

Overall the first year of the project was successfully completed. The project is going as according to the plane for the next two years.

AS/2018/3/31 Modeling of tensile behavior of Polymer Composites

Professor Dr. Md. Akhtarul Islam¹ and Jibesh Kanti Saha², Assistant Professor

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²Dept of Electrical & Electronic Engineering, Shahjalal University of Science and Technology, Sylhet- 3114, Bangladesh

Abstract

Polyvinyl Chloride (PVC) and PVC-Jute composite were prepared by a double roller mixing machine at around 120-140°C. The dumbbell shaped specimen was made by injection molding. The specimen was subjected to a given load and the elongation of the specimen is recorded as a function of time. After a certain period of time the load was withdrawn and again the recovery of the specimen was recorded as a function of time.

The deformation behavior can be represented by a three-element mechanical model (Burger model): elastic, visco-elastic and viscous. The parameter of the mathematical model corresponding to three element model was calculated for both elongation (under applied stress) and recovery (with stress withdrawn) phase. The Burger model parameter was calculated from the creep part of the curves, and recovery part was modeled using these values. A very good agreement between experimental data and theoretical curves were obtain in the creep region, Although the modules of elasticity for both phases differ a bit because of some structural change have taken place in the sample during elongation phase.

AS/2017/18 Identification of groundwater potential Zone by Electrical resistivity techniques in and around the SUST campus

Dr. Md. Shofiqul Islam, Associate Professor and Md. Ashraf Hossain, Assistant Professor

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Abstract

Groundwater zones and subsurface lithology in the Shahjalal University of Science and Technology (SUST) campus area were identified by the Geophysical Electrical Resistivity Survey method. In this work, a total eight (08) Vertical Electric Sounding (VES) had been conducted using with Schlumberger array. Pseudo-sections and cross-sections have been generated by IPI2 WIN (version 3.0.1) considering the geology, geomorphology and hydrogeological conditions in the study area. A total four major zones had been found at SUST by this survey. Subsurface view (using Surfer software) shows the undulating nature of the fresh water bearing layers (fresh aquifer) in the SUST campus, which might fail by the civil engineers to find out the exact layer for water supply. Fresh water bearing zones were found near the surface at Ladies Hall and Central ground, whereas it is at 28 to 68m and 52-98 m at in front of the B-Building and the Central Mosque area. Unfortunately, this aquifer was found below 200 m near the Shaheed Minar area.

Key words: Resistivity, ground water, lithology, sand, aquifer

AS/2017/19 Conversion of Plastic Waste into Liquid Fuel by Pyrolysis

Dr. Md. Saiful Alam, Associate Professor and A.T.M Shahidul Huque Muzemder, Assistant Professor

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Abstract

Plastic is an indispensable piece of our everyday life. Its production and application have been rising rapidly because of its extensive variety of utilization. Because of its non-biodegradable nature, it can't be effortlessly arranged off. So, these days new innovation is being utilized to treat the waste plastic. One of such process is pyrolysis. The pyrolysis of plastic waste creates an entire range of hydrocarbons counting paraffins, olefins, naphthalenes and aromatics. This paper discusses various results obtained from thermal pyrolysis and catalytic pyrolysis of waste plastic. Under the pyrolytic conditions, the plastic waste can be disintegrated into three parts: gas, liquid (plastic oil) and solid residue. The waste plastics composed of low-density polyethylene (LDPE) is pyrolyzed in this study. The experiment is conducted under various temperatures ranges of 4500C to 6500C. Pyrolysis process of LDPE gives its maximum yield of 80.55% at 550oC temperature. Different catalysts like Calcium Oxide (CaO) and Charcoal are used for catalytic pyrolysis. The yield of liquid obtained from catalytic pyrolysis is found to be lower than that from thermal pyrolysis. The highest yield is found to be 74% for CaO. The rheological property of the produced liquid oil is also compared with the property of conventional kerosene. The produced plastic oil is expected to substitute the conventional kerosene as a fuel and contribute to mitigate the future energy demand as well as to reduce the environmental damage.

AS/2018/1/18 Biodiesel production from waste plam oil by transesterification process

Professor Dr. Saiful Islam

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Abstract

Many restaurants around Bangladesh are using vegetable oil like soybean oil, palm oil repeatedly to fry their food which is very harmful to human body. Those used vegetable oils are just thrown to the environment without any treatment. In this project, we produce a good quality biodiesel from those used oil by transesterification process. The main goal of the research was to find a better alternative of the conventional diesel fuel and find the most useful properties of it as far as possible. Our specific objective is to produce better quality of biodiesel by changing the temperature and the amount of catalyst. The used biodiesel was collected from restaurant near Modina Market Point. The experimental results were compared with the conventionally produced octane. It was found that using the reaction temperature at 60⁰ C and 0.89 gm of catalyst, the produced biodiesel shows a higher calorific value (58.58 MJ/kg) than conventional octane (49.30 MJ/Kg).

AS/2018/2/33 The state of gas seeping and environment around the gas blow out area of Sylhet Gas Field, Haripur, Sylhet: A view for protecting the future environment

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Abstract

Sylhet gas field is one of the largest among the gas fields in Bangladesh and also one of the most important. Apart from being productive, it has some cons too. One of them that can be pointed out is the major blowouts that happened near well-1 and well-4 and still the gas is seeping around the gas field. Thus, this study has been carried out to assess the impact of the blowouts in the nearby areas by analyzing environmental elements of those areas such as Soil, water, air and noise. Soil, water samples and noise, air quality data were collected from several different locations of the study area.

From laboratory analysis, various parameters were determined and the dynamic behaviors of the soil and water quality parameters are characterized after some six decades of the blowout. In this research the effect of the phenomena in the surface areas around the blowout zones are observed. The study is mainly focused on physical, chemical and statistical analysis of the components of the environment which also involves survey on the inhabitants of the area which will help by giving a picture of the day to day lives around the blowout zones. From the data devised from the laboratory analysis, charts and graphs are plotted showing the variation in the components of environment and their deviation from the ideal state of livelihood.

The study shows high amount of organic matter in soil and nearly ideal pH values in soil and water. Water is found to be soft by hardness test. There are some problems in the study area which includes subsidence and gas see-page. Although, overall environment is not in a hazardous state as people are cultivating crops near gas see-page pond and using the water of gas see-page pond for cultivation.

Therefore, the variation in weather environmental components is minimal and the area is very livable. Noteworthy, blowouts in gas fields known to have severe impact on the reservoir and aquifers underground. In this study only the

impact on the surface which is found to be minimal and recommend to regular monitoring for the safety of the environment around the area.

Technical Session–X

(For Dept. of SOC & BUS)

Date: September 28, 2019 || Time: 1:00 PM – 3:30 PM

Session Chair: Prof Dr Md Nazrul Islam

Resource Person: Prof Dr. Mohammad Jasim Uddin

SS/2017/12 Representations of the Female Body in Bangladesh: A Study on Embodiment, Agency and Empowerment

Professor Dr. Laila Asrafun and Nadia Haque, Assistant Professor

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Abstract

In contemporary societies, the body signifies a person's social status, group membership and cultural capital, as well as the individual's health status, sexual status and moral status. The body's health and appearance have become indicators of a "good person" who is living a "good life". This research explores young Bangladeshi women's body experiences and possibilities for embodied agency within or despite the constraints of their given socio-cultural surroundings. By focusing on the perspective of physical appearance, the study examines young women's common experience of body satisfaction and dissatisfaction. Theoretically, the study draws from Bourdieu's reflexive sociology and feminist appropriations in order to explore both the stable outlook of habitual body experience and the changing outlook of body. To find out individual's body experience, the study analyzed both collectively and individually produced accounts of body experience by focus group discussions and individually written accounts. The research is qualitative and approach is interpretive. The research shows that the common experiences of self-realized body surveillance and body anxiety among contemporary young Bangladeshi women rise from the experience of a representational self, constructed by a culture of appearances. This research finds that, young women's body experiences were constructed within contradictory demands posed by current cultural beauty and health imperatives. Consequently, the young women were on a quest for the ideal body, the ideal self and an inner experience of well-being. The research depicts that most of the young women typically emphasizing independence from existing cultural point of view and life-style for representing their bodies and like to exhibit their bodies with the mixture of different cultural outlook. The study also shows that through new experiences, in combination with feminist reflexivity, some of the young women were able to inhabit their bodies in new and more empowering ways. The agency of the body itself in acquiring new ways of being, enabling the young women to re-embody themselves, help to cause a rupture in their previous socialization and life-style

SS/2017/13 Migration, Individual Modernity and Fertility Performances: A Study among the Slum Dwellers in Sylhet City Corporation Area

Professor Dr. Mohammad Jasim Uddin and Mohammad Mojammel Hussain Raihan, Lecturer & Mohammad Moniruzzaman Khan, Lecturer

Dept of Sociology, Shahjalal University of Science and Technology, Sylhet- 3114, Bangladesh

Abstract

Migration from rural to urban areas has historically played a significant role in the rapid growth of cities and, together with the reclassification of rural localities into urban centers; continues to be important factor of demographic change and city growth. Migration and modernity are also often regarded as correlated factors. It is argued that the greatest change in individual modernity was experienced by the men who left the countryside and associated agricultural pursuits to take up work in the urban areas. The nature of their work stimulated them to new attitudes, new ways of

looking at things, to a heightened sense of personal efficacy, or to any of the other changes that would have made them more modern. Yet our knowledge on rural to urban migration, modernity and fertility practices in the context of Bangladesh remains patchy. The present study took a closer look into migration, modernity and fertility preferences from sociological point of view. The empirical data of this study was collected from 250 migrants living in slum in Sylhet City corporation area. We measure the level of individual modernity, and then identify how modernity relates to the fertility practices. In doing so, however, the individual modernity construct was conceptualized to reflect the respondent's orientation toward modernity with respect to six dimensions: fatalistic attitudes, activity orientation, planning values, kinship orientation, and gender beliefs. Result shows that the distribution of modernity scores is fairly skewed toward upper tail indicating that a majority of the respondents hold modern attitudes and values. Modern attitude contributes significantly to the explanation of fertility practices independent of migration variable. This study underpins our idea that what one believes and perceives, or the attitudes and values one holds, will eventually be manifested in preferences and perhaps in practice.

SS/2017/15 Does Financial inclusion through mobile banking increase financial resilience in flood prone region? A case of Sunamganj haor basin in Bangladesh

Mohammed Anwar Hossain, Associate Professor and Professor Dr. A. H M Belayeth Hussain

Dept of Sociology, Shahjalal University of Science and Technology, Sylhet- 3114, Bangladesh

Abstract

NOT SUBMITTED

SS/2018/1/18 The socioeconomic factors influencing attitude towards Rohingya Refugees from Myanmar living in Bangladesh

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Abstract

The present project analyzed what are the socioeconomic factors that contribute in the attitudes of the host population to Rohingya refugees taking the data from primary survey into account. The host community living nearby villages adjacent to Kutupalong and Leada refugee camps are directly affected by the influx of refugees. A structured questionnaire for survey interview has been administered to collect data from 109 host community people and two FGD has been conducted to understand the overall senior in a qualitative way. The study finds that the nearly 80 percent of the host people think that youth of the host society are getting spoiled due to the influence of the Rohingya. Economic threats is higher among is that 99.1 percent of the local people think that “Because of the Rohingya, the job opportunities of the locals are decreasing”. 97 percent of the respondents opined that the Rohingya are getting more health facilities than the local people. 85 percent of the local respondents strongly agrees with the statement that the Rohingya are spreading YABA (drug) in the society. 65 percent of the local respondents think that the law and order of their community has been degraded due to the Rohingya refugees. Economic threat and health were found to be higher for male than female. The research results, therefore, showed there was statistically significant difference in the attitude towards refugees of the respondents according to their gender (male or female). The results indicate that there is a statistically significant difference attitude of feeling economic threat among the different types age group $\chi^2=16.793$, p value=0.052. and the feeling cultural threat among the different types type of age group $\chi^2=26.471$, p value=0.022. The two FGD reviles that the host community people cannot avail basic health services from govt. and also NGOs health service providers or service point due to Rohingya. Rohingya become hostile sometime. Host community people are feeling like a minority group, because they are deprived off all types of facilities and socially

excluded. Local people are at high risk of affected by communicable and no communicable diseases like diphtheria, Social discipline has been destroyed due to overpopulated situation. The local people are suffering from inferiority complex always, like fair justice and law in order. Rohingya are now occupying local business as some of them are rich among them. This study suggest that government and NGOs should take necessary action to mitigate hostility among the host community.

