2018

Book of Abstracts

6th ANNUAL CONFERENCE on RESEARCH FINDINGS-2018

ORGANIZED BY

SUST RESEARCH CENTRE

SHAHJALAL UNIVERSITY OF SCIENCE & TECHNOLOGY, SYLHET

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Designed & Compiled by

Professor Dr. Md. Zakir Hossain
Director, SUST Research Centre

Dr. Mohammed A. S. Arfin Khan
Associate Professor, Dept. of Forestry and Environmental Science, SUST, Sylhet

PROGRAMME

Day-1 (27 September, 2018)

10:00 Guest Reception

10:10 **Welcome Address:**
Professor Dr. Md. Zakir Hossain
Director, SUST Research Centre

10:20 Vice-Chancellor Award

10:30 **Speech of the Special Guests:**
Mr. Hafiz Ahmed Mazumder
Chairman, Bangladesh Red-crescent Society

Mr. M.A. Halim Chowdhury
Managing Director and CEO, Pubali Bank Limited

Professor Dr. Md. Elias Uddin Biswas
Treasurer, SUST

10:45 **Speech of the Chief Guest:**
Professor Dr. Mohammad Yousuf Ali Mollah
Member, University Grants Commission of Bangladesh

10:55 **Speech of the Chairperson:**
Professor Farid Uddin Ahmed
Vice-Chancellor, SUST

11:05 **Vote of Thanks:**
Professor Dr. A. Z. M. Manzoor Rashid
Member, SUST Research Centre

11:10 Tea Break

Day-1 (27 September, 2018)
11:30 am to 1:30 pm
Technical Sessions 1-2

1:30 pm to 2:15 pm
Launch and Prayer Break

2:30pm to 6:00 pm
Technical Sessions 3-4

Day-2 (30 September, 2018)
10:00 am to 1:00 pm
Technical Sessions 5-6

1:00 pm to 2:00 pm
Launch and Prayer Break

2:00 pm to 5:30 pm
Technical Sessions 7-8

INAUGURAL CEREMONY

The inaugural ceremony of the

6th Annual Conference on Research Findings-2018

By

RESEARCH GRANT AWARDEE 2017-2018

will be held on September 27, 2018

Professor Dr. Mohammad Yousuf Ali Mollah, Member, University Grants Commission of Bangladesh has kindly consented to be the Chief Guest.

Mr. Hafiz Ahmed Mazumder, Chairman, Bangladesh Red-crescent Society, Mr. M.A. Halim Chowdhury, Managing Director and CEO, Pubali Bank Limited & Professor Dr. Md. Elias Uddin Biswas, Treasurer, SUST have agreed to be Special Guests.

Professor Farid Uddin Ahmed, Vice Chancellor, Shahjalal University of Science & Technology will chair the inaugural ceremony.

We are pleased to invite you to attend the conference.

Professor Dr. Md. Zakir Hossain
Director, SUST Research Centre

Session Schedule

Technical Session 1
Day 1 (27.09.2018); Time: 11:30 am - 2:00 pm; Venue: SUST Research Centre
Session Chair: Prof. Dr. Mohammad Younus, CHE, SUST
Resource Person: Prof. Dr. Md. Mizanur Rahman, CHE, SUST
Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

Technical Session 2
Day 1 (27.09.2018); Time: 11:30 am - 2:00 pm; Venue: Conference Room of IQAC, SUST
Session Chair: Prof. Dr. S. M. Saiful Islam, CHE, SUST
Resource Person: Prof. Dr. Md. Shamsul Haque Prodhan, GEB, SUST
Coordination: Prof. Dr. A. Z. M. Mazoor Rashid, FES, SUST

Technical Session 3
Day 1 (27.09.2018); Time: 2:30 pm - 6:00 pm; Venue: Conference Room of IQAC, SUST
Session Chair: Prof. Dr. Kamal Ahmed Chowdhury, SOC, SUST
Resource Person: Prof. Dr. Abdul Awwal Biswas, ANP, SUST
Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

Technical Session 4
Day 1 (27.09.2018); Time: 2:30 pm - 6:00 pm; Venue: SUST Research Centre
Session Chair: Prof. Dr. Akhtarul Islam, CEP, SUST
Resource Person: Prof. Dr. Mohammad Iqbal, IPE, SUST
Coordination: Prof. Dr. Md. Mizanur Rahman, CHE, SUST

Technical Session 5
Day 2 (30.09.2018); Time 10:00 am – 1:15 pm; Venue: SUST Research Centre
Session Chair: Prof. Dr. Md. Elias Uddin Biswas, Treasurer, SUST
Resource Person: Prof. Dr. Md. Sajedul Karim, MAT, SUST
Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

Technical Session 6
Day 2 (30.09.2018); Time 10:00 am – 1:15 pm; Venue: Conference Room of IQAC, SUST
Session Chair: Prof. Dr. Kamal Ahmed Chowdhury, SOC, SUST
Resource Person: Prof. Dr. Md. Abdul Ghani, SOC, SUST
Coordination: Prof. Dr. Md. Nazrul Islam, BUS, SUST

Technical Session 7
Day 2 (30.09.2018); Time 2:00 pm – 5:30 pm; Venue: SUST Research Centre
Session Chair: Prof Dr A. Z. M. Mazoor Rashid, FES, SUST
Resource Person: Prof. Dr. Md. Nazrul Islam, BUS, SUST
Coordination: Prof. Dr. Mohammad Iqbal, IPE, SUST

Technical Session 8
Day 2 (30.09.2018); Time 2:00 pm – 5:30 pm; Venue: Conference Room of IQAC, SUST
Session Chair: Prof. Dr. Sabina Islam, STA, SUST
Resource Person: Prof. Dr. Md. Zakir Hossain, STA, SUST
Coordination: Prof. Dr. Md. Shamsul Haque Prodhan, GEB, SUST

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Technical Session 1

Day 1 (27.09.2018); Time: 11:30 am - 2:00 pm; Venue: SUST Research Centre

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Resource Person:Prof. Dr. Md. Mizanur Rahman, CHE, SUST

Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

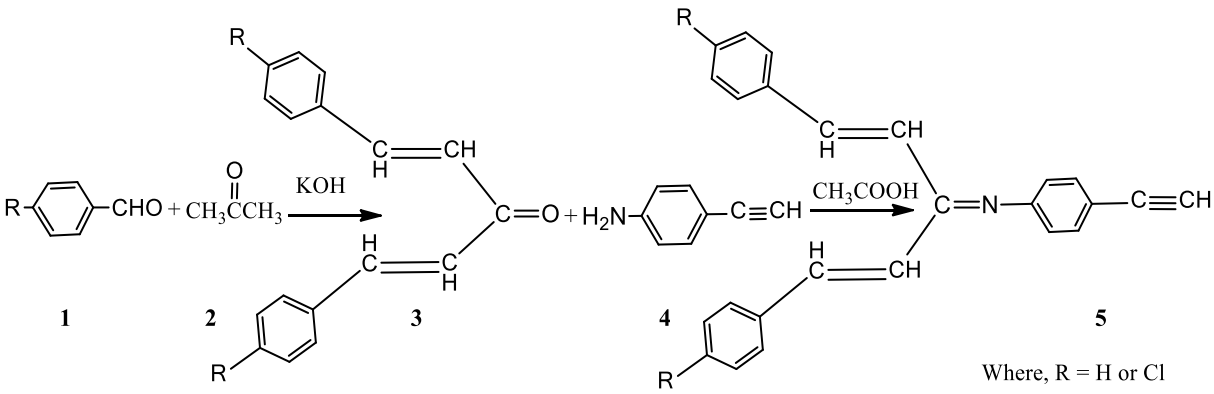
1. Designed, synthesis, and characterization of some novel schiff base containing alkynes via aldol condensation reaction