SS/2018/1/19 Social Capital and Social Resilience: Collective Action in Community Based Fishery Management in Bangladesh

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Abstract

The driving factors of wetland dependent fishers' resilience to socio-ecological challenges largely depend on their social contexts; thus, the selection of criteria to evaluate the resilience of wetland dependent fishermen is a major issue for both planners and researchers. Taking this issue into account, this study utilizes a pair-wise comparison matrix model to measure the resilience of a wetland dependent fishermen community in Bangladesh. The model is based on twenty-one sub-criteria under social capital, collective action, and community facility. These sub-criteria explain a 6-29% relative effectiveness in fishers' resilience to socio-ecological challenges. This study finds that social capital is the main determinant of fishers' resilience (40%) followed by collective action (32%) and community facilities (28%). This study suggests that bonding and linking social capital has less effectiveness than bridging social capital in developing fishers' resilience. Lack of coordination among fishers, government officials, and their activities may restrict the role of collective action in fishers' resilience. The resilience of fishers may also be restricted by their failure to address economic and institutional constraints in managing the fishery. This study is the first report of its kind of wetland dependent fisher's resilience in Bangladesh, and it will serve as a tool to manage wetland fisheries.

Key words: Social capital, collective action, community facility, social challenges, and fishers' resilience

SS/2018/1/20 Marriage Patterns, Conjugal Relations and Kinship Support: A Study on Slum Woman in Sylhet city

Sumena Sultana, Assistant Professor and Nadia Haque, Assistant Professor

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Abstract

This study attempts to explore the lived experiences of urban poor women in relation to their marriage patterns, conjugal relations and kinship support. In adopting a qualitative approach, the study examined 10 purposively selected married women aged 22-37 years in Sylhet city. Life history interviews and ethnographic observations were employed to generate data. On the basis of mate selection process, either it is selected by parents or by spouse themselves, this study categorized marriage into two types—arranged marriage and love marriage. Focusing on three dimensions of conjugal life, findings of this study demonstrates that in their conjugal lives, urban poor women have changed traditional notion of 'male breadwinner', however, gender hierarchy still exists as a regular phenomenon. Regardless of marriage pattern, women experience different forms of domestic violence by husbands and in-laws family members. Traditional notion of 'male protection' suppress women to protest domestic violence. In the case of attaining material and emotional support provided by primary natal kin, if women needed, arranged married women are in a more favorable position than love married women.

SS/2018/1/22 Justice for the Poor: an assessment of the existing services of District Legal Aid Office, Sylhet

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Abstract

Justice for the poor has become a core concern in judicial services now-a-days. Legal aid is that essential mechanism which enables the poor and the vulnerable segments of society to be able to insist on their legal rights in order to have free, fair and equitable justice in the society. Today, legal aid is reasonably regarded as a crying need to secure social and legal justice in Bangladesh. As most of the citizens are below literacy rate and live below the poverty line, they need such mechanism for access to and ensure Justice where needed. Because of the financial crisis or lack of legal knowledge the poor are often barred from access to justice. In recognizing the legal aid as a right, the government has enacted some laws. This work aims at assessing the services provided by the District Legal Aid Office through revealing the existing infrastructure, logistic support and cases handle in the Legal Aid office. It is a descriptive research. This design attempts to describe the trends and patterns of services provided by the Legal Aid office. Sample Survey is the most important tool. Based on survey report/result, some case studies for special occurrences have been taken with service receivers (Legal Aid Receivers) and, with the service providers and other stake holders like BLAST and BRAC. Mixed method has been followed to accomplish the work. For qualitative data, sample survey has been the strategy. Based on the survey result, some particular cases are studied. In-depth interviews have also been conducted for qualitative work. Semi-structured questionnaire is used to collect the data. The findings explore that the laws attempted at ensuring legal aid seem to have some weaknesses, loopholes, and technical complexities which have to be judiciously addressed in the proper legal perspectives. The logistic arrangements and support that Legal Aid Offices hold are not appropriate enough but the expected that result is that maximum number of the people who are getting such services from Sylhet Legal Aid Office are satisfied within their own sphere.

Keywords: justice, legal aid, poor people/litigant, government, statutory laws, Bangladesh.

SS/2018/1/23 Knowledge, Attitude and Perceptions of General people about antibiotic usage and resistance: a cross-sectional study in Sylhet Bangladesh

Mohammad Mojammel Hussain Raihan, Lecturer and Mohammad Moniruzzaman Khan, Lecturer

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Abstract

The objective of the study is to know about public knowledge, attitudes and perceptions about antibiotic usage and its resistance. The data of this study is collected from 110 respondents by using social survey questionnaire. This study is basically a comparative study to conduct the comparison public knowledge, attitudes and perceptions about antibiotic usage and its resistance in rural and urban. In the present context of Bangladesh People in the rural area are less knowledgeable about antibiotic use and resistance than in the urban because of their lack of proper education, availability of registered doctors, appropriate medical facilities compare to urban and proper awareness of antibiotic uses and resistance. On the other hand, the people of the urban have their proper education, get medical facilities enough compare to rural people and have relatively more awareness of antibiotic uses and resistance due to the available information and publicity from various social media. In the present study it is displays that 29.09 percent of the rural people are concerned about antibiotic uses and resistance, whereas above half of urban people (70.91 per cent) are concerned about it. Therefore, in rural above half of people (61.82 per cent) take antibiotic as the safe drug for any disease whereas above one-fourth of urban people (26.36 per cent) consider antibiotics as a safe drug. So, the

above mentioned comparison concluded clear differences of uses, knowledge practices and behavioral attitudes over antibiotic drugs between rural and urban people.

SS/2018/2/39 Voices of the Poor: Demystifying the Nexus between Rights and Agency of Tea Workers in Bangladesh

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²Dept of Political Studies, Shahjalal University of Science and Technology, Sylhet- 3114, Bangladesh

Abstract

Bangladesh is a major tea producing country in the world. It earns a significant amount of foreign exchange through exporting tea. Hundreds of thousands of tea workers have been working in tea gardens since the inception of the industry. The workers have been encountering poverty, vulnerability and social exclusion. Yet they have been working in the gardens for generations. The tea companies apply policies to retain them. This study aims to investigate the institutional mechanisms which the companies adopt to retain the workers. The study also explores why the workers continue their jobs in the gardens for generations despite their perpetual poverty, vulnerability and other social constraints. Furthermore, the study examines how the workers exercise their agency to negotiate collective bargaining with the authority for safeguarding their rights and interests. We used Scott's concept of public and hidden transcript to investigate the phenomenon by employing a robust methodology for this study. We selected four major tea gardens spanning across three districts of the greater Sylhet region: Sylhet, Maulvibazar, and Habigonj. These gardens included Malnichara Tea Estate (Sylhet District), Lungla and Finlay Tea Estates (Maulvibazar District), and Teliapara Tea Estate (Habigonj District). We conducted a multi-sited ethnography comprising a set of data collection instruments: In-depth interviews, case studies, focus group discussion, and direct observation. We interviewed 43 individuals, including 35 tea workers, four tea garden managers, and four Panchayat (local Council) or local trade union leaders. Local council or trade union leaders were workers too. We also conducted 12 case studies and six focus group discussions with workers. The study finds that the tea companies apply shrewd industrial policy to retain the workers. The companies' official policy, which can be termed as "public transcript" according to Scott, contradicts the official practices. While implementing this policy, as our investigation reveals, the companies adopt offstage behavior, which Scott termed as "hidden transcript", to regulate the workers. The public and hidden transcript of the companies is intended to maximize their profit and ensure industrial sustainability. The study also reveals that the workers also construct their public and hidden transcript. Their public behavior contradicts their offstage practices. Due to the companies' hidden regulative policy, the workers have been bound to remain and work in the gardens for ages despite their longstanding poverty, insecurity and social vulnerability. The complex power relations and non-professionalization of trade unionism have led to the weakening of their collective bargaining agency and thus upholding their rights.

SS/2018/3/45 Cultivating decent working conditions through Accord remediation program: workplace consciousness and quality of work-life in RMG sector in Bangladesh

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Abstract

The April 24, 2019 imprints the sixth commemoration of the Rana Plaza collapse which positions among the world's worst industrial disasters. International Labour Organization (ILO) believes that it was not a localized disaster. The

consumers of apparel products felt the associations between workers' casualties and the products they produce for the global markets. As a response to the catastrophes that happened to garment industries and was responsible for the loss of 1,134 workers of whom mostly were women, the conditions of ready-made-garment (RMG) industries came under global scrutiny concerning work environment, and occupational health and safety (OHS) issues. As a result, three largest remediation programmes have been in progress in the RMG factories in Bangladesh - the Better Work (hereafter, Better Work) programme administered by the ILO, the Alliance for Bangladesh Worker Safety (hereafter, Alliance), and the Accord on Fire and Building Safety in Bangladesh (hereafter, Accord). It has been expected that the workers and employers in RMG factories by all accounts would appear to be more safety conscious through the remediation process of the factories (ILO, 2016). Despite more than two decades of private voluntary approaches to address workers' rights issues in apparel supply chains, workers in the lower production tiers continue to face poor working conditions and chronic violations of the labor rights (Anner, 2018). Approaching the six-year anniversary of the catastrophe, the question arises as to whether the intervening (most likely the remediation programmes) years have found the significant development on the working conditions of RMG workers (Anner, 2018). We intend to analyze whether the workers have achieved social-psychological upgrading amid economic and structural upgrading through remediation programmes run by the Alliance. It is also appropriate to redefine the decent working condition which is among the seventeen sustainable development goals (SDGs) declared by the United Nations. Considering the particular fact about the recent tragedies, such as Rana Plaza collapse (2013) and Tazreen Fashions fire (2012), we assess the social upgrading of workers through workplace consciousness and transformations of work in Bangladesh garment factories. This study follows an analytical research design employing different data collection techniques including questionnaire interviews, MSC (Most Significant Change) techniques, and documents studies including the reports on Amader Kotha (Our Voice— a digital helpline for garment workers) which is administered by the The Cahn Group, LLC (the United States).

SS/2018/3/46 Civil Society and Social Development in Bangladesh: A Study in Sylhet Division

Professor Dr. Abdul Ghani

Dept of Sociology, Shahjalal University of Science and Technology, Sylhet- 3114, Bangladesh

Abstract

NOT SUBMITTED

BUS/2018/1/06 Economic and Social up (Down) Grading in the Global Production Network of Bangladesh's Tea Sector: Drivers, Dynamics, Directions

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Abstract

A key challenge to promoting decent work in global production networks is how to improve the position of both firms and workers. This paper explored the challenges and opportunities for promoting decent work for the tea-sector workers through economic and social upgrading in Bangladesh Tea sector's Global Production Networks (GPN). The key question that the project attempted to deal with was: under what circumstances can both firms and workers gain from a process of upgrading? To that end, the paper at first examined the literatures on global value chains, production networks, labour economics and labour studies in order to address the separation between firm and worker levels of analysis in the context of GPNs, where production and employment decisions are not only influenced by local markets, but also by foreign buyers and their agents. Thereafter, the paper examined and defined the concepts of economic and

social upgrading, as a means of assessing improvements for firms and workers that are participating in GPNs. In addition, the paper tested the GPN framework of Barrientos, Gereffi, and Rossi for assessing the linkages between economic and social upgrading based on type of value chain and type of work. It then explored the opportunities and challenges for linking the two, given that regular and irregular workers have very different levels of access to employer-based channels to promote their rights, protection and voice. Finally, the paper revealed the different trajectories (and mixed outcomes) that can be pursued through economic and social upgrading or downgrading. This paper has explicitly examined the policy and strategy options available to firms and other actors, which were compared with contemporary findings such as Mayer and Pickles (2010).

The paper has identified the following three trajectories of social upgrading: Small-scale worker upgrading; Labor intensive upgrading; and Higher skill upgrading. The study has reflected on the possible strategies for economic and social upgrading through value chain, on the ways of overcoming constraints on upgrading and on appropriate specific institutions and market structures. The paper has also documented the best practices; i.e., most effective practices of smallholders for successfully inserting themselves in the value chain. The paper visibly identified opportunities and strategies for economic and social upgrading.