Md. Mostafizur Rahman, Md. Jalal Ahmed, Masnun Naher, and Md. Ashraful Alam

Department of Chemistry, School of Physical Sciences, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh, E-mail: mostafiz-che@sust.edu

Abstract

Schiff bases, named after Hugo Schiff, are formed when any primary amine reacts with an aldehyde or a ketone under specific conditions. Structurally, a Schiff base is a nitrogen analogue of an aldehyde or ketone in which the carbonyl group (>C=O) has been replaced by an imine or azomethine group. Schiff bases that contain aryl substituents are substantially more stable and more readily synthesized, while those which contain alkyl substituents are relatively unstable. Schiff bases of aliphatic aldehydes are relatively unstable and readily polymerizable while those of aromatic aldehydes having effective conjugation are more stable. The formation of a Schiff base from an aldehydes or ketones is a reversible reaction and generally takes place under acid or base catalysis, or upon heating. Schiff bases (imines) constitute one of the most widely used families of organic compounds, not only as synthetic intermediates but also in coordination chemistry. They are used as pigments and dyes, catalysts, intermediate in organic synthesis, and as polymer stabilizers. Schiff bases have also been shown to exhibit a broad range of biological activities, including antifungal, antibacterial, anti-malarial, anti-inflammatory, antiviral, and antipyretic properties. Metal complex of Schiff bases were also exhibit as a catalytic activity as well as optical properties. Herein study carried out on synthesis of novel Schiff base containing conjugated organic alkynes 5. These conjugated new organic alkynes were characterized by FTIR spectroscopy [1-2].



Scheme 1: Synthetic routes of Schiff base containing alkynes

References: [1] D. N. Dhar, C. L. Taploo, J Sci Ind Res, 1982, 41, 501.

[2] L. Zhou, P. Cai, Y. Feng, J. Cheng, H. Xiang, J. Liu, D. Wu, X. Zhou, Analytica Chimica Acta, 2012, 735, 96.

2. Synthesis and applications of tio_2 -Al_2O_3 nanocomposite materials by fast and facile microwave irradiation method

Iqbal Ahmed Siddiquey, Md. Nizam Uddin

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Abstract

Titanium dioxide (TiO_2) nanoparticles (NPs) enjoy manifold applications due to its unique physical and chemical properties. There are several ways by which TiO_2- Al_2O_3 nanocomposite can be synthesized such as sonochemical process, chemical precipitation method, heterogeneous precipitation method, sol-gel process. Compared to the conventional methods mentioned above, microwave (MW) assisted synthesis has the advantages of very short reaction times, production of very thin and uniform coating layers. In this research work, MW assisted synthesis of TiO_2- Al_2O_3 nanocomposite is explored to offer an effective alternate of these methods. The nanostructure development were corroborated by X-ray photoelectron spectroscopy (XPS), X-ray fluorescence (XRF), scanning electron microscope (SEM), energy-dispersive X-ray (EDX) and Fourier transform infrared spectroscopy (FT-IR) analysis. The XPS analyzed results affirmed that elements on the coated surface were Al and O. Zeta potential analysis predicted the presence of Al_2O_3 layer on TiO_2 due to almost similar zeta potential curve for pure Al_2O_3 and TiO_2-Al_2O_3 nanocomposite. Electrochemical properties of the as prepared TiO_2- Al_2O_3 nanocomposites were studied thoroughly to determine the sensing activity of the nanocomposites towards 3,4-Diaminotoluene (3,4-DAT) which is a harmful or hazardous chemical using I-V method. Selective electrochemical sensor using TiO_2-Al_2O_3 nanocomposite onto glassy carbon electrode (GCE) was assembled and the details electrochemical investigation of 3,4-Diaminotoluene (3,4-DAT) was developed in phosphate buffer solution (PBS) medium. It was calibrated using in range of 3,4-DAT concentration and data were plotted as current versus concentration. Considering the highest linearity (r^2=0.99) of calibrated range, the linear dynamic range (1.0 pM~ 1.0 µM) was found. Employing the slope of calibration curve, the sensitivity (0.5024×10^3 $\mu A \mu M^{-1} cm^{-3}$) and detection limit (0.19 ± 0.01 pM) were estimated. Besides this, the selective 3,4-DAT chemical sensor was shown long-term stability and precious reproducibility with very short response time without any interference effect.

3. Synthesis, morphology and thermal properties of polyvinyl alcohol-cuo-cao ternary nanocomposite films: Application as photocatalyst for organic dye removal

Mohammad Mizanur Rahman Khan*, Md. Shahadat Hussain Chowdhury and Md. Mainul Haque

Department of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh. *Corresponding author: mizan_su@yahoo.com.

Abstract

Among the organic polymers, polyvinyl alcohol (PVA) has been used extensively due its extremely hydrophilic nature, good film forming capability, nontoxicity and biodegradability [1]. PVA-CuO-CaO nanocomposite films were prepared by mixing of the constant amount of PVA (0.5 g) and five different ratios of CuO and CaO (5 to 25 wt%) through solvent casting method. Both Fourier transform infrared spectroscopy (FTIR), ultraviolet–visible spectroscopy (UV-Vis) spectra revealed the possible incorporation of CuO/CaO into PVA matrix. Field emission scanning electron microscopy (FESEM) and energy-dispersive X-ray spectroscopy (EDX) data demonstrated the variation of morphological feature of PVA-CuO-CaO nanocomposite films. Thermogravimetric analysis (TGA) data indeed showed the better thermal stability of PVA-CuO-CaO composites than PVA alone. Differential scanning calorimetry (DSC) measurements revealed the higher melting temperature (Tm) of PVA-CuO-CaO composite films than PVA. The photocatalytic measurements exhibited the good photocatalytic degradation ability of composites films. Such photocatalytic performance make the PVA-CuO-CaO nanocomposite films a promising candidates for the removal of organic dyes for waste water treatment.

Reference: [1] Singhal A, Kaur M, Dubey K A, Bhardwaj Y K, Jain D, Pillai C G S, Tyagi A K (2012) RSC Adv. 2:7180-7189

4. Development of proton exchanger for solid electrolyte fuel cells from functionalization of graphene oxide

Mohammad Razaul Karim, Mr. Ramkrishna Saha

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Abstract

The solid electrolytic property of a materials can be studied by means of proton conductivity measurement. In this study, the proton conductivity of GO' (bulk graphite oxide), GO-H (graphene oxide and proton hybrid), and GO (graphene oxide film) was measured by impedance study. Proton conductors are essential for fuel cells and steam electrolysis. GO, the oxo derivative of graphene (G) is a perfect candidate for proton conduction, as it possess 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 ~ 10^{-4} and ~ 10^{-5} S cm^{-1} whereas for GO it is high with nearly 10^{-2} 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 GO > GO' > 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 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 solid phase structure of GO confirms privilege over other conductor like phosphoric acid. Pure GO is obviously cheaper and more environmentally friendly than its hybrids or derivatives. In near future we are waiting for multilayer GO sheet as a solid electrolyte.