BUS/2018/3/07 Longitudinal impact of micro-credit-credit on the livelihoods of clients: A study on Sunamganj district of Bangladesh

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Abstract

Haors are bowl-shaped large tectonic depressions which receive surface runoff water and consequently become a very expensive water bodies in the monsoon and mostly dries up during post-monsoon period. Haor districts (Sunamganj, Sylhet, Habiganj, Maulvibazar, Netrakona, Kishoreganj and Brahmanbaria) of Bangladesh cover 19,998 sq. km land, which is 13.56% of total area of the country. According to Center for Environment and Geographic Information Services (CEGIS) the total land of the haor districts is about 43% (8585 sq. km) is under wetland (haor) where 373 haors are exists (CEGIS, 2012). Sunamganj district is situated in the North-East region of Bangladesh. Geographically its location is 25.03869-degree North and 1.403761-degree East. The total area of the district is 367,000 hector of which 268,531 hectors are wetland i.e. haor which is 31%. Therefore, about one-third of total area is haor and is for this it is called the haor- based district in Bangladesh where 95 haors are located. People living in this area are considered as “backward section of citizens. A number Micro-Credit (MC) institutions have distributed a large volume of microcredit to improve the socio-economic conditions of this area and also, they are still doing for example BRAC solely disbursed loans among 51760 borrowers through its 39 branches up to December 2015 (BRAC, 2016). The research findings revealed that MC played a significant role in socioeconomic development of haor areas, especially household income increment, livelihood diversification, creation of self-employment, poverty reduction and women empowerment though it entrapped few households in vicious cycle of poverty (BRAC, 2015, and IFAD, 2015,). A number of development projects have also been implemented to improve the socio-economic condition of this area viz. SCBRMP by government and many international donors and agencies viz. IFAD, SDC, CARE etc. As there is no in –depth study following this method on the impact of micro-credit, an in-depth research is essential to discover the real impact on micro-credit on the client's livelihoods which will help to achieve the Sustainable Development Goals (SDGs) for Bangladesh. The study is directly related to SDGs # 1, 2, 3,8 & 10. The core objective of project is to assess the impact of micro credit on the livelihoods of the clients in Samangan district. The specific objectives are to identify the nature of microcredit services available in Sunamganj district; measure the productive outcome of microcredit on the livelihoods of the clients; identify the problems in microcredit facing by the clients in the utilization

of microcredit services ;explore the best examples of social learning pertaining to the utilization microcredit; and draw implications for design and implementation of micro-credit programs in Sunamganj district. The population of the study is the micro credit users from formal micro-finance institutions in the Sunamganj district of Bangladesh. There are 769 licensed NGOs from Micro Credit Regulatory Authority (MRA) of Bangladesh. The target respondents of the study are the women who have taken micro credit from any formal micro-credit institutions/NGOs which are listed in MRA and, no priority of institutions will be considered. Basically, the study will gather necessary primary data from the selected households for estimating the outcome of micro-credits on livelihoods of the people of the district. For this purpose, the study will collect data from both the micro-credit borrowers and micro-credit non borrowers. In selecting both type of respondents, the study will employ cluster sampling design and each upazilla(sub-district) will be treated as a cluster. There are total (11) upazila in Sunamganj district and hence total number clusters will be 11 (eleven). About 30 households of micro-credit borrowers (treatment group) from each cluster will be selected for household-level interview and the study will cover 330(30*11) households. Again, 15 households of micro-credit non borrowers (control group) from each cluster will be selected for household-level interview and the study will cover 165(15*11) households. As a result, the total (both treatment and control group) sample size will be $(330+165) = 495$. This sampling method and size of sample have been used in many studies in assessing the impact of micro- credit (Nilufa,2104, Habib and Jubb,2015, Islam,2014). The generalized linear model will be used to analyze collected data.

Technical Session–XI

(For Dept. of FES & BUS)

Date: September 28, 2019 || Time: 1:00 PM – 3:30 PM

Session Chair: Prof Dr Md Shamsul Haque Prodhan

Resource Person: Prof Dr A. Z. M. Manzoor Rashid

FES/2018/1/01 Livelihood Pattern and floristic diversity with the changes of land use systems in Southern coastal zone of Bangladesh

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Abstract

The coastal population of Bangladesh is exposed to a number of climate induced hazards. Most of the region lies less than 3 m above sea level, and is subject to extreme events such as flooding, cyclones and storm surges, salinity intrusion affecting existing soil and water sources. This study was conducted in two contrasting saline zone of high and medium salinity in the coastal areas of Bangladesh. The change of land use and livelihoods pattern and changing trend of homestead plant diversity from 1995 to 2019 were assessed in the present study. Household survey and FGDs were done to collect relevant information of a total 120 respondents (60 from each saline zone), 4 FGDs and 6 key informants. Livelihoods of the local people were shifted from agricultural farming to shrimp and other labor-intensive job. A reduction of 34% agricultural land and increase of 38% shrimp farming from 1995 to 2019 were reported by the respondents. The changes presumably influenced by natural hazards like flood, salinity and cyclone. Consequently, natural hazards and salinity reduced the land capacity to provide various provisioning ES like food, fodder, fuel woods etc. and increased the capacity to provide shrimp and other brackish water fish as found the study areas. Due to excessive salinity homestead plant diversity significantly reduced during last 25 years and some species are now absent or very rare to find. Implication of sustainable policy for coastal area management is very crucial in the current context.

Key Words: Livelihood, Floral diversity, Land use

FES/2018/1/02 Modelling the impact of Projected climate and use change on stream flow in Halda Basin, South eastern Bangladesh

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Abstract

Water resource management and land use changes are intrinsically linked and received extensive attention in the prospective modelling domain. Here in this study, SWAT model associated with LCM model is used to simulate streamflow in the Halda Basin under future land use and climate scenarios. Despite uncertainties in future projections, this study indicates that the Halda Basin is expected to become warmer in future, with more precipitation during the dry season but less in the monsoon. By the 2060s, maximum temperature is projected to be up to 1.6°C warmer than the baseline period. Minimum temperature is also projected to increase across the 21st century, although at a lower rate than maximum temperature. Monthly streamflow changes were influenced mainly by the variability in precipitation. Results indicate that climate change is likely to be a greater driver of changes in streamflow than land

use changes. Understanding the changes in streamflow caused by separate and combined impacts of future climate and land use changes provides information to stakeholders and policy makers and will facilitate effective decision making with regards to implementing land and water resources planning and management

FES/2018/2/03 Integrating Ecological Models and Conservation Planning Frameworks for Sustainable Protected Area Management in the North-Eastern Bangladesh

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Abstract

Bangladesh is losing its biodiversity faster than before due to extreme anthropogenic pressure and global climate change. Rema-Kalenga Wildlife Sanctuary (RKWS) which is one of the biodiversity hotspots in Bangladesh, has been also under historical human pressure and lost a significant amount of biodiversity. However, we have limited knowledge about the spatial ecology of the plants in RKWS. To address the present scenario and to predict the future threats, quantification of species habitat preferences and mapping both species density and biodiversity are timely requirements. Therefore, this study aimed to (1) develop species distribution models and maps for determining the suitable habitats of the major tree species (*Artocarpus chama*, *Schima wallichii* and *Terminalia bellerica*, *Glochidion lanceolatum*, and *Dipterocarpus turbinatus*), (2) determine the variables that drive spatial variations in α and β diversity, and (3) map α and β diversity in RKWS. We collected species abundance, environmental and disturbance data from 60 randomly selected plots covering the entire RKWS (1795 ha). We constructed habitat-based species and biodiversity models and used spatial interpolation techniques to develop species and biodiversity maps. Our species distribution models revealed that *S. wallichii* preferred elevated sites. Responses to soil properties, community structure and disturbance varied among species. Soil pH had negative influence on *S. wallichii* and *A. chama*. *S. wallichii* responded negatively to sandy soil while *A. chama* had preference for clayish soil. Disturbance had negative influence on *T. bellerica* while *A. chama* could grow abundantly in the disturbed sites. Community structure, elevation, spatial arrangements of the forest stations and settlements, and disturbance had combined effects on the spatial distributions of α diversity. The remaining α diversity hotspots are currently located in the eastern edges (adjacent to Indian border) of the Chonbari and Rema Forest Beats, thus these areas require more forest protection/conservation efforts. Community structure, clay percentage and disturbance were related to decrease of community heterogeneity. β diversity maps revealed that most of the heterogeneous and effective communities, which comprises many diverse and rare species are currently located along the protected area boundary, hence prone to human exploitation.

FES/2018/2/04 Isolation, Characterization and Culture of Plant Growth Promoting Rhizobacteria (PGPR) to Produce Bio-fertilizer and Bioassay its Effect on Plant Growth

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Abstract

Nitrogen fixation resulting from mutual symbiosis of rhizobia and cultivated legume plants is critical to food security as it directly bust-up agricultural production. Biological Nitrogen Fixation (BNF) can be an important factor in sustainable agriculture. For biological nitrogen fixation screening and selecting efficient rhizobia bacterial strain is important. The present study aimed to isolate and identify Rhizobium from the root nodules of Albizia saman (Raintree), Acacia auriculiformis (Akashmoni) and Albizia lebbeck (Koroi) to for biofertilizer production. The

variance of nodulation in root and the its relation with growth of seedlings were evaluated 150 days after seed germination. Nodules were found as single or in cluster, only Akashmoni had the single nodule while the other two showed single and cluster. Nodule of Akashmoni had uniform shape, almost all had round while others two species had both round and irregular shape. They were found to form mostly in secondary or tertiary root while minimum was in primary roots irrespective of species types. The present study showed that almost all nodules in three legume seedlings were effective as color was red or brownish indicating the presence of leghemoglobin. The healthy nodules were harvested, crushed in sterilized water and the suspension streaked onto yeast extract-mannitol agar (YEMA) with Congo red containing Petridis and incubated for 3-4 days at 25°C. The bacterial colony was found translucent, elevated with irregular margin. The growth in this selective media confirm it as nitrogen fixing bacteria as others hardly grow in this culture. The culture was then purified through subsequent streaking and stored for further study. The important feature of rhizobia is its inability to absorb red color of Congo red media which was observed in the present study. A milky white colony with spherical convex surface was isolated from the Congo Red media. The growth of the strain in nitrogen free media confirm that the isolated strains are rhizobia and capable of fixing nitrogen. Optimum growth of nitrogen fixing bacteria of all of three species have been found at PH 6. The data is useful for the selection of legume plants in plantation program keeping in mind the site factors like pH and heavy metal accumulations. These isolates can also be used as bio-fertilizer as these promotes plant growth and makes nutrient available for host plants.

FES/2018/2/05 Identification and characterization of Phytophthora species associated with the diseases of tree species in semi-evergreen forests of Sylhet district

Dr. Mohammed Masum Ul Haque, Lecturer and Abdur Rakib Bhuiyan, Lecturer

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Abstract

Leaf spot disease of telsur (*Hopea odorata* Roxb.) was reported to occur in Shahjalal University of Science and Technology (SUST) campus during the month of November-December, 2018. The pathogen was identified as *Phytophthora citrophthora*. The pathogenecity test was carried out on detached healthy leaves in the laborary. It was observed that the tested fungal pathogen was capable of causing infection on detached healthy leaves and spots developed were similar to those observed on the leaves affected in nature. The severity of the disease was measured in different telsur plantation areas of SUST campus. Differences in the mean percentage of leaf infection and disease index of different planted areas of SUST campus were noted. The reaction to telsur leaves to infection didn't vary significantly with leaf age. In the pathogenicity test, the isolated pathogens produced disease symptoms in wounded leaves but didn't produce any symptoms in the non-wounded leaves. Results suggested that the pathogens were equally virulent to three leaf grades (young, middle and matured aged leaf). The colony pattern developed on several culture media showed varied growth patterns. The pathogen grown on PDA showed rosette like colony patterns with slightly woolly morphology. Colony developed on CMA was usually Smooth, slightly striate, centre slightly raised. Colony morphology on CA and V8A were usually smooth, adpressed, slightly striate. The pathogen showed highest radial growth at 25°C. At this temperature, the radial growth rate of the pathogens ranged from 5.5mm to 6.1mm while the growth was reduced with increasing temperature. They didn't show any growth at 35°C. In pH-growth relationship, the pathogens showed optimum growth at pH 7 (growth rate ranged from 5.8mm to 6.2mm) and the growth declined with increasing pH. In osmotic potential-growth relationship experiment, the pathogens showed highest radial growth at -1.2MPa (growth rate ranged from 4.8mm to 6.2mm) while the lowest growth was recorded at -2.4MPa.

**FES/2018/2/06 Assessing the Effects of Invasive Alien Species on Native Biodiversity and Rural Livelihoods-
A Case Study from Protected Areas of Bangladesh**

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Abstract

Non-native species have become a major focus in ecology, conservation biology and biogeography as many ecosystems are threatened by the invasion of alien species. The problem of biological invasions is considered as one of the most important components of human-induced global environmental change. Exotic species are increasingly invading ecosystems. However, the knowledge on alien species is still limited in tropical systems in general and in Bangladesh in particular. Here, I investigated exotic species in the Satchari Protected Area and its surrounding landscape, one of the few protected forest ecosystems in Bangladesh. Traits, the biogeographic origin and their effects on native species in the study area are provided. In Satchari Reserved Forest, the number of alien species shows a hump-shaped relationship with native species richness. The relationship is negative in the surrounding area. An increase in invasive species with anthropogenic disturbances is detected in the study area. Protection status is reflected in the presence of exotic species with less invasive species in better protected areas.

Keywords: nature conservation area, non-native species, tropical forest.

FES/2018/2/07 Comparative study of land use change biodiversity among two different types of forest protected areas of Bangladesh as an effect from co-management

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Abstract

The major weakness of forest management system in Bangladesh was the inability to ensure participation of the forest dependent communities. Gradually government adopted legal frameworks for community participation in governance through co-management approach. In this study we are going to compare land use change and biodiversity among two different categories of IUCN protected areas of Bangladesh as an effect from co-management. Chunati wildlife sanctuary (IUCN category II) and Lawachara National Park (IUCN category IV) were chosen purposively as these are two prominent FPA enjoying co-management approach since 2008.