5. Electron transfer oxidation of organo-cuprates with benzophenone: synthesis of biaryls

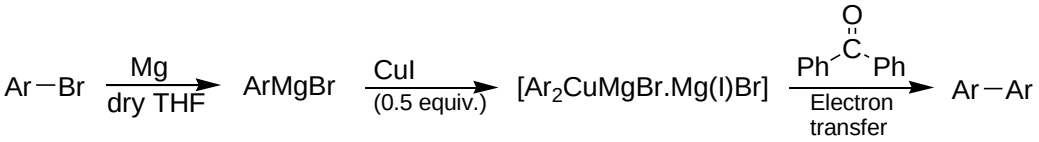
Mohammad Jalilur Rahman, Rehana Pervin and Md. Abdul Malek

Department of Chemistry, School of Physical Sciences, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

Aryl-aryl bond formations through transition metal mediated coupling reactions have been the subject of significant interests in modern organic synthesis. Biaryls and their heteroaromatic analogues are some of the most important structural units in natural products, bioactive compounds, functional polymers, ligands in catalysis etc. The homo-coupling of aryl Grignard reagents via organo-cuprates has been an effective access to the production of symmetrical aromatic compounds.

An efficient, mild and simple way to synthesize biaryls through electron-transfer oxidation of organo-cuprates has been developed. The organo-cuprates {$Ar_2CuMgBr.Mg(I)Br$} were generated from arylmagnesium bromide and half equivalent of copper(I) iodide in dry THF at lower temperature under nitrogen atmosphere. These organo-cuprates have been found to undergo electron-transfer oxidation with aryl ketone like benzophenone giving biaryls as homo-coupled products in moderately good yields. Various aryl bromides have been transformed first into aryl Grignard reagents and then to organo-cuprates and finally electron-transfer oxidation of these cuprates form biaryls. Aryl bromides with either electron-donating or electron-withdrawing substituents were smoothly transformed into the corresponding biaryls in a one pot reaction through this electron-transfer oxidation pathway (Scheme 1).



ArBr: C_6H_5Br, *p*-MeC_6H_4Br, *m*-MeC_6H_4Br,
p-$MeOC_6H_4Br$, *m*-$MeOC_6H_4Br$,
p-FC_6H_4Br, *p*-BrC_6H_4Br, *p*-ClC_6H_4Br

Scheme 1

6. Water solubilization of hydrophobic biologically active heterocycles through supramolecular complexation using β-cyclodextrin as host

Dipen Debnath, Shameem Ara Begum

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Abstract

In this project two 1,3,4-thiadiazoline derivatives were synthesized from two different aldehyde derivatives. Earlier aldehyde thiosemicarbazones (Schiff's base, 1a and 2a) were synthesized from two benzaldehyde derivatives i.e., 4-chlorobenzaldehyde and benzaldehyde combining with thiosemicarbazide in acidic media. These Schiff's bases were further converted into cyclized 1,3,4-thiadiazoline derivatives (1b and 2b) on heating with acetic anhydride. The synthesized compounds were characterized by FTIR and ^{1}H-NMR spectroscopic studies.

The synthesized thiadiazolines was introduced with β-cyclodextrin (β-CD) for synthesizing water soluble supramolecular/inclusion complexes of 1,3,4-thaidiazoline derivatives with β-cyclodextrin. A water-dispersible inclusion complex of benzaldehyde thiadiazoline (2b) with β-cyclodextrin (2c) was obtained whereas the inclusion complex of 4-chlorobenzaldehyde thiadiazoline (1b) with β-cyclodextrin was not achieved. The formation of the inclusion complex (2c) was confirmed by FTIR and ^{1}H-NMR spectroscopic analyses. Thermal Gravimetric Analysis (TGA) showed a stoichiometric ratio of 1:1 between 2b and β-CD in the supramolecular complex, 2c.

Cytotoxic activity was tested through brine shrimp lethality test using *Artemia Salina* leach (brine shrimp eggs). Both the cyclized compound, 2b and the inclusion complex 2c were applied *in vitro* test to find out their cytotoxicity variation towards the inclusion. The LC_{50} values for 2b and 2c were found 72.01 and 15.97 µg/mL, respectively. LC_{50} values clearly showed that 2c was more toxic to shrimp larvae in comparison with 2b. This difference in cytotoxicity was achieved probably because of the more bioavailability of water dispersible 2c compare to 2b.

7. Selective electrocatalytic oxidation of uric acid at in situ fabricated thiocyanate-modified gold electrode

Md. Rezwan Miah and Md. Saiful Alam

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Abstract

Fabrication of polycrystalline gold (Au (poly)) electrode surface with a compact thiocyanate-adlayer was carried out in situ by virtue of spontaneous chemisorption of thiocyanate. Open circuit potential measurement shows that the presence of thiocyanate in the solution resulted in a sharp negative shift of electrode potential, suggesting that thiocyanate underwent spontaneous reductive adsorption onto the Au (poly) electrode surface.

The thiocyanate-modified Au (poly) ($SCN_{(ads)}$|Au (poly)) electrode was employed towards the electrocatalytic oxidation of uric acid (UA). The obtained results showed that UA oxidized at a significantly lower overpotential with a higher current density as compared with the bare Au (poly) electrode. The harmful adsorption of UA at the $SCN_{(ads)}$|Au (poly) electrode surface was very effectively inhibited and thus an enhanced UA oxidation current was achieved. UA underwent selective oxidation in the presence of ascorbic acid (AA) and dopamine (DA) with a satisfactory peak current separation. The current response of UA oxidation was unaltered in the presence of several interferents. This technique may be advantageously utilized for selective sensing of UA in real samples.

8. Label free single molecular detection of troponin i by afm study: virus nanoparticle as afm tip.

Md Abdus Subhan, Mahbubul Alam and Pallab Chandra Saha

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Abstract

We have made some metal complexes by facile co-precipitation method. Then by using we have characterized the samples. Surface morphology, particle size and roughness of the surfaces has been determined. Photoluminescence spectroscopy has also been used to study the synthesized samples. Now these samples will be subject to biological study. Chemicals, solvents and UV-Visible cells, photochemical reactor etc. have been purchased.

Synthesis of nanomaterials and characterization by XRD, SEM, EDS, AFM, Spectroscopic methods, Zone inhibition method for biological study.

Some new nanocomposite materials have been developed and characterized. Their materials and biological studies are in progress.

A trimetallic, MoO_3·CuO·ZnO nanocomposite was synthesized by coprecipitation method. The nanocomposite was characterized by X-ray diffraction (XRD), scanning electron microscopy–energy dispersive X-ray spectroscopy (SEM–EDS), atomic forcce microscopy (AFM) and photoluminescence (PL). Particle size was determined to be 40.34 nm by using Scherrer's formula from XRD data. The SEM–EDS mapping shows that all the elements in this composite are not confined in a single site, rather they are distributed in a solid matrix. PL study of the MoO_3·CuO·ZnO nanocomposite showed spectral variation through size and morphology

with calcination temperature. Photocatalytic activity of the composite was studied under visible light irradiation. The composite showed excellent visible light dye degradation efficiency of 95.82% at pH 9. Based on these outcome of the research a paper has been published. (Res Chem Intermed https://doi.org/10.1007/s11164-018-3491-0).

9. Electrochemical oxidation of As(iii) on Pd immobilized Pt surface: kinetics and sensing performance

Mohammad Abul Hasnat, Md. Masum Talukder

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Abstract

Pd nano particles were electrochemically immobilized on Pt surface in presence of SDS molecules to study electrokinetics of arsenite oxidation reactions and corresponding sensing activities. The XPS analysis showed that on the Pt surface, content of Pd (0) and Pd (II) were 75.72 at. % and 24.28 at. %, respectively, where particle sizes were in the range between 61nm to 145nm. The experimental results shows that catalytic efficiency as well as charge transfer resistance (at the redox potential of Fe(II)/Fe(III) couple) increased with an order of Pt < Pt-Pd <

Pt-Pd_{sds}. A Pt-Pd_{sds} surface exhibited open circuit potential (OCP) at 0.65 V in acidic condition, however, while 50mM $NaAsO_2$ was present, the OCP value shifted to 0.42V. It was predicted that the arsenite reactions proceeded using a consecutive pathway; As (III) → As (IV) → As (V). After optimization of the square wave voltammetric data, LOD of As(III) was obtained as 14.3 ppb and 4.1 ppb while the surface modification of the Pt surface was obtained in absence and in presence of SDS surfactant, respectively.

Key words: Arsenite, Kinetics, Voltammetry, LOD, Electron transfer, Oxidation

Reference

1. M.M. Alam, M.A. Rashed, M.M. Rahman, Y. Nagao, M.A. Hasnat, RSC Adv., 2018,8, 8071

10. Comprehensive characterization of bioactive compounds from *Kalanchoe crenata* for anti-microbial activities

Mohammad Salim[1,*], Md. Ali Zaber Sahin[2] and Md. Hazrat Ali[2]

[1]Department of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

[2]Department of Genetic Engineering and Biotechnology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh

Abstract

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.

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.

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

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

11. Synthesis, X-ray crystal structures, photoluminescence studies and bioactivities of M(II) complexes of the bidentate N,S chelating ligands derived from dithiocarbazates.

Mst. Sabina Begum[1], Khurshida Begum[2]

[1]Dept. of Chemistry, Shahjalal University of Science and Technology, Sylhet-3114, Email: sabina-che@sust.edu.
[2]Dept. of PHY, Shahjalal University of Science and Technology, Sylhet-3114.

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 NiL_2 and CuL_2

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.

12. Cost effective removal of Pb (lead) by using bio-adsorbent

Ahmed Jalal Farid Us Samed* and Syed Shamsul Alam

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Abstract

Lead (Pb) is one of the heavy metals that imparts enormous risk to human health and environment. Removal of Pd 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, biodegradability of adsorbent got priority due to their environmental benign nature. Carbonaceous and cellulosic wastes from our domestic and agricultural sector were collected and treated and then these were used for our current study to remove toxic metal Pb. 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.

Technical Session 2

Day 1 (27.09.2018); Time: 11:30 am - 2:00 pm; Venue: Conference Room of IQAC, SUST

Session Chair: Prof. Dr. S. M. Saiful Islam, CHE, SUST

Resource Person: Prof. Dr. Md. Shamsul Haque Prodhan, GEB, SUST

Coordination: Prof. Dr. A. Z. M. Mazoor Rashid, FES, SUST

1. Elucidation of molecular mechanisms of multidrug resistance in bacteria causing urinary tract infections

Sabrina Suhani*, Md. Abul Kalam Azad, Nandan Chowdhury, Nafisa Nawaar

Dept of GEB, SUST, Sylhet. E-mail- sabrinasuhani@gmail.com, dakazad@yahoo.com.

Abstract

Infectious diseases pose major threat in Bangladesh which requires frequent use of antimicrobials. However, antimicrobial resistance complicates the treatment procedure. Enterobacteriaceae are the most common causative agent of one such infectious disease as urinary tract infection (UTI), but multidrug-resistance among Enterobacteriaceae has contributed to the escalating problem of selecting empiric antibiotics against UTIs. Multidrug resistance (MDR) is the ability of bacterial pathogens to withstand lethal doses of structurally diverse group of drugs. Molecular cause of MDR properties in bacteria from UTI patients in Bangladesh is the need of time to be determined. In this study, samples were collected from 64 patients suspected with UTI by the physicians. Among them 40 were infected with *E. coli.* Antibiogram of these *E. coli* isolates were investigated using antibiotic disks of different generations. The percentage of overall resistance pattern of *E. coli* isolates to the antibiotics investigated was 100 (amoxicillin), 55 (ceftriaxone), 100 (ampicillin), 95 (cefotaxime), 5 (imipenam), 100 (cephalexin), 85 (cefixime), 35 (chloramphenicol), 80 (ciprofloxacin), 65 (tetracycline), 75 (co-trimoxazole), 100 (cefepime), 20 (gentamycin) and 65 (azithromycin). The AcrAB-TolC system of *E. coli* is a multidrug efflux system which pumps out a wide range of lipophilic and amphiphilic inhibitors directly into the medium. Beta lactamases are a group of enzymes that can hydrolyze penicillin and cephalosporin antibiotics and are encoded by genes that can be transferred from one bacteria to another. The isolates were assayed for beta lactamase enzyme production and all the *E. coli* isolates (100%) showed positive result for the presence of beta lactamase. PCR based detection revealed that the genes *AcrA*, *AcrB*, and *TolC* are present in the chromosome and beta lactamase genes Bla_{TEM}, Bla_{SHV} and Bla_{CTX-M} are present in plasmid DNA of the *E. coli* isolates from UTI patients. These genes were further characterized based on DNA sequencing and bioinformatics analysis. Data in this study supports the notion that *AcrAB-TolC* and beta lactamase genes might be the contributor to antibiotic resistance in the MDR *E. coli* isolates from UTI patients in the North-East region of Bangladesh, which in turn, ultimately leads to the path of noble attempt to develop anti-resistance interventions.

Keywords: Multidrug resistance; UTI, *AcrAB-TolC*; β-lactamase genes

2. Establishment of Regeneration and Protoplast Isolation Techniques for Citrus sp.

Beethi Sinha, Sonia Rani Majumdar, Nazmul Hasan, Shamsul H. Prodhan and Hammadul Hoque*

Department of Genetic Engineering and Biotechnology, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh. *Corresponding author, email: hammadulgeb@gmail.com