According to work plan we have finished and analyzed our work in Chunati Wildlife Sanctuary. Total 36 tree species under 15 families were identified. We have prepared the diversity index, rank abundance curve, rarefaction curve and importance value index for tree, sapling and seedling. *Acacia auriculiformis* were found dominant for both tree and sapling and *Artocarpus lacucha* for seedling species.

Land use change analysis reveals that the deforestation rate was 0.5% annually before co-management and after co-management deforestation closed and afforestation rate was 0.4% annually. But urbanization rate was also 0.4% annually after co-management. This interesting finding has been discussed in the final report.

FES/2018/3/08 Developing a framework and a modified model for valuation of recreational economic benefits of protected areas in Bangladesh

Dr. Narayan Saha, Professor

Abstract

The estimation of recreational economic value provided by the natural ecosystems has been receiving increased attention in recent years. Some recreational sites provide free entrance or a nominal entrance fee and thus fail to appear the real value in national accounts and these values ascribed to other parts of economy. Consequently, the economic contribution of recreation of natural ecosystems is undervalued and undermined in national resource allocation and budgeting systems. The estimation of recreational economic value of any recreational sites thus helps policy makers for national development planning. Travel Cost Method (TCM) is used for estimation of recreational economic value in Bangladesh and elsewhere. But this method has limited ability to provide the more precise results. Therefore, we need a modified TCM for robust estimation of recreational economic value of natural ecosystems. We have developed such a robust method, which has proposed for estimating the following components: i) the amount of vehicle operating cost for visiting other site (s) in case of multipurpose visits and ii) the amount of vehicle operating cost for journey value, which are directly associated with travel costs, and iii) the costs of complementary items, which are directly associated with the site management earnings in addition to the existing components of the TCM. Finally, we applied this modified TCM as case studies to the Lawachara National Park (LNP) and Satchari National Park (SNP), important protected areas as well as tourist spots of Bangladesh providing various recreational amenities, such as wildlife watching, seeing beautiful landscape and enjoying fresh weather nature.

Keywords: Travel Cost Method (TCM); recreational economic value; Protected Area; Lawachara National Park (LNP); Satchari National Park (SNP)

BUS/2018/1/01 The Impact of work Stress on work Productivity at Higher education: A Comparative Study on Teachers of Public and Private Universities in Bangladesh

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Abstract

Stress is a psychological and physiological reaction to situation that affects individual total well-being. Employees suffering from high stress levels have lower engagement, are less productive and have higher absenteeism levels than those not working under excessive pressure. Stress is not entirely dysfunctional as some people only perform well under stress and deadline. Although stress can be productive up to a certain level, when stress crosses that level it emerges with negative symptoms that demoralizes employees and reduces their intention to perform well for the organization. This study examined the impact of work stress on work productivity at higher education.

The main purpose of the study is to find out the overall impact of work stress on work productivity of the teachers of private and public universities in Bangladesh with special attention to the responsibilities of the university teachers and quality service of the teachers at university level. This study has conducted based on the quantitative method. Data was collected mainly from the primary as well as secondary sources. Teachers of the private and public universities are the main sources of primary data while report of UGC, data from BBS were considered as sources of secondary data. Data were analyzed by using SPSS 22. Descriptive statistics, ANOVA, and regression analysis were used as analytical tools in this study. Conclusion was drawn based on the findings of the study. The study concludes that work stress of the teachers of private university higher than teachers of public universities in Bangladesh. Thus, productivity of public universities is comparatively little bit higher than private universities.

Key words: Work stress; Work productivity; Symptoms; Quality Education

BUS/2018/1/02 An Investigation on Profitability and Efficiency of Leasing Companies-A Study on Selected Firms through Data Envelopment Analysis

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Abstract

Leasing companies face some challenges in conducting their business in Bangladesh regarding sources & cost of funds, asset-liability mismatch, undertaking risky ventures, product diversification, rising competition, lack of human resource, weak legal system and lack of secondary market. The main objective of the study was to measure the efficiency of leasing companies through Data Envelopment Analysis and relate it with profitability. Study period was from 2013 to 2017. Twenty-two leasing companies were selected according to simple random sampling method. Secondary data from published annual reports of sample firms were used to measure profitability and efficiency. Four profitability indicators namely ROA, ROE, EPS, and NPM were analyzed and it is seen that except few firms, most of the firms' profitability is very poor. Some firms suffered loss to a staggering amount, which reduced net worth to a significant extent. Efficiency is measured both in constant and variable return to scale approach. Total factor productivity efficiency (TFPE) is decomposed into technical, scale, and mix efficiency. It is seen that average TFPE of all leasing companies over the entire study period is only 31.86% and 24.17% according to CRS and VRS approach respectively. Average OTE of all leasing companies over the entire study period is 64.28% and 81.2% according to CRS and VRS approach respectively. Although CRS indicates that by using the same input firms can increase their output by 47.1% as per mean ITE score, VRS shows very strong ITE (91.1%). IME of the firms is healthy in both CRS (0.7821) and VRS (0.7882) which means that firms are at satisfactory efficiency level in innovation & proliferation of new services on an average. By changing the scale of operation the firms can increase their efficiency level by 20.43% to reach maximum productive scale size (MPSS) in output orientation although efficiency level is lower in input orientation (ISE = 0.5743). RME score of 41.45% indicates that there are opportunities for firms to increase efficiency by operating at MPSS of unrestricted frontier rather than operating at MPSS of restricted frontier. Except RISE, efficiency measures are not significantly different from one year to another rather differ from one firm to another according to both approach. Only EPS is significantly associated with efficiency measures as per CRS. EPS is significant but NPM is insignificant with most of the efficiency measures while ROA and ROE shows mixed evidence as per VRS.

BUS/2018/1/03 Impact of Environment Friendly Management on Sustainable Development and Organizational Success: A Study on SMEs Sector in Bangladesh

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Abstract

Environmental management has become an important issue in organizations because now consumers increasingly expect businesses to be at least environmentally aware, if not environmentally friendly. This has put the obligation on senior managers to adopt a corporate strategy that balances economic growth with environmental protection. Friendly environment management practices are the right option to fulfill the demand of the different stakeholder at a time. The main purpose of the study is to find the impact of friendly environment management of sustainability and performance of SMEs in Bangladesh. In order to achieve objectives, mixed method (quantitative as well as qualitative) survey study method as a quantitative technique and in-depth interview as a qualitative method were used in collecting necessary data. Data were collected mainly from the primary as well as secondary sources. Employees, manager or owner of the firm. Purposive sampling method used to identify the friendly environment management practicing firm to collect

required data. Data were analyzed by using SPSS 22 and spread sheet analysis. Descriptive statistics, ANOVA, and regression analysis were used as analytical tools in this study. Conclusion was drawn based on the findings of the study. This study conclude that friendly environmental management has direct impact on the organizational performance while organizational performance has also direct effect on sustainable development of the firm.

Key words: Friendly environmental management, operational performance, customer satisfaction, sustainable development

BUS/2018/1/04 The Impact of Financial Inclusion on The Profitability of Banks: A Study on PCBs in Bangladesh

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Abstract

Financial inclusion or inclusive financing has been emerged as a revolutionary policy, aiming of ensuring access of unbanked and underserved populace of the society to the formal financial system. Banks, particularly PCBs, are playing a vital role as the panacea for minimizing financial exclusion of the society by delivering financial services at an affordable costs. The present study mainly focused on investigating the impact of financial inclusion on the profitability of PCBs in Bangladesh. With the aim of that, the study developed a conceptual model by establishing financial inclusion as a mediating factor between the determinants of financial inclusion and the profitability of PCBs. ROA, ROE, ROI and NIAT had been emphasized as the indicators of the profitability of PCBs and the quests are finding out the impacts of the determinants of financial inclusion on ROA, ROE, ROI and NIAT of PCBs. To do so, the study selected five (5) private commercial banks (PCBs) of Bangladesh purposively as sample banks representing 40 private commercial banks of Bangladesh. Financial statements and annual reports (2012-2016) of the sample banks were used to capture the required secondary data on the study variables. The study analyzed the data statistically through regression method and for doing so, the Statistical Package for the Social Sciences (SPSS) 20.0 was used. The regression analysis was made out for four determinants (ROA, ROE, ROI and NIAT) separately considered as the dependent variables and the determinants of financial of financial inclusion were considered as the independent variable. All tests were carried out at 5% level of significance. The regression results revealed that financial inclusion had a statistically significant effect on the profitability of PCBs in Bangladesh although some determinants have more positive impact and some determinants have less impact. The study recommended that PCBs should focus on those determinants of financial inclusion which bear more positive impact on ROA, ROE, ROI and NIAT of PCBs in Bangladesh.

BUS/2018/1/05 Job Stress on Job Satisfaction: A Study on the University Teachers in Bangladesh

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Abstract

The numbers of private and public university in Bangladesh have increased tremendously for the last few years. For the radical increasing number of universities in Bangladesh, university teachers have to face more challenges in their job as the managements are facing competitive pressure from other universities. Especially private universities are now setting new goal to compete with other universities for each and every day for their sustain. This may causes the university teachers to face plenty of job stress which affect their job satisfaction. Unhealthy job stress among the

university teachers responsible in assisting the future generation's education will ultimately affect their intellectual and social abilities. This projects aims at examining the relationship between the job stress and job satisfaction as well as the factors which significantly influence job satisfaction on university teaching in Bangladesh. In our country, a large number of university teachers are engaged in this industry. Based on the literature, a questionnaire is developed. Factor analysis has been used to analyze the data and make a conclusion to the findings. The outcome of the research is that there is a negative relationship between job stress and job satisfaction. As well as the another outcome of the research is that compensation package, relationship with peers and students, working environment and insufficient leisure time have significant influence on job satisfaction in university teaching. It is found that university teachers are facing huge job stress and the job satisfaction level is not up to the work. Finally few suggestions have been noted to increase job satisfaction of university teachers in Bangladesh.

Technical Session–XII

(For Dept. of IPE and CEE)

Date: September 28, 2019 || Time: 01:30 PM – 03:30 PM

Session Chair: Prof Dr Mushtaq Ahmed

Resource Person: Prof Dr Abul Mukid Mohammad Mukaddes

AS/2017/06 Design and Development of a Security System using Renewable Energy and Its Feasibility Study

Professor Dr. Md. Abu Hayat Mithu, and Mohammed Abdul Karim, Assistant Professor

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Abstract

The world is using up all the resources to meet up the daily demands of energy and it is quite expectable that in the near future we will run out of any naturally occurring resources. As a result, renewable energy solution has achieved a great demand today to save the natural resources and also to tackle the crisis of energy. Solar energy is rapidly gaining its popularity as an important source of renewable energy. The main objectives of this work are to design and implement a renewable energy-based security system and to investigate and analyze the long term sustainability in terms of energy consumption, effectiveness, use, pay-back period, etc. during the service life. The work also focuses on the demonstration of other feasibility conditions as the power can be used for altered systems. To execute the project, we have performed sizing of different solar components so that the power produced by the solar panels can meet the power required by the security camera, monitor, DVR machine and lights. Data of solar irradiance and solar output correspondence with the irradiance has been collected. Then a relationship between the solar panels output and corresponding time has been developed with the help of Microsoft Excel®. Relationship between solar irradiance and time also been developed. This study shows that the project needs almost 5 years and 9 months to reach its break-even point. Almost two year has been passed after the installation of the project and it is running smoothly. The main obstacle of this project is the weather condition of Sylhet it is very unpredictable, there is limited sunshine for two or three days during rainy season and then it is difficult to generate power by the solar panels. It is concluded that the renewable energy-based security system can be used in industry, home and even at street. Though the initial cost of implementing renewable energy-based security system is higher but as it is green energy and has no environmental effect, it is a good alternative to other sources.

AS/2018/1/17 Knowledge, Attitude and Practice (KAP) regarding Personal Protective Measure: A Concern among Labor-oriented Unorganized Small Industries

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Abstract

In the labor-oriented unorganized small industry like engineering workshops and stone-crushing industry, workers have been involved in several agents of injuries and health problems. Personal protective equipment (PPE) plays a vital role in protection to workers' health from exposing to those agents and hazards. This study, therefore, focus on (i) assessing the prevalent work-related hazards and their associated risks of accidents or injuries encountered by employees in engineering workshops and stone crushing industries located in Sylhet region; (ii) assessing the knowledge, attitude and practice (KAP) on the use of personal protective equipment (PPE) and examining the

association among them; and (iii) assessing the training need for the workers and developing an action plan for ensuring the occupational health and safety. In this study, a total of 388 stone crushing workers and 384 engineering workshops were interviewed using a structured questionnaire, and the data thus obtained were analyzed. The Pareto analysis was applied to identify potential hazards and occupational health and injury. Chi-square test was performed to examine the associations among knowledge, attitude, practice for personal protective equipment use, and demographic variables deemed critical. In the stone-crushing industry, majority (56.72%) of the respondents were found to encounter potential occupational injuries. The associations between knowledge and attitude, knowledge and practice, and attitude and practice were found statistically significant. Besides, in engineering workshop, majority (60.4%) of the respondents encountered potential occupational injuries. Also, the associations between knowledge and attitude, knowledge and practice, and attitude and practice were statistically significant. Various work-related hazards and their associated risks prevailing in engineering workshops and stone-crushing industries were revealed. The workers' level of knowledge, attitude, and practice regarding the personal protective equipment in both sectors were investigated. The relationships among demographic variables, knowledge, attitude, and practice of PPE use among the workers were identified and used in assessing the training and education need and determining the necessary actions to be taken to ensure occupational safety of the workers.