Abstract

Orange is one of the most favorite fruits among the people of our country, but due to high price it is exorbitant to them to meet malnutrition. This study was carried out to develop efficient regeneration and protoplast isolation techniques of local orange (Citrus reticulata) in order to improve traditional breeding methods through

biotechnological approaches. For callus induction, Tamabeel cultivar showed best response (100%) in MS medium supplemented with 2.5 mg/l of 2,4-dichlorophenoxyacetic acid (2,4-D); Bandarbon cultivar showed 100% response at 2.0 mg/l of 2,4-D and 0.50 mg/l of 6-benztlaminopurine (BA/BAP); Companigonj cultivar reported 100% response at 3.0 mg/l of 2,4-D and 1.0 mg/l of 1-napthaleneacetic acid (NAA); Biyanibazar cultivar was best (80%) at 2.0 mg/l of 2,4-D and 0.50mg/l of BA, 2.0 mg/l of 2,4-D and 0.75 mg/l of BA, 3.0 mg/l of 2,4-D and 0.50 mg/l of BA, 2.0 mg/l of 2,4-D and 0.25 mg/l of Indole-3-butyric acid (IBA), 3.0 mg/l of 2,4-D and 1.0 mg/l of NAA and Karimgonj cultivar showed the best (50%) in MS medium supplemented with 3.5 mg/l of 2,4-D. Best shoot initiation from callus of Companigonj cultivar was reported when callus was transferred in MS media supplemented with BA (2.50 mg/L). Although, other cultivars are non-responsive to these shoot inductive plant hormones. For rooting, Best result found MS media supplemented with 0.5mg/l NAA for the same cultivar. For protoplast isolation, combination of cellulase and pectinase enzymes were used and significant numbers of protoplast were successfully isolated from the mesophyll tissues of leaves. In this study, reliable and efficient callus induction and protoplast isolation methods of Citrus reticulata species were developed. Since the regeneration ability were very low, further research could be performed to find out ideal regeneration systems for local orange cultivars.

Key Words: In vitro technique, regeneration, plant growth regulators, cellulase, pectinase etc.

3. Analysis of DYRK1A in serum as an early biomarker for screening of Down syndrome in pregnant women in Bangladesh

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Abstract

Down syndrome (DS) is one of the autosomal chromosomal and neurodevelopment disorders of neurobiological diseases, and main cause of mental retardation. Thus, DS bio-marker screening is fruitful study to know epidemiology of this disease. Studies have shown that one of the genes dual-specificity tyrosine-phosphorylation-regulated kinase 1A (DYRK1A) is overexpressed in DS patients, and is closely associated with DS phenotypes. Importantly, the numbers of diagnosed DS pregnancies have increased at advance maternal age at the time of conception which is a major one of the known risk factors for DS. However, in Bangladesh the prevalence of DS with increasing maternal age has not been so far studied. Thus, this project aimed to analyze serum DYRK1A protein expression by western blot method as an early biomarker for DS in pregnant women in Bangladesh. Notably, during pregnancy folic acid uptake, maternal weight, use of contraceptive pills, smoking/tobacco use and the socioeconomic conditions are known as DS risk factors were checked by using a questionnaire form. This study will also inspect baby after giving birth by a Pediatrician to make sure whether or not the baby really shows up the DS characteristic phenotypes as those should be seen in women serum if they have the DYRK1A protein overexpression. Until the report preparation~ 54 blood samples were collected from pregnant women at 2nd trimester of their pregnancy from Sylhet MAG Osmani Medical College and Hospital, Sylhet. Blood Serum was separated by centrifugation at 4000 rpm. Serum protein concentration was then determined with Total protein assay kit. DYRK1A protein expression will be measured by Western Blot (WB) technique which will be done at the end of the September. After analyzing adequate number of samples (~ 300) hopefully our study will be able to estimate the possible prevalence of DS with advanced maternal age in Bangladesh. For the first time after estimating the possible existing prevalence of DS with advanced maternal age in Bangladesh, this study might recommend that women over age 30 should have pre-birth testing for the DS condition. Notably, since up to now the prenatal termination of pregnancy is unethical in Bangladesh. Thus, our study will have an impact to reduce live birth with DS instead of prenatal termination. Finally, this study in

Bangladesh will provide awarenessto the people to avoid possible risk factors, and will suggest preventive cares and advices that could help to reduce the rate of giving child birth with DS.

4. Prevalence of hypertension and its associated risk factors in human population- A large-scale cross-sectional study in Bangladesh

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Abstract

Background: Hypertension is a global health issue and has been recognized as a major contributor to the burden of cardiovascular diseases (CVDs), kidney failure and premature death. The prevalence of hypertension and CVDs are increasing rapidly in Southeast Asian countries including Bangladesh, where hypertension is counting as a significant health concern, affecting more than one-third of the adult population. Some previous studies reported the presence of hypertension among the Bangladeshi adults. However, still, there is insufficient information on hypertension prevalence considering several factors such as age groups, education, socioeconomic status, physical activities and food habits across the country. We aimed to conduct a large-scale systematic study to estimate the hypertension prevalence and identify the potential risk factors among the rural and urban adults including university students in Bangladesh.

Methods: This study was a cross-sectional design. The data was collected on 1111 rural and urban adults (600 males and 511 females) and 811 university students (527 males and 284) females) from eight divisions of Bangladesh. Data on anthropometric, lifestyle, food habits and blood pressure were recorded in a standardized questionnaire. Hypertension was defined by a systolic blood pressure (SBP)≥140 mm Hg and/or, diastolic blood pressure (DBP)≥90 mm Hg. Serum uric acid was measured in 100 blood samples collected from Sylhet and Dhaka region.

Results: Overall, the prevalence of hypertension was 25.5% among the participants with no significant difference between males (25.8%) and females (25.0%). The prevalence was higher in the rural adults (30.6%) than in the urban (21.4%) adults. Hypertension was more prevalent among the population in Mymensingh and Rangpur divisions and lower in Dhaka and Sylhet divisions. Among the university students, hypertension prevalence was 10.6% with higher frequency in male than in the female participants ($p<0.01$). The overall prevalence of obesity was 18.2% in rural and urban adults and 8.3% in young adult students. Serum uric acid was significantly associated with elevated blood pressure (<0.01). Age, sex, BMI, smoking, physical activities and food habits were positively correlated with hypertension.

Conclusion: This study reports the prevalence of hypertension and obesity and its associated risk factors in rural and urban adults and adult students in all divisions of Bangladesh. Several factors like age, sex, BMI, physical activities and food habits were found to be significantly associated with hypertension and obesity. A comprehensive and integrated intervention programs focusing on modifiable risk factors are recommended to make awareness and prevent hypertension and obesity in the Bangladeshi population.

5. Alarming Prevalence of Acinetobacter baumannii of Urinary Trac Infection (UTI) and Respiratory patients in Sylhet, Bangladesh