AS/2018/1/40 Assessment of the status of Safety Culture practices in Selected Thermal Power Plant Industries in Bangladesh

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Abstract

The thermal power plants are large electricity generation industries that generate electricity using fossil fuel like coal, natural gas etc. Hazards, accidents and ill management in thermal power plants have a big impact on business, whether it's due to reduced productivity, lost sales, lower staff morale, or even closure. In order to reduce problems relating to injuries, hazards, accidents and ill management in organization, setting an effective safety and health management system is crucial. To prevent and/or mitigate workplace injuries, hazards, accidents and to improve productivity and staff morale, it is necessary to establish safety culture practice in the entirety of the management system by constructing the framework for measuring its performance safety culture area. One way of controlling hazards in the work environment is the use of safety signs. Safety signs are used to effectively control workplace hazards.

In this research, different safety culture factors were formulated and analyzed. The factors of safety culture were taken from OHSAS 18001:2007 standard safety. OHSAS 1800:2007 is an international management certification standard which provides a framework to identify, control and decrease the risks associated with health and safety within the workplace. The objective of this study was to assess the safety culture factors in three selected thermal power plants namely Sylhet 150 MW Combined Cycle Power Plant, Kumargaon, Sylhet, Fenchuganj 90 MW Combined Cycle Power Plant, Fenchuganj, Sylhet and Bibiyana South 400 MW Combined Cycle Power Plant, Habiganj, Sylhet, Bangladesh

This research describes the key elements of organizational health and safety management system and measures the safety practice performance of the three selected thermal power plants. The collected data were analyzed to explore research findings \Finally recommendations were made to take corrective actions in order to improve safety culture practice in specific thermal power plants.

Keywords: Safety, culture, sign, factors and management.

AS/2018/2/30 Design and feasibility study of a photovoltaic (PV) power generation system for a proposed Academic Building of SUST based on experimental Investigations

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Abstract

The world is using up all the natural resources including fossil fuels to meet the daily demands of energy which leads to depletion of the natural reserves very rapidly and also causes unrepairable damage of the environment. Replacing fossil fuel based energy by renewable energy is a crying need of the present world. Solar energy is one of the most popular and important sources of renewable energy. The geographical position and climatic conditions of Bangladesh are favorable for solar energy. The diurnal variation of solar irradiance is an important issue for all solar PV installations. So, a calibration of irradiation on a sample space (per square meter) must be carried on an hourly basis. The daily data collection is carried out for the last six months and averaged for monthly solar insolation in this research. The present study also focuses on designing of photovoltaic (PV) power generation (off-grid & grid-connected) systems and estimate its feasibility for an academic building SUST. Technical analysis has been performed using PVsyst V 6.77 and RET Screen V 4 is used for financial analysis. The net present value (NPV) of the grid-connected PV system with battery and without battery are found to be 5,652,567 BDT and 475,134 BDT, respectively. Their respective annual life cycle savings are 16,584,800 BDT and 1,706,426 BDT. The simple payback of the off-grid system seems to be much larger than its project life time. However, the simple payback periods are 8.78 years 3.47 years for the grid-connected PV systems with and without battery, respectively. Both the grid-connected PV systems can save greater emission with 81.51 tons of CO₂ per year than the off-grid system with 50.63 tons. Though both the grid-connected PV systems are feasible, considering the net present value(NPV), emission savings and annual life cycle savings, equity payback period and internal rate of return (IRR), the most preferable option is the grid-connected PV system without battery.

AS/2018/2/31 The Bio Heat Transfer to and through Human Skin During Burns and Their Treatments: An Investigation Using Finite Element Method

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Abstract

Abstract. Bio-heat transfer deals with the heat transfer in the biological bodies. Human skin burn can be analyzed using the Penne's bio-heat equation which has been adopted in many commercial finite element software. Human skin burns also known as thermal burn can result from direct contact with hot object such as a hot disk, hot fluid or being exposed to radiation. Depending upon the condition and duration of exposure thermal burn may cause severe skin damage. In this paper, the two dimensional and three-dimensional Finite Element (FE) models of human skin have been developed. The burn effect on human skin model under the contact with hot object has been analyzed. The radiation effect of different shape of hot objects on the skin burn has also been analyzed. The commercial numerical software COMSOL Multiphysics® is used for the purpose of analysis and validation. The burn intensity in terms of degree of burn is measured with different burning conditions. The variation of temperature at different location of skin is measured. The results from this analysis can be used in the treatment of burn injuries.

Keywords: Bio heat transfer, finite element, skin burn, burn treatments.

AS/2018/2/39 Design and Development of a Security System for Household Gas Stove Its Performance Improvement

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Abstract

Gas stove is one of the most widely used cooking medium in the world. Gas stove uses natural gas and liquefied petroleum gas as a fuel source. This technology had become a commercial success around the world because a large reliable network for gas pipeline transport spread over much of the country, making gas relatively cheap and efficient for domestic use. However, with the increase of domestic stove users, the accidents associated with gas stoves are also increasing. Therefore, this work focuses on the design and development of an effective gas burner that could reduce the fuel consumption, ensures better cooking performance, and to install a security system for the women, for the children as well as the immature users of gas stoves. In this work, the design is in work-in-progress, where the stress put forth on the design of burner which will be able to ensure safety for the users especially the women and children; it will ensure the reduction of heat losses and control the flame direction to reduce the fuel consumption. A lock-key security system has been introduced; it can be said that this new design will work better than any other existing design, such as it has a special security system for children which ensure complete safety to the users, and the burner won't work without unlocking the security system, so the security system is very strong. The proposed system is cost effective and the aesthetic looking is good enough. The refractory material used in the proposed model will improve the thermal efficiency as well, which is under investigation. However, this system has some limitations too. These limitations can be overcome easily with little effort and improvement in design.

AS/2018/1/04 Production of lightweight bricks using saw dust

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Abstract

Bricks are widely used and one of the most common type of construction material in Bangladesh. Now-a-days for rapid urbanization, use of clay bricks are increasing exponentially which leads to huge degradation of top soil from the agricultural land, pollute our environment as well as increasing the dead load of Structure. In order to make the balance between public demand and environmental degradation there remain a need of low cost eco-friendly advance technique using locally available materials. In this study, we have assessed the potentiality to create lightweight Eco-friendly bricks by using saw dust. Total 16 different ratios of cement, saw dust and sand has been taken to testify the compressive strength of burnt and unburnt saw dust bricks, unit weight, water absorption rate, and cost of production per brick. The result shows that the unit weight of saw dust bricks were reduced by about 2 – 42.8 % then that of clay bricks. The compressive strength of the bricks were approximately satisfactory with very low water absorption rate.

Keywords: Saw dust, Eco-friendly, Lightweight, Burnt bricks, Unit weight, Compressive strength, and Water absorption rate.

AS/2018/1/05 Integration of biosorption and phytoremediation processes in biofilter design

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Abstract

Road dust is contaminated with heavy metals, which can mix with runoff water. This water contains complex metal compounds, which can be retained in the bioretention system and can be degraded to simple inorganic metal compounds. This study mainly focuses on the performance of non-vegetated bioretention hydrology and describes the bulk breakdown rate, accumulation, and leaching of Cu, Pb as well as Zn in the bioretention system. For the assessment of metal pollution in road dust, around 50 urban road dust samples have been collected from urban Sylhet, Bangladesh using a systematic sampling method and assessed thereafter. Except for Zn, in fact, the concentration of Cu and Pb in road dust has been observed to be exceeded the soil contamination standard. Synthetic runoff water, with the road dust metal concentration, at a constant flow rate has been tested with the existing metal quantity through the bioretention system. The water flux modeling has been associated with MATLAB environment and then tested against experimental pollutographs from inflow and outflow. A deterministic model has been developed to describe the bulk breakdown rate, accumulation and leaching of Cu, Pb, and Zn in biofilter. Water flux model has been integrated to the metal concentration flux model, where metal retention in biofilter soil and its uptake by plants have been expressed by Langmuir isotherm and Michaelis-Menten equation respectively. The goodness of fit between the modelled and experimented data has been observed as $R^2 \geq 99\%$ and normalized root mean square error (NRMSE) $\leq 5.5\%$ indicating the effectiveness of the model used to assist in designing biofilters.

AS/2018/1/06 Development of a phytoremediation based air purifier unit for indoor environment facilitated with Arduino gas sensor

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Abstract

Now a day, indoor air quality is being seriously affected by some unwanted agents specially volatile organic compounds (VOCs), particulate matter, ozone, radon and lead. Most of them are carcinogenic and possess harmful effects on human health. However, some ornamental plants can remove such pollutants from indoor air. The main objectives of the study were to investigate the phytoremediation process in removing air pollutants and simulate the phenomena mathematically to improve indoor air quality. The experiment was conducted with three plant species familiar as *Scindapsus aureus*, *Chlorophytum comosum* and *Aloe vera* to determine their ability to remove volatile organic compounds from indoor air. In the experiments CO₂ was also monitored as it can be increased by respiration during low light condition. About 1m² of leaf (surface area) of *Scindapsus aureus* was found to remove total VOCs from 1800 ft² room area within 500 hours. The corresponding removal efficiency was 82.78% and 89.32% while 5 mg/m² of formaldehyde and ethanol was used as total VOCs source respectively. Similarly for *Chlorophytum comosum*, the removal efficiency was observed as 79.13% and 85.15% and for *Aloe vera* the removal efficiency was observed as 42.84% and 67.45% respectively in formaldehyde and ethanol condition respectively. Moreover, all these plants were found to able to decrease CO₂ concentration in both light and dark environment. However, the plants increased the relative humidity in the controlled chamber up to 20%.

AS/2018/1/07 Analysis on the Demand and Supply of Parking System at Sylhet Commercial Buildings

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Abstract

Parking is the burning issue all over the world especially urban Central Business District (CBD) areas like Zindabazar, Sylhet, affected mainly by this problem. The areas with development of shopping centers and other commercial buildings attract a lot of trips as well as increase the demand for parking. Zindabazar has been selected as a study area because it considers as a commercial hub of Sylhet city. Due to lack of adequate off-street parking and poor service of the transit system of this area, visitors are forced to park their vehicles on the street which leads to creating congestion. To assess the current parking scenario through the analyzing parking demand and supply of the commercial building is the main focus of this study. In this study, some high-rise shopping centers have been selected as a case study. The data was collected by field survey and analyzed by In-out Survey method, License plate method, Linear Regression model and peak hour forecast model. Statistical software like SPSS used for analysis the Linear regression model and found that the number of 4-wheeler owned is the most significant parameter which affects the parking demand. Peak hour parking demand also developed considering 5:00 pm to 7:00 pm as peak hour on both weekend and weekday. Important parameter like individual land use, transit accessibility index, parking accessibility index, parking fee etc. used to develop the demand model. The demand model compared with the present supply to find out the gap between demand and supply. The estimated demand found in some shopping center is much higher than the present supply. Parking In-out and license plate method also conducted to assess the parking scenario of those shopping malls and it has been found that parking duration was high in some shopping malls because most of the time parking spaces are occupied by same particular cars, as a result, the vehicles are forced to park on the street. Finally, this study provides the latest and reliable information about the parking scenario of the case study area. For the future plan, this study will help to advocate parking policies for urban CBD of Sylhet city.