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Abstract

Bacterial resistance to antimicrobial agents is increasing worldwide day by day. *Acinetobacter* species are the most important nosocomial and opportunistic pathogens, which have become a global public health threat due to rapidly increasing resistance to almost all antimicrobial compounds. In South-Asian countries including Bangladesh, prevalence of Respiratory Infection (RI) and Urinary Tract Infection (UTI) due to *Acinetobacter* in hospital environment and their resistance to antimicrobial agents is significantly high. This study aims to isolate *Acinetobacter* species from various clinical specimens like sputum, tracheal aspirate, urine, pus and wound swab etc. and examine the prevalence of Respiratory Infection (RI) and Urinary Tract Infection (UTI) due to *Acinetobacter* species in different units (ward) of different hospitals in Sylhet (North-East region) of Bangladesh. This is a retrospective study over 1 year period where specimens collection, bacterial identification and their antimicrobial sensitivity testing were performed using the standard microbiological techniques. In this study, there were 113 *Acinetobacter* positive sample were collected from different units (ward) of different hospitals. Among the collected 113 *Acinetobacter* positive sample of this study, 65 (57.5%) and 48 (42.5%) were male and female respectively. About 68 patients from 113 were identified who were suffered from respiratory and urinary tract infection and among them, 45 (66.2%) and 23 (33.8%) were suffered from lung infection and urinary tract infection respectively. Among the collected 113 *Acinetobacter* positive patients sample, 100 were infected after admitted in hospital. Since the samples were collected from different units of hospitals, so a comparative study of prevalence of *Acinetobacter* among the hospital units was done. Among the 100 *Acinetobacter* positive sample (infected after admitted in hospital), 40 (40%), 32 (32%), 14 (14%), 8 (8%), 4 (4%) and 2 (2%) samples were collected from Intensive Care Unit (ICU), Medicine, Gynae, Surgery, Orthopedics and Nephrology units respectively which indicates the prevalence of *Acinetobacter* infection is highest in Intensive Care Unit (ICU) followed by Medicine, Gynae, Surgery, Orthopedics and Nephrology unit. The prevalence of infection of *Acinetobacter* in hospitalized patients in different season was another finding of this study. 36 (42.9%), 30 (35.7%) and 18 (21.4%) patient were infected at rainy, winter and summer season respectively. In our study, Colistin was found to be the antibiotic with highest susceptibility (96.4%) followed by Tigecyline (89.6%), Imipenem (57.7%) Meropenem (51.4%), Piperacillin (48.5%), Doripenem (46.9%), Amikacin (46.4%), and Gentamycin (38.1%) etc. and maximum resistance was observed to Cephradine (94.3%) and followed by Amoxycillin (93.4%), Cefuroxime (90.1%), Cefixime (89.2%), Cefotaxime (87.1%), Nalidexic acid (81.8%), Amoxiclav (76.6%), Ceftroaxone (76.6%), Ticarcillin (73.9%), Mecillinum (73.3%), Ciprofloxacin (72.1%), Nitrofurantoin (71.9%), Levofloxacin (68.4%) etc. Since multidrug resistant *Acinetobacter* are a common pathogen in hospital environment specially in Intensive Care Unit (ICU) and Medicine Unit and rainy and winter seasons are the most preferable time of their spreading out, so a good feasible hospital antibiotic policy and strict adherence to it will help prevent the spread of *Acinetobacter* in hospital environment.

6. Molecular characterization of flavonoid compounds from *Tridax procumbens* for anti-arthritis drug

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Abstract

Arthritis is regarded as a whole joint disease with a multifactorial etiology, including increased mechanical stress, ligament derangements, cartilage degradation, subchondral bone changes and muscular impairments. The current clinical treatment regimens for arthritis are anti-arthritis drugs, which maintain bone mass by inhibiting osteoclast's functions, such as parathyroid hormones (PTH), PTH receptor analogues, calcitonin, and bisphosphates. However, the low efficacy, long lasting and possible side effects are the real challenge of these drugs to use. Therefore, a sustainable drug is desirable which can provide better and safe treatment. Recently, our study showed that *Tridax procumbens* flavonoids (TPF) could promote the osteoblasts differentiation and bone formation. However, the effects of the TPF as anti-arthritis is agent remain unclear.

In this study, we investigated the effects of the TPF as anti-arthritic agent, injected the TPF (20 mg/kg) twice a day in the arthritis induced mice and killed them after 41 day. Radiographic and biochemical analyses were performed on the dissected bones to determine the anabolic effects of the TPF.

Arthritis scores of the TPF-treated mice were significantly reduced compared to the control mice. Biochemical test related indices were significantly increased in the TPF-treated mice compared to the control mice.

Our findings point towards the stimulation to reduce arthritis by TPF, suggested that the TPF could be a potential natural anabolic agent to treat patients with bone loss-associated diseases such as osteoarthritis.

7. Biochemical and molecular characterization of hilsa shad, Tenualosa ilisha for natural stock management in Bangladesh

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Abstract

Biochemical and molecular characterization of hilsa shad, Tenualosa ilisha for natural stock management in Bangladesh" was considered with several targets to know the biochemical and molecular status in different ecological habitats of Bangladesh. Few experiments were already conducted. 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 for checking nutritional differentiation among the populations of marine (Saint Martin) and freshwater (Chandpur). According to the analysis of different biochemical parameters, it was observed that nutritional quality was found better in marine (St. Martin) population than freshwater (Chandpur). RAPD based genetic diversity assay was studied for observing genetic structure of this fish considering those marine (St. Marin) and freshwater (Chandpur) populations of T. ilisha. Five RAPD primers were used where total bands was observed 159 in marine population and 171 in freshwater population. Average number of polymorphic loci was found 4.8 and 7 in marine and freshwater populations of hilsa shad respectively with 92% and 90.28%. Genetic diversity was recorded 0.53 and 0.46 respectively in marine and freshwater conversely genetic similarity was recorded 0.63 in marine population and 0.67 in freshwater population. Based on different linkage distances, cluster analysis using UPGMA was done to resolve the phylogenetic relationships among experimental individuals of T. ilisha in both the populations. The UPGMA clustering system generated four clusters using 1 clade in freshwater population and five clusters with three clades in marine population and the rest of the samples were connected to those clades with a specific linkage distance. In this experiment with RAPD assay poor genetic diversity were observed in both the populations, however, comparatively higher genetic diversity were observed in marine population than freshwater population.

8. On-site detection of CaC_2 used for artificial ripening of fruits

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Abstract

Artificial ripening is a very regular practice in many developing countries like Bangladesh. Many vendors, growers and wholesalers are rampantly adulterating the fruits using ripening agents such as commercial-grade calcium carbide (CaC_2) for getting more economic benefit attributing to very severe health concerns including headache, mood disturbance, and memory loss, vertigo, dizziness, delirium, seizure and even coma. According to the Bangladesh Safe Food Ordinance (Amendment) act 2005- Section 6A, the production and use of ripening agents are prohibited. Despite this legal prohibition, chemically treated fruits are being sold out openly in all markets as the government has no fruitful CaC_2 detection system. The difficulty in elemental analysis, Ca^{2+} diffusion makes the CaC_2 detection harder and non -realistic. Currently, no simple method for CaC_2 detection has been developed. Therefore, it has become a burning issue to develop a very simple, small and cost effective detection system which allows on-site, naked eye detection of calcium carbide. When CaC_2 comes in contact with moisture it produces acetylene gas that accelerates the ripening process. The gaseous nature of acetylene makes its detection process harder. We propose a strip based detection system. The strip will show the color change on the basis of acid-base chemistry. To procure this color change on strip, several pH indicators–phenolphthalein, red cabbage extract and methyl red have been tested. Previous reports indicated the presence of 20-nM CaC_2 on the fruit surface. Our first target was to categorize the CaC_2 solution on the basis of pH change due to the variation of its concentration using those indicators. Phenolphthalein showed the color change up to the lower limit of CaC_2 concentration with 10-µM (pH-9.4). The red cabbage extract showed a significant color change over 1-µM (pH-7.8) of CaC_2 solution. Therefore, those two indicators were not suitable for real type detection system. On the other hand, the methyl red indicator displayed the color change started from the concentration of 1-nM (pH-7.0). This result presented methyl red as suitable indicator for using in CaC_2 detection strip. Amazingly, methyl red strip traces CaC_2 directly on the fruit surface changing color from pink towards the yellowish gradient. Therefore, strip-based CaC_2 detection system could be a fruitful tool for the determination of fruit adulteration.