AS/2018/2/22 Investigation of ground water quality and subsurface lithology in St. Martin's Island in order to categorize potential ground water source

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Abstract

Saint Martin's Island is the only coral island of Bangladesh and one of the Bangladesh ecotourism destinations. *St. Martin's Island is a small island in the northeast of the Bay of Bengal, about 9 km south of the Cox's Bazar-Teknaf peninsular tip and forming the southernmost part of Bangladesh. It is about 8 km west of the northwest coast of Myanmar at the mouth of the river Naf.* During peak tourist season 5000 to 6000 people visit it daily on average and about a thousand stay overnight. One of the biggest problems is the scarcity of drinking water. Saltwater intrusion into a freshwater aquifer is a common problem now a day in the coastal region of Bangladesh. Salt intrusion can affect the ground water storage, which is used extensively as a source of fresh water for drinking and agriculture purposes. The main objective of the project is to investigate the status of ground water quality and delineate the subsurface lithology to assess the sustainable groundwater source by using VES (Vertical Electrical Sounding) method in the study area. VES is a resistivity measurement method, in which, a series of measurements of resistivity are made by increasing the electrode spacing in successive steps about a fixed point. This method of vertical exploration is also known as the expanding electrode method, "Resistivity sounding" or "Depth probing". The apparent resistivity values obtained with increasing values of electrode separation are used to estimate the thickness and resistivities of the subsurface formations. To determine the ground water quality of Saint Martin's island, samples were collected from different locations. Standard laboratory testing procedure will be used to assess the water quality and the result will be compared with the standard of ground water quality. The vertical electrical sounding (VES) data were processed to produce

depth sounding curves, which are obtained by plotting apparent resistivity values against electrode spacing on a graph paper. The depth sounding curves are classified (using IPI2 software) based on layer resistivity combinations. From the interpretation of VES curves, 3 to 4 subsurface layers were identified within the study area. Subsurface lithology, freshwater bearing zone and saline water formation have been identified in the island. A subsurface map also has been created with the experimented data based on VES.

AS/2018/2/23 Investigating the effectiveness of iron decorated rice husk ash in removing heavy metal and metalloid from aqueous solution

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Abstract

Toxic metal and metalloid substances can pose a risk to the environment and human health due to their hazardous effects, persistency and accumulation tendency. Though several options for toxic pollutants removal have been well documented over the past decades, the adsorption process is still considered to be preferable due to its simplicity. Research has been progressing for the surface modification of domestically available low-cost adsorbent like rice husk ash using iron substances. While iron sludge, which is a waste product generated in a large scale from iron manufacturing industries and iron treatment plants, the effectiveness of rice husk ash decorated with iron sludge in removing toxic substances is yet to be studied. It is therefore aimed in this research to investigate the performance of iron sludge decorated rice husk ash composite in removing chromium (as metal) and arsenic (as metalloid) from aqueous solution. The influence of different experimental parameters (such as adsorbent material, adsorbent grain size, proportion of iron sludge to rich husk ash, initial chromium/arsenic concentration) on the adsorption capacity of target contaminants was examined through conducting separate batch experiments. From this current study, the magnitude of chromium and arsenic adsorption by decorated rich husk ash is found to be the highest among three different adsorbent materials. Moreover, the study confirms that the fine grain size (0.074 mm) of the adsorbent gives superior adsorption capacity. In addition, the increase of the iron proportion in the adsorbent enhances the adsorption capacity of target contaminants. In this study, the iron sludge decorated adsorbent having the highest proportion of iron (sludge : ash = 3:1) demonstrates the best adsorption capacity of chromium (9.12 mg/g) and arsenic (8.44 mg/g). The chromium removal efficiency decreases from 85.9% to 67.8% when the initial chromium concentration in the solution increases from 10 mg/L to 50 mg/L respectively. Whereas the batch experiments with initial arsenic concentration of 10 mg/L and 50 mg/L give the arsenic removal efficiency of 82.86% and 61.2% respectively.

Keywords: Iron sludge; Adsorption capacity; Chromium; Arsenic; Removal efficiency

AS/2018/2/24 Low-cost filter design for treating saline drinking water

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Abstract

Salinity is a critical issue to the people of the coastal region of Bangladesh. More than half of the coastal area of Bangladesh are affected by salinity. There is a high risk of gestational hypertension and high blood pressure among the people who continuously drink saline water. At present, there are available technologies such as reverse osmosis, ion exchange, membrane filtration for treating saline water. But those technologies are not affordable to the poor

people due to high cost. To solve this problem low cost locally available materials such as Laterite soil (LS) and Rice husk (RH) have been extensively studied in this project. LS mainly consists of iron, aluminum and manganese oxides. Iron oxide is an efficient adsorbent in removing salinity. The LS collected from the Narsingdi district had low iron content which showed lower efficiency in removing salinity. In order to increase the removal efficiency, the iron content was synthetically increased by mixing iron oxide. On the other hand, the potentiality of the other indigenous material Rice husk in removing salinity also studied. First, the effectiveness of RH ash in removing salinity was studied. Subsequently, activated carbon was produced from RH and its effectiveness was studied. The removal efficiency of salinity in drinking water has been assessed by passing synthetic saline water having chloride concentration of 500 mg/l, 700 mg/l and 900 mg/l through filter media derived from LS and RH. Each experiments were conducted for ten days and the data were collected twice daily. The best salinity removal efficiency has been found as 42.86% from LS filter media. The efficiency was further increased to 44.54% after increasing the iron content of LS from 7% to 25% having a flow rate of 7.2 L/d. The effect of burning temperature was also studied and it was found that 600°C is the optimal burning temperature for LS. The RH ash filter showed lower removal efficiency (15.76%). However, the removal efficiency using activated carbon derived from RH was significantly higher than the RH ash. It had been found that activated carbon impregnated with FeSO_4 1:1 at 500°C showed the best removal efficiency (48.11%) in column adsorption process with a flow rate of 7.73 L/day

Technical Session–XIII

(For Dept. of FET and BMB)

Date: September 28, 2019 || Time: 03:30 PM – 7:00 PM

Session Chair: Prof Dr Mohammad Iqbal

Resource Person: Prof Dr S M Saiful Islam

AS/2017/21 Climate change-potential adaptive crop (foxtail millet) to develop a new product (noodles) for enhancing the food security of ultra-poor people in northwestern part of Bangladesh

Professor Dr. Md. Mozammel Hoque and Dr. Razia Sultana Chowdhury, Associate Professors

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Abstract

Rising sea level and changing the intensity of temperature causes the severe drought and the northwestern part of Bangladesh becomes uncultivable. Foxtail millet (FTM) (*Setaria italica*) has the health-promoting effects and highly adaptive capacity to cope up this adverse situation. Consumption of noodles has increased dramatically across the world, but the low protein content of it is a major concern for its utilization. This research was undertaken to develop highly nutritive instant noodles (FTM noodles) which will fulfill the demand of protein-energy malnutrition while adding commercial importance. The Nutritional and functional components of FTM noodles were determined and organoleptic and microbiological study was used to focus on the quality of the product by the interaction of expert councilors' and staffs. The foxtail millet flour was incorporated with wheat flour at a replacement level of 50%, 40% and 30%. Results showed 50% FTM noodles is the best quality of noodles compared to other sample noodles due to its flavor, taste and overall acceptability. It contained significantly higher ($p < 0.05$) amount of protein (14.78%) and energy (464.62 kcal), but lower amount of carbohydrate (57.74%) than the commercial noodles. It also enriched with Ca (23.40 mg/100g) and phosphorous (695.08 mg/100g) which varied significantly ($p < 0.05$) than the market available noodles. It has also low bulk density (0.59 g/ml), higher water absorption capacity (197.77%) and least swelling power (12.17%) among the sample noodles in terms of its functional characteristics. Microbiologically it is safe to consume and can be stored up to six months of storage period in an ambient temperature without adding any preservatives. So, healthy food products like FTM noodles have the potential to reduce women and child malnutrition and household food insecurity especially adolescent girls, pregnant women, lactating mother and young children.

AS/2017/24 Characterization and Optimization of Rice Noodles of different Rice Cultivars: Perspectives of Food Product Development

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Abstract

Noodles of rice are one of such diversified product that is made from rice flour. Its main ingredients are rice flour and water. On other hand, some other ingredients such as tapioca or corn starch are also added for improving the transparency or increase the gelatinous and chewy texture of the rice noodles. The goal of the present research project is to investigate the effects of different physical and chemical characteristics of rice noodles. That is why, three rice varieties of Beruin, Binni, Bansful were taken from Sylhet region. The rice flour, starch, salt was added to a mixing bowl. Then mix and dissolve everything in water well. Brush a light coating of oil on the bottom of the flat-bottom

pan, put the pan on top of the boiled water, and add a 1/4 cup of the rice liquid to the pan. After 4-5 minutes, the noodle sheet was formed and later was cut into 1/3-inch wide pieces.

Cooking time ranges from 16.5 to 19.5 minutes, elongation ratio and volume expansion ration varies from 1.3 to 1.5 and 3.4 to 4.3 respectively. Noodles samples will be evaluated in terms of moisture, ash, fat, carbohydrate, protein, sensory properties. It is found that moisture and Ash content has profound effect on firmness and lightness of the finished product.

Final results shows that, no noodles sheet formed by the Biruin variety while Binini has given the best scores in terms of structure formation and sensory properties.

AS/2018/1/14 Model development and optimization of freeze drying process for Lychee (*Lychee ChinenissSonn.*) Preservation

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Abstract

Drying is the most popular preservation techniques of fruits and vegetables. Lychee contains with good number of biochemical nutrients though it is highly perishable. Mathematical drying models are helpful to predict the drying kinetics, mass transfer phenomena and quality optimization of food product. Without mathematical consideration, relying only on the experimental drying practices can significantly affect the efficacy of dryer, increase the production rate and quality degradation of dried food product. A study was conducted to develop a mathematical drying model which was a function of drying air temperature and relative humidity (RH). The study was also conducted to explain the effect of drying air temperature and RH on drying kinetics and quality (Vitamin C, Total Phenolic Content, DPPH free radical scavenging activity) of lychee. The results showed that the equilibrium moisture content was decreased from 0.53 gm/gmDM to 0.29 gm/gmDM with increasing temperature 40⁰C to 70⁰C and increased from 0.42 gm/gmDM to 0.59 gm/gmDM with increasing RH 50% to 70%. The quality parameters – TPC, DPPH scavenging activity and vitamin C were decreased to 78%, 91% and 74% respectively at 70⁰C, whereas at 40⁰C it was 27%, 10% and 44% respectively after drying of 2hr. On the other hand, TPC, DPPH scavenging activity and vitamin C were decreased to 29%, 57% and 85% respectively at 50% RH, whereas at 70% RH it was 19%, 15% and 44% respectively after drying of 2hr. Four different models; Newtonian model, Henderson and Pabis model, Page model and Logarithmic model were evaluated to describe the lychee drying kinetics and equilibrium. However, these models are independent of temperature and relative humidity that have a potential effect of drying behavior. An integrated drying model was developed to predict the drying kinetics, mass transfer phenomena with changing temperature and relative humidity. The developed model was calibrated and validated with independent experimental datasets with Nash-Sutcliffe model coefficient (*E*), coefficient of determination (*R*²) and index of agreement(*d*) close to 1 in all cases. Besides these, the developed model was applied for the process optimization and scenario analysis and found that the drying rate constant was high at high temperature and low RH. For the preservation of dried lychee, the equilibrium moisture content must be low to avoid the microbial attack and it was possible through applying the low RH and high operating temperature. Exponential decreasing of the drying time with increasing temperature and reduction RH, will give the opportunity to select the drying time and operating conditions based on the process operating cost and quality of the lychee.

AS/2018/1/15 Bioaccumulation and Health Risk Assessment of Heavy Metals in Poultry Feed (Chicken and Quail) and Its Deposition in Corresponding Foods at Different Regions in Bangladesh

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Abstract

Heavy metals cause toxic effects and health hazard that's so why now-a-days it is a matter of concern. This study was done to determine possible accumulation of heavy metals (Cr, Cu, Zn, Fe, As, Co, Cd, Mn, Pb) from feeds to Broiler chicken and Cockrail chicken those were collected from local farm of Sylhet, Bangladesh. Samples were digested with Aqua-Regia method to analyse metal concentrations by UV-VIS spectrophotometer and then calculated risk and hazard parameters belonging to consumption of chickens. Level of concentration found in both feeds and organs crossed the safe limit in maximum cases. Determined concentration of heavy metals in feeds and organ found with a range in mg/kg Cr: (33.18±1.02 – 128.53±0.78) and (6.64±0.80 - 14.01±0.68), Cu: (29.95±1.92 – 56.40±1.79) and (5.93±1.09 – 11.41±1.86), Zn: (67.38±1.6 – 90.41±1.53) and (31.24±2.82 – 47.94±3.21), Fe: (287.36±17.99 – 388.27±12.38) and (128.08±22.61 – 178.47±10.25), As: (8.87±1.00 – 11.56±0.88) and (4.54±0.75 – 7.54±0.62), Co: (8.80±0.96 – 11.62±0.92) and (3.84±0.92 – 4.40±0.91), Mn: (7.92±0.91 – 23.57±0.88) and (3.84±1.29 - 6.82±3.45), Cd: (0.44±0.05 – 3.58±0.42) and (0.52±0.32 – 1.99±0.91), Pb: (75.40±4.75 - 128.44±5.35) and (9.28±2.64 – 20.69±3.56) respectively. The order of trace elements in feeds obtained were Cd < As < Co < Mn < Cu < Cr < Zn < Pb < Fe. Heavy metals concentration in Broiler and Cockrail chicken are strongly correlated with feeds with correlation coefficient r=0.960 and r=0.971 respectively. Broiler chickens accumulate more trace element than Cockrail chicken. The order among organs of accumulation was Chest < Thigh < Liver.

AS/2018/1/16 Effect of boiling time on phytochemicals and antioxidant activity of commonly consumed carotenoid rich vegetables in Bangladesh

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Abstract

We divided our research work into 2 parts based on vegetable morphology and natural pigments. The research part-1 was conducted to determine the optimum boiling time resulting in maximum retention of the bioactive compounds and radical scavenging activity. For this analysis, two most commonly consumed anthocyanin-rich vegetables, red amaranth (*Amaranthus tricolor*) and red skin potato (*Solanum tuberosum*) were exposed to boiling for 0, 1, 5, 10, and 20 minutes. Then the effects of boiling times on physicochemical, bioactive compounds, and antioxidant activity by DPPH radical scavenging ability were analyzed. In physicochemical analysis, ash content was decreased significantly, and the pH value increased significantly as the boiling time increased (p<0.05). The % of WSI was increased significantly as the boiling time for red amaranth as well as red skin potato (p<0.05) increased. The total polyphenol content (TPC), total anthocyanin content (TAC), total carotenoid content (TCC), and radical scavenging activity (RSA) of red amaranth and red skin potatoes were gradually reduced with the increasing of boiling time. The first-order kinetic model showed the good fit for the loss of total phenolic, carotenoids, anthocyanin, and DPPH radical scavenging activity of red amaranth and red skin potatoes with 0.86 - 0.98 coefficient of determination (R²). The findings could encourage both the household boiling and the food industry to recommend specific boiling time to maintain vegetables' antioxidant properties. The objective of the research part-2 was to evaluate the effect of boiling duration on physicochemical, bioactive compounds, antioxidant activity, color, and texture properties of pumpkin

(*Cucurbita maxima*). The pumpkin was subjected to boiling for 0, 1, 5, 10 and 20 min at 100°C. The physicochemical analyses showed that pH, moisture and water solubility index were increased, whereas ash content was decreased with increasing the boiling time. Prolong boiling caused detrimental effect on total phenolic content, total carotenoids content, and antioxidant activity; and it was found that boiling caused 25.91±2.21 %, 14.79±1.03 %, and 18.46±1.34 % of loss respectively at 20 min. The kinetic study revealed that logistic model can predict the variation in bioactive compounds and antioxidant activity with higher R². However, first order kinetic models were found suitable to predict the changes occurring in bioactive compounds, antioxidant activity, color properties (L, a, b, chroma) and firmness. The total color changes (ΔE) showed good fit with zero order kinetic models (R² = 0.98). The t_{1/2} and D- value were calculated for all measured parameters of pumpkin. These findings would be useful in designing thermal processes and related calculations of pumpkin.

AS/2018/2/27 Production of High Quality Tomato Powder Using Foam-Mat Drying Technique to Reduce Post-Harvest Loss

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Abstract

Foam mat drying is less expensive, less complicated, less time consuming as well as retains products quality than other drying techniques. Because of being the simplest forms of drying, foam-mat dried products gain consumers' attention in recent years. The purpose of the study was to optimize the effective drying conditions and different foaming agent concentrations on the biochemical properties of foam mat dried tomato powder. Foaming was achieved by using egg albumin as foaming agent and sodium salt of Carboxymethyl Cellulose (CMC) as foam stabilizer with different concentrations. Drying was achieved by using different drying temperatures. The changes in different physicochemical properties of foam mat dried powder viz. total soluble solid (TSS), pH, ascorbic acid, titratable acidity, β-Carotene, DPPH radical scavenging activity were observed. Foams were prepared from different concentrations of egg albumin (3%-7% w/w) and sodium salt of Carboxymethyl Cellulose (1%, 0.5%). The drying temperatures were varied from 60 °C to 70 °C. The drying time changes with different drying temperatures. It was found that, the drying time was decreased with the increased foaming agent concentrations as well as higher drying temperature. It takes almost 13 hours for drying in 70 °C. TSS and pH content were increased with the increase of foaming agent concentrations and foam stabilizer's concentrations but decreased with the increasing temperatures. Ascorbic acid decreased with the increase of foaming agent concentrations and temperatures, but increased with CMC concentration. Titratable acidity content of foam mat dried tomato powder was decreased with the increasing foaming agent concentrations but increased with the higher temperatures and decreased CMC concentration. β-Carotene contents increased with the increase of foaming agent concentrations but decreased with the increase of temperatures and foam stabilizer concentration. DPPH free radical scavenging activity increased with the increase of foaming agent, foam stabilizer and temperatures. Based on the maximum retention of physicochemical properties, the optimum treatment of foaming agent was found to be 7% egg white + 1% CMC at 60 °C temperature.

AS/2018/3/38 Comparative analysis of organic and nano-organic tea cultivation systems in Panchagarh District of Bangladesh

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Abstract

The experiment is conducted to see the effect of organic and non-organic tea cultivation system on tea quality in Bangladesh during July 2018 to July 2019 at Kazi & Kazi Tea estate (as organic) and Hoque Tea estate (as inorganic) in Panchagarh. The quality parameters of tea i.e. theaflavin (TF), thearubigin (TR), caffeine, high polymeric substance (HPS), total liquor color (TLC), lipid, total ash, water extract, dry matter and moisture content and nutrient status of soil i.e. N, P, K, P^H, organic matter content, heavy metal (Pb, Cr, As, Zn, Cd) etc. were evaluated. In organic farming, the soil nutrient profile is richer in nitrogen (N) and phosphorus content (P) than that of non-organic one as they always use vermicompost and compost fertilizer to cultivate tea. Among the quality parameters the caffeine, antioxidant activities and polyphenol content are found to be higher than the non-organic one. On the other hand the total ash content and moisture content are found to be higher in non-organic tea cultivation. Though the setup and management of organic farming have some special criteria, it has much positive impact on soil and human health also.

LS/2017/09 JunB protein as a candidate biomarker in cancer diagnosis and its therapeutically implication

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Abstract

Finding a universal or novel oncogenic target in cancer is increasingly getting attention for early detection, prognosis and therapeutic responses. JunB a member of activator protein-1 (AP-1) family, which play an important role in carcinogenesis and tumorigenesis while participate as transcriptional factor in the regulation of cell proliferation, apoptosis, angiogenesis and autoimmunity. The protein that has such an important functionality, while playing a pathogenic factor, is the area need utmost attention. Therefore, such ironic behavior could be explainable by the “expression level” which however, the determinant factor of JunB being oncogenic or not. Blood samples of various cancerous patients with different stages will be evaluated to see the comparative JunB protein expression profile among the patients with respect to healthy individual using genomics and proteomics approaches.

First phase of this study, we are investigating the patients clinical data to find out where and how to proceed in the context of JunB profiling among various cancer at the molecular level. In this conference we will introduce our preliminary clinical findings and the progress of molecular work at BMB department, SUST.

LS/2017/14 Isolation and Characterization of Collagen Types of Chicken and Fish Skin of Bangladesh

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Abstract

Collagen is the most abundant protein in animal body. It contributes to the structure of major connective tissues. The growing need of collagen in biomedical and industrial sectors has accelerated the research of finding new source of collagen. Though the bovine collagen and porcine collagen are the major sources to meet the current need, the dietary restriction due to religious prohibition and the risk of transmissible diseases, such as Bovine spongiform encephalopathy (BSE) and transmissible spongiform encephalopathy (TSE), have led the researchers to investigate other sources. The national need of collagen in industrial and biomedical sectors in Bangladesh is met by import of collagen from foreign country. The main goal of this study was to isolate, purify and characterize collagen in available broiler chicken skin and fish skin/scale from local markets of Bangladesh that will pave the way for industrial production of collagen in Bangladesh that will save a huge amount of currency. Moreover, the pollution and health

hazard due to dumping of chicken skin and fish skin/scale in open spaces can be minimized by this way. The subsequent biochemical processes were carried out to extract collagen by solubilizing them in acetic acid and acetic acid containing pepsin following the agitation with protease inhibitor solution in neutral condition. Type I and type III collagen from fish scale (Katla catla) and chicken skin were precipitated at 2.5M and 1.8M at sodium chloride (NaCl) concentration respectively. Due to the yield of low amount of type III collagen obtained in this study, the subsequent purification and characterization was carried out only for type I considering the factors in terms of availability and economic value of this type. The purification was carried out by dialysis process and then the collagen was dried in air. The characterization of collagen was done by UV-Vis spectroscopy, SDS PAGE & FTIR spectroscopy. The UV-Vis spectroscopy initially ascertained the presence of collagen. Then the SDS PAGE of acid soluble and pepsin soluble collagen showed the presence of characteristic pattern of collagen. The FTIR spectroscopy presented the characteristic peaks that ensure the intact secondary structure of the collagen. The total yield of collagen were found to be 1.357 and 8.4 gram per 100 gram of chicken skin and fish scale respectively, those make the broiler chicken skin and fish scale of Bangladesh a potentially profitable source of collagen.

LS/2018/1/01 Investigation of the ameliorating effect of algae against arsenic toxicity through biochemical analysis in mice

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Abstract

NOT SUBMITTED

LS/2018/2/05 Determination of folate in serum as an early risk factor for screening of Down syndrome in pregnant woman in Bangladesh

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Abstract

Down syndrome (DS) or trisomy of chromosome 21 is one of the most common cause of autosomal chromosomal genetic disorder that occurs in about 1 in 700 live born children, and main cause of mental retardation and intellectual disability. Several studies in different countries have shown that advanced maternal age at conception, impaired folate status and/folate metabolism, impaired maternal recombination, maternal weight during pregnancy, low socioeconomic conditions, radiation exposure, use of contraceptive pills, and cigarette smoking are major maternal risk factors for giving birth child with DS. However, the prevalence of developing fetuses with DS in pregnant women in Bangladesh especially with altered folate status and/ metabolism has not yet been investigated. Hence, this study aimed to determine the serum folate status in pregnant women as a risk factor for DS at advanced maternal age. In this study, we used the Enzyme-Linked Immunosorbent Assay (ELISA) technique method to determine serum folate concentration. In this study, we found 13 out of 70 pregnant women with a decreased level of serum folic acid. In addition, we found that a major percentage (84.62%) of the participants with decreased serum folic acid levels had no folate supplementation. Moreover, we also observed a higher frequency of other major maternal risk factors low socioeconomic status, overweight during pregnancy, and use of contraceptive pills in the pregnant women with

decreased serum folate level than the women with normal serum folate level. Importantly, we with the help of pediatricians observed no DS characteristic phenotypes in babies from pregnant women with decreased serum folate levels. To calculate the prevalence of DS in Sylhet, Bangladesh, a large number of samples are needed to be analyzed. Nevertheless, the primary findings of this study will indeed increase awareness among pregnant women in Bangladesh to take folic acid supplementation during pregnancy to prevent mothers from having children with DS. This study will also increase consciousness among Bangladeshi pregnant women to avoid the other possible maternal risk factors to decrease the frequency of DS baby birth instead of prenatal termination.

LS/2018/2/06 JunB protein as a candidate biomaker in cancer diagnosis and its therapeutic implication

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Abstract

NOT SUBMITTED

LS/2018/2/07 Association of circulating biomarkers with type-2 diabetes and cardiovascular diseases: A population-based study in Bangladesh

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Abstract

Background: Type 2 Diabetes (T2D) and Cardiovascular diseases are the major public health concern affecting millions of people worldwide. The relationship of liver enzymes with T2D and hypertension has been reported in limited studies and their findings are inconsistent. Moreover, there is no study has been conducted in Bangladesh to investigate such association. Preliminary, this study aimed to estimate the prevalence of elevated liver enzymes and examine its association with T2D and hypertension in Bangladeshi adults.

Methods: A total of 270 individuals (192 males and 78 females) were enrolled in the study. Alanine and aspartate aminotransferase (ALT, AST), alkaline phosphatase (ALP), and γ -glutamyltransferase (GGT) activities were measured in blood serum collected from them. T2D was defined as fasting blood glucose (FBG) ≥ 126 mg/dL and intake of anti-diabetic medications, and hypertension was defined as SBP > 140 mm Hg and DBP > 90 mmHg. Association of liver enzymes with T2D and hypertension was evaluated by multinomial logistic regression analysis.

Results: The mean concentrations of serum ALT, AST, ALP and GGT were higher in the T2D and hypertensive groups compared to the normal control group. The prevalence of liver functions abnormalities were significantly higher in diabetic and hypertensive individuals than the healthy individuals ($p < 0.01$). In regression analysis, only GGT activity showed an independent association with T2D, whereas, both ALT and GGT showed the independent association with hypertension.

Conclusions: A high prevalence of elevated liver enzymes was observed in diabetic and hypertensive individuals. Increased GGT activity was independently associated with both T2D and hypertension among Bangladeshi adults. Results of this study suggest that monitoring of ALT, GGT levels could help in the diagnosis and management of diabetes and hypertension. Prospective large scale studies are needed to investigate the underlying mechanisms between liver enzymes and incidence of T2D and hypertension in the general population.