9. Study the impact of consanguineous marriage to accumulate heritable connective tissue diseases in Bangladeshi population

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Abstract

Consanguineous marriage is the practice of marital union between two individuals who are bloodly related as second cousins or closer, is a traditional and respected practice in several countries, especially in Muslim communities. As Bangladesh possess a population mostly dominant by Muslims and consanguinity exists here and often manifested as a source of autosomal recessive disorders as well as other complications, however, only a limited study are found. Hence, a survey with standard questionnaire was channeled among 2nd degree consanguineous families in randomly selected 39 villages of 17 districts of the country. Data regarding the degree of consanguinity, effect on offspring, public health status, extent of awareness, and medical history of the families were documented precisely. Data were analyzed using different statistical programs and compared with control subjects. In the studied samples, the prevalence of consanguinity was 9.02% ($n = 903$). Our findings revealed that infant mortality and abortion/miscarriage rates in the consanguineous families were 9.7% ($p > 0.0001$) and 11.8% ($p > 0.0001$) respectively, which is significantly higher compared to the controls. A number of genetic disorders were found to be predisposed with significantly higher prevalence in the consanguineous children than the normal controls. Very few people in our studied population were found concerned about the

burden of consanguinity. So far, this study gives a novel insight about the prevalence and impact of consanguineous marriage in Bangladeshi population, which will be helpful to build up awareness to mitigate consanguineous marriage and its related effects and most importantly, it essences a far more comprehensive study addressing this particular issue to understand the real scenario.

10. Diagnosis of plant parasitic nematodes from different tea estates in Sylhet city and their management by using some indigenous plant extracts

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Abstract

Tea is one of the leading cash crops in Bangladesh and makes significant contribution to the export economy of our country. Nematodes are roundworms in the Phylum Nematoda; some nematodes can harm tea plants cause economic losses in tea production. In this study, diagnosis of plant parasitic nematode by morphological and molecular methods, different parts of medicinal plant species were used as nematicide to control nematode in different tea garden of Sylhet city. Nematodes were extracted and recovered from soil samples using a modified Baermann funnel method. The extracted nematodes were identified under inverted light microscope based on their morphological characters which is mainly the presence or absence of stylet. Genomic DNA was extracted from nematodes of different soil samples. 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. As biological nematicide viz Castor (Ricinus communis L.) leaves, Arjun (Terminalia arjuna L.) leaves and barks, Datura (Datura metel L.) leaves and Tridhara (Tridax procumbens 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. The observed data showed that extracts from Arjun barks had significant killing the nematodes than the other plant leaves extracts ($p<0.001$). 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 plant parasitic nematodes is highly promising and this tree are available in greater Sylhet region. 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.

11. JunB protein as a candidate biomarker in cancer diagnosis and its therapeutical 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.

The primary goal of this pilot study is to find out a way of correlation analysis, how an oncogenic factor/protein expression level is influenced among different cancerous patients. And doing so, we aimed to assess on JunB as candidate target, which expressed ubiquitously under tight regulation in normal physiological condition. More importantly, JunB expression can easily be monitored at the blood sample; which, however, make JunB as an excellent target protein for comparison among cancer patients.

12. Isolation and Characterization of Collagen Types of Chicken 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 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 in open spaces can be minimized by this way. The isolation was carried out with extensive pretreatment of the skin that involves removing the fat content that amounts to approximately 50% of the total weight of the skin. 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. As previous researches indicated that type I and type III should be present in chicken skin, the selective salt precipitation was maintained in such way that these two types of collagen can be recovered from the extract of sample tissue. Type I and type III were precipitated at 2.5M and 1.8M at sodium chloride (NaCl) concentration. 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 ensures the intact secondary structure of the collagen. The total yield of collagen was found to be 1.357 gram per 100 gram of chicken skin which makes the broiler chicken skin of Bangladesh a potentially profitable source of collagen.

13. Development of simultaneous saccharification and fermentation (SSF) technique for production of bioethanol from potato peel and rice straw.

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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. Due to the high populations, 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 genarating value added products from zero value or hazardous products. Thus, the present research work focused on bioethanol production from waste potato peel- a potential renewable source as it contains a significant amount of starch)~28%(. Three key steps are involved in bioethanol production from potato peel- liquefaction of starch to dextrins, saccharification of dextrins to glucose and fermentation of glucose to 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(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 of rice straw can complete the picture and can scale up the process for large scale production.

Technical Session 3

Day 1 (27.09.2018); Time: 2:30 pm - 6:00 pm; Venue: Conference Room of IQAC, SUST

Session Chair: Prof. Dr. Kamal Ahmed Chowdhury, SOC, SUST

Resource Person: Prof. Dr. Abdul Awwal Biswas, ANP, SUST

Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

1. Implication of democratic local governance in building institutional trust: a study of Sylhet city corporation (SCC)

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Abstract

This study examined the relationship between Democratic Local governance (DLG) and institutional trust. The previous studies demonstrated that the low level of democratic governance in Bangladesh is highly correlated with the low level of institutional trust (World Bank 2010; Zafarullah and Siddiquee 2001, Knox 2009; Sarkar 2009; Moniruzzaman 2009; Quadir 2010; Kabeer 2003; Sobhan 1998). The previous studies examined general pattern of trust on different institutions ignoring the contextual factors, therefore this study was an attempt to understand the relationship between trust and DLG in the SCC context.

A sample survey was conducted among 398 voters of the SCC. Multi-stage random sampling technique was applied to draw sample for the study. The DLG and institutional trust were measured on a 5 points Likert scale and was converted to composite score. The scales were pre-tested and checked for reliability and convergence validity. The Cronbach's alphas indicate that all composites have satisfactory alphas (α=>.70). The correlation matrix shows that there is moderate correlation between all the independent variables ($p<0.01$). The correlation coefficient also suggests the convergent and discriminate validity of the research measures. Regression models were performed to examine the association between dependent and independent variable. The regression model explained 52% variation in the dependent variable and all the independent variables in the regression model are statistically significant ($p<0.001$).

The results imply that performance has the greatest impact on trust. A one unit increases in the performance indicator will result in 27% increase in trust on the SCC. Similarly, a one unit change in the councilors composite is associated with 12% changes in the trust on the SCC. The SCC needs to be more concerned with improving performance as way to enhance Institutional trust. Secondly, the councilors should emphasize on citizen concern, which includes listening the voice of ordinary citizens and careful in using public funds. Finally, emphasize should be given to change the staffs' behavior positively in dealing with citizens. Thus, the mayors and councilors roles are pivotal to change staffs' behavior and improve performance.

2. Level of people's participation and the question of real autonomy of upazila parishad in Bangladesh: challenges of devolutionary administration

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Abstract

Devolutionary administration was mainly introduced in local level of Bangladesh for ensuring proper peoples participation in the national decision making process and with the help of this system they can express their

demand and need in the local level and it combines the aptitude of local democracy with technical efficiency and gives local bodies' extensive decision making power and has to be accountable and responsive to local people. The Government acquires information about the challenges of the system from this study and brings an idea that the policies which are actually appropriate or need to change to make the system people oriented. The aim of this research project is to examine the level of people's participation and effectiveness of autonomy in real sense as a devolutionary administration at sub-district (Upazila) level of Bangladesh. Mixed research approach with survey method has been considered to identify the people's participation process in local level functions, decision making and scrutinize the position of sub district in context of autonomy. Qualitative data has been collected from the people's representatives and officials from two upazilas (UZP's) (Sylhet Sadar and Biswanath; randomly selected) under Sylhet district and quantitative data has been collected from the beneficiaries (service receivers of these two UZP's). Efficient people's participation at UZP can empower local people (82.31%). Peoples are mainly participating in the UZP activities indirectly by their elected representatives (83.10%) and have limited access to participate in the formulation, implementation and budgeting and have poor feedback mechanism (monthly meeting). In question of autonomy to take decisions and financial matter of UZP major portion of the respondents gave adverse comments. Sub district levels of Bangladesh have not financial autonomy thus they are continuously dependent on government grants for their development works. Inequality in service delivery, political pressure and biasness, less people orientation mechanisms, lack of accountability and transparency, lower autonomy in financial matter and decision making of people's elected representatives, centralized planning and budgeting system etc. are the main challenge to ensure UZP autonomous and make it people oriented. Implementing devolution of power in real sense at UZP by reducing the scope of central government influence and make people consciousness through civic orientation can ensure great level of people's involvement at Sub district level of Bangladesh and make it prosperous.

3. Ensuring Effective Health Care Service Delivery through Improving Health Information System at Rural-Local Areas in Bangladesh

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Abstract

The government of Bangladesh has developed a Health Management Information System (HMIS) department which is shortly called as "MIS-health" is one of the directorates of the Directorate General of Health Services (DGHS) under the Ministry of Health and Family Welfare (MOHFW) of the Government of the People's Republic of Bangladesh. This system works as the backbone of the e-Health service network of Bangladesh. Since 1980s, MIS-health was in existence to gather and provide health management information to the DGHS and MOHFW for policy and management decisions. With the present government of Bangladesh from 2009, MIS-health has been assigned additional responsibility to implement the Digital Bangladesh vision of the Government for the health sector of the country as a whole. The study attempts to explore the level of effective health service delivery system facilitated by better health information system at rural-local level of Bangladesh. Based on the research objectives, this study is based on exploratory and descriptive design. This study has been followed by social survey method and case study method. In this research, mixed approach (both qualitative and quantitative) has also been followed. This study has covered 150 respondents (from both Golapgonj Upazila and South Surma Upazila health complex) for data collection by stratified (non-proportionate) random sampling in case of service providers' and in case of service receivers' simple random sampling has been followed.Primary data has been collected by using semi-structured questionnaires, interview & case study schedule from the respondents and collected data has been analyzed by using Statistical Programme for Social Science (and Microsoft Excel. Secondary data collected from different published materials-books, articles, repots, and internet browsing etc. The study findings have revealed that health information system at upazila level health complex is moderately effective and the service receivers' are not satisfied with the service providing system of upazila level

health complex, but maximum of the service provider are satisfied to some extent also. The result shows that corruption; lack of government fund; unavailability of ICT tools; inadequate training facilities; unskilled manpower; absence of monitoring & supervision; insufficient infrastructural & logistics support etc are the obstacles ahead of ensuring an effective health information system. Finally, the study also comes up with some recommendations like-remove corruption, adequate ICT infrastructure & logistics support, training, adequate manpower, proper monitoring, access to information, formulation of appropriate policy framework etc to ensure better health care service delivery through improving health information system at rural areas in Bangladesh.

4. Trust in public institutions: understanding citizens' perception

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Abstract

This paper examines trust in public institutions along two dimensions: trust in political institutions, meaning political parties, politicians and the parliament and trust in the public service, meaning civil service, police, office of the Deputy Commissioner (DC), and the judiciary. The importance of trust has long been emphasized by social science theorists. Trust in public institutions implies that citizens extend positive expectations to the members of such institutions and assume that they follow procedures that will produce beneficial outcomes for themselves and for society at large. Trust between citizens and their government officials and elected representatives are a vital element of a well governed society that may provide a "governance capital" that gets citizens to cooperate with government. So, the sustenance and the legitimacy of political regime is based on trust. The analysis is based on a probability-based sampling survey conducted among 458 respondents in Sylhet City Corporation in 2018. A series of socio-demographic and contextual variables are modeled in an effort to explore their relative influence on citizen perceptions of trust is public institutions. The results from the binary logistic regression models indicated that the socio-demographic factors, such as age, religion, education, profession, and income were found to be significant predictors of trust in public institutions. In addition, those who had contact with the officials of public service showed a significantly higher level of trust in public service. Study also affirmed that citizens who are satisfied with specific public services generally have a higher level of trust in public institutions than citizens who are dissatisfied. Although a number of causes are responsible for citizens' negative evaluations of the government and their lack of trust. But trust can be restored when politicians serve the people, public servants change their colonial mindset and adequate accountability mechanisms are installed for their misdeeds, public sector institutions provide services without creating hassles to the citizens and charging extra money.

Key Words: Trust, Public Institutions, Political Institutions, Public Service, Citizens' Perception, Satisfaction

5. Life behind leaves: poverty, capability and social vulnerability of tea garden workers in Bangladesh

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Abstract

Bangladesh is one of the major tea producing and exporting countries in the world. The history of the establishment of tea industry in Bangladesh dates back to the British colonial era. Thousands of tea workers have been working in tea gardens and producing tons of tea annually which make a significant contribution to the government exchequer. The tea garden workers have been encountering enormous poverty and vulnerability for generations. Against this backdrop, this research aimed to investigate the underlying causes of poverty of the tea garden workers and explore their strategies to cope with poverty and vulnerability. We conducted the study

drawing on Sen's and Nussbaum's capability approach which deals with entrenched social injustice and inequality, especially capability failure resulting in discrimination or marginalization. Given the contexts of the tea garden workers, this approach is relevant to the proposed study which appropriately explains the capability failure of tea workers eventually resulting in poverty. We employed a triangulation of methods comprising in-depth interviews, focus group discussions (FGD), and Key Informant Interviews (KII) for the collection of data. A triangulation of methods for data collection was appropriate for ensuring the authenticity of data alongside the validity and reliability of the research. The study finds that the tea garden workers in Bangladesh encounter chronic poverty for largely capability failure in areas of food, clothing, shelter, education, health, political engagement, freedom of choice, property and security, social justice, and entertainment. The major findings include: The workers are extremely poorly salaried e.g. their daily income for eight hour workload remains only 85 taka (around $1) which does not suffice to maintain the minimal standard of living. The workers do not formally own any landed property. Even, the houses they dwell in are owned by the tea estates that forces them into bonded labor and further vulnerability. They are confined in a particular tea garden; they have hardly any freedom for seeking any jobs elsewhere beyond the garden. These conditions lead to their poverty and vulnerability with regard to daily life including diet and healthcare facilities of the family members, education of the children, social mobility, social relationship, entertainment, and so forth. The study also finds that the tea garden workers cope with hardships borrowing loans from neighbors, relatives and NGOs, and frequently purchase essential commodities to meet their immediate household needs from local groceries on credit which put them into a state of permanent debt and vicious cycle of poverty