Key words: Prevalence; Liver enzymes; Bangladeshi adults; type 2 diabetes, hypertension

LS/2018/3/10 Assessing the Health Status of SUST Faculty Members: Implications for Future Health Management Strategy

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Abstract

The rate of diabetes, kidney diseases, liver dysfunctions and cardiovascular diseases are increasing in Bangladesh at an alarming rate. Similarly, the prevalence of Chronic Kidney Disease (CKD) is also rapidly increasing worldwide. In case of liver diseases, Cardiovascular Disease (CVD) particularly Coronary Artery Disease (CAD), is getting epidemic day by day. The current prevalence of hypertension, CAD and stroke are about 20-25%, 4-6%, 0.3-1.0% respectively where nationwide population was considered. However, there has not been any age based study. The individuals of over 35 years old are particularly at high risk to be affected by these diseases. As Shahjalal University of Science & Technology (SUST) has over 500 teachers and about 250 over 35 years old, they are not out of the risks of these diseases and maybe some of them have already been suffering from these diseases. The diseases are not only harmful for the individuals who are suffering, but also have implications in their professional performances. As early detection can reduce the risk of fatality, we had designed a health screening program. For this purpose, a total of 154 individuals (128 males and 26 females) over 35 years old were primarily surveyed about their anthropometric data, personal health, food habit and history of disease. Then, their blood sample was processed, estimated serum glucose, serum glutamate- pyruvate transaminase (SGPT), serum creatinine and lipid profile. According to our survey, the Body Mass Index (BMI) data shows that 44.2% were healthy individuals, 49.4% were overweight and 6.5% were obese. Among them, 16.2% of the individuals possessed a habit of smoking, 26.6% were hypertensive according to doctor and 16.8% of the individual were diabetic. Our results from serum analysis indicate that about 21.5% individuals are prone to being diabetic with high blood glucose level. About 29.8% population have an elevated SGPT level. The lipid profile analysis shows that individuals with an increased amount of Total Cholesterol (TC) is about 38.3%, 35% of them have high levels of Triglyceride (TG), 66.9% possess low amount of High Density Lipoprotein (HDL) and 22% have been found to have elevated Low Density Lipoprotein (LDL). On the other hand, only 3.3% individuals have been shown to have an increased level of creatinine. The screening of the health status of SUST faculty member twice in a year can give us a clear indication of the health status of them as well as it can guide a person who is in risk to maintain a healthy lifestyle.

Technical Session–XIV

(For Dept. of SCW and ECO)

Date: September 28, 2019 || Time: 03:30 PM – 7:00 PM

Session Chair: Prof Dr Mohammad Iqbal

Resource Person: Prof Dr S M Saiful Islam

SS/2017/27 Preconceptions and Misconceptions about Menstruation: Experiences of Adolescent Girls in Sylhet City

Professor Neaz Ahmed and Abul Kashem, Assistant Professor

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Abstract

The term “adolescence” has been defined as including those aged between 10 and 19 years. Adolescence has very special and distinct needs, which can no longer be overlooked. Adolescence has multifaceted dimensions where menstruation is one of the vital changes of this stage. Based on qualitative approach case study method was used to identify the preconception and misconception regarding menstruation among adolescent girls. 14 adolescent girls of 6 to 10 standard from three schools located in Sylhet city and their mothers were interviewed using in-depth interview schedule. Findings indicated that changes are happening between the two generations in terms of perceptions, misconceptions and practices. Where mothers depend on mostly traditional practices, girls are more likely to follow modern scientific knowledge and practice and try to avoid traditional misconceptions. Internet, text book and media intervention are playing vital role to bring positive changes among girls but mothers are more rigid about tradition in a moderate way. Still some sorts of traditional perceptions and misconceptions are seen among all due to multiple reasons. Mothers often like to control girls’ movement, eating habit, playing during menstruation but majority girls are found very relax about it. Family, as well as society is not ready to share and discuss menstruation related issue which restrict their easy access to know and to get proper medical service. Even majority of the teachers try to avoid in sharing and discussing the issue at class room. Changes are also seen at school level as majority of schools have developed facilities considering the needs of adolescents. Respondents viewed that massive changes and interventions are needed to reduce existing misconceptions and to create friendly environment. Community based awareness, school based program, wider and special access for adolescent at hospital, education and awareness through media, etc. could be helpful to minimize misconceptions, barriers and changes of perception. It is also important to bring positive family environment and to incorporate male in that change process.

Key words: Adolescent, Experience, Menstruation, Misconception and Perception

SS/2018/1/16 Livelihood Status and Health Condition of Waste Pickers in Sylhet Corporation: A Study

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Abstract

With the rapid growth of industrialization and urbanization, management of solid waste has become a serious issue and environmental challenge to the developing countries like Bangladesh. Although the sector has created a livelihood opportunity for the people like the poor, the destitute, and unskilled migrant workers of urban areas, the sector remains unrecognized, and undervalued, and it has been considered as informal economic activities in urban economy. The people involved in the sector are called scavengers, waste pickers, rag pickers etc. who maintain their livelihood by

collecting and selling recyclable materials out of solid wastes. This study was investigated and analyzed livelihood status and health condition of waste pickers in Sylhet City of Bangladesh. This was a mixed study which followed qualitative and quantitative methods. The paper is based on the information collected from the field survey using observation, case study, focus group discussion and interview techniques. Data were collected from waste pickers who are concentrated at the selected four incinerators and one dump site. A total of 100 respondents were selected by accidental sampling method for conducting survey. In addition, 10 case studies and one Focus Group Discussion (FGD) were conducted to complement survey findings. The data were put on a tabular form and it was analyzed statistically using frequency counts and simple percentages for the structured segment of the interview schedule. The study found that, most of the waste pickers are males (70%). Among the participants, 65% have no educational background and 73% waste picker earns Tk. 200 to 400 every day which is very low for maintaining their daily expenses. Though they work in a filthy environment, a significant portion (40%) use the same dress while collecting wastes from the site and 23% don't brush their teeth regularly. Almost all of the waste pickers couldn't afford shoes, rubber gloves and clothes protective towards their health and often get hurt in the legs and hands. They suffer from low back pain (65%), fever (44%), common colds (39%), and headache (69%). Other problems include gastric pain (34%), skin rashes (14%), asthma (15%), diarrhea (25%) etc. They are marginalized, couldn't afford health services; received no treatment for injuries or many illnesses and preferred self-medication; sometimes they visited to the local doctors or hospitals depending upon the disease. This study recommends that, solid waste management process should integrate waste pickers as key stakeholders and government should adopt rules and regulations regarding their health issues and safety in the workplace.

Keyword: Livelihood Status, Health Condition, Waste Pickers, Sylhet City Corporation

SS/2018/1/17 Public Health Impact of Shrimp Farming with Water Salinity: A Study in the South-west Coast of Bangladesh

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Abstract

NOT SUBMITTED

SS/2018/2/35 Women's Access to safe Abortion and Sexual and Reproductive Health in Three Selected Areas of Sylhet Division: A Study

Professor Dr. Faisal Ahmed and Dr. Mohammad Ali Oakkas, Assistant Professor

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Abstract

NOT SUBMITTED

SS/2018/2/36 Causes and Consequences of Dowry Practice and Legal Measures: A Study in Sylhet Division

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Abstract

Dowry is one of the most common forms of gender based discrimination in Bangladesh. Every year thousands of women have to face serious social, psychological and physical torture due to dowry related dispute. Even they become the victim of acid violence; sometime some are killed by their husband and other family members. Despite having

policy, legal measures and services, women are often being victim of dowry in our country. But practice of dowry is not similar in all the region of the country due to social, economic and cultural condition. In some areas where dowry demand is settled before marriage through bargaining between the parties. But in Sylhet division, dowry is not the matter of discussion rather it has become the established form where parties are well informed about it. Though rate of education is increasing slightly, but dowry trend also exists here. This reality is not suitable for all specially for the middle class families. But they have to maintain the existing social practice unconditionally which often create financial crises for them. Sylhet division is composed of plain; hills and low land and here Muslim and Hindu religious people live together. Thus here practice of dowry is also different at different geographical areas and among religious groups. However, people of this region are unconscious or less aware about the dowry rather they think it is the socially approved rituals. For his reason problem of dowry has become unexplored and lots of people become the victim of dowry. It is also necessary to know the results along with barriers of legal measures taken by the victims. Due to absence of research and documentation dowry practice and causes have been unidentified and thus people become unconscious to avoid it. With the aim of exploring the reality of legal measures taken by the victims and its consequences over their life, the research project is conducted with the financial support of University Research Centre (URC) SUST. The finding of the research project may help the future researchers, policy makers and others to understand analyze and make proper action for adjusting the reality of it.

SS/2018/2/37 GO and NGO Partnership for Protection of Women in Haor Regions of Bangladesh: A Study

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Abstract

NOT SUBMITTED

SS/2018/3/42 HIV/AIDS in Bangladesh: An exploratory study

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Abstract

Though HIV infections in most of the South Asian and South East Asian countries have started declining, HIV/AIDS seems to have been still on the increase in Bangladesh. There are different factors responsible for it. One of the factors is Bangladeshi migrant labors who work as labor mostly in Middle East countries leaving the wife/husband and other family members at home in Bangladesh. In most cases, when they are identified with HIV positive status in the overseas they generally get deported from their work place and feel forced to come back to Bangladesh. After coming back, they do not share their HIV positive status with anyone else and as a result the spouse mostly wife also get infected with HIV positive. The major objectives of this research are: knowing the socioeconomic status of the people living with HIV/AIDS, perceiving the kinds of stigma and discrimination they face due to their HIV positive status, understanding community perception about the people living with HIV/AIDS status and the services these people receive from different organizations. Mix methods are used, employing socioeconomic survey, in-depth interviewing and focus group discussion techniques to collect data from people with HIV/AIDS status and the service providers of government and nongovernment agencies. Data are collected from Sylhet, Chattogram, Rajshahi, Khulna and Dhaka divisions, making the total sample size as around 250. On the basis of the progress so far made for your proposed study, the findings show the socioeconomic status of the people living with HIV/AIDS is poor, and they are frequently being stigmatized and labeled as bad and perverted people at family and community level. The people with HIV/AIDS are often deprived of their father's property, child education, etc. prevented from participating in social and religious

gatherings. The community people generally avoid them and blame them for being sexually perverted. The overall situation in the community makes these people frustrated, alienated and depressed. But the services they receive from different organizations in the form of treatment, counseling, motivation and the warm acceptance by the doctors and other service providers help them feel happy and awaken them to desire a long life.

Key words: Stigma, Discrimination, Community perception, Counseling and Warm acceptance

SS/2018/3/43 Sustainable Development of Haor Community Through Smart Village: a Study

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Abstract

NOT SUBMITTED

SS/2017/21 Modeling Environmental Change, Internal Migration and Risk Sharing Network Using Survey Data

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Abstract

NOT SUBMITTED

SS/2018/1/09 Exploring the Factors Determining the Residential House Rent in the Sylhet City

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Abstract

NOT SUBMITTED

SS/2018/1/10 Smoking and Exposure to Second Hand Smoking (SHS): A Measure on the Effectiveness of Tobacco Law at Public Places in City Corporation areas of Bangladesh

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Abstract

Smoking and Second Hand Smoking (SHS) are jointly the leading preventable cause of major public health burden of morbidity, disability, and mortality in Bangladesh. To confront such burden, governments are taking policies to influence tobacco consumption. The aim of the study is to measure the effectiveness of tobacco law in public places and generate evidence on second-hand exposure to such prohibited public places. This study used a multistage clustered sampling design from 27 wards within Sylhet City Corporation (SCC) Area of Bangladesh with probability proportional to population size and collected data of 1008 sample of both smoker and non-smoker. Logistic regression analysis is performed to assess the association of outcome with each of the background characteristics separately. It is found that around 30% of the male smoke within the SCC area and higher smoking prevalence is found among household heads, people with age between 25 to 34 and illiterate to primary pass respondents. Houses and offices with

smoking restrictions have lower smoking rates. But knowledge of tobacco law has no impact on tobacco consumption. Among the public places examined exposure was low in the educational institutions (schools) and health care facilities. It is also found that exposure to Second-hand Smoking is higher in public transport, waiting areas of public transport, universities, workplace, shopping center, restaurants, etc. Even though more than 50% of the respondents have knowledge about the tobacco control law, but due to not having any effective implementation of this law made higher exposure to the second-hand smoking. The data clearly shows that smoke-free policy essential to be strengthened by declaring more and more public places 100% smoke-free in Bangladesh. Awareness campaigns through effective public education, media advocacy, and communication are the key to implement smoke-free policies. Governments and communities need to work together to create smokefree environments. Media coverage of smoking ban, awareness and health impacts; and anti-smoking campaign and other programs also generate a negative impression on people to combat with Second-hand smoking.

SS/2018/2/27 Theoretical and Empirical Perspective of Price Differential between Trafficked and Legal International Migration

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Abstract

NOT SUBMITTED

The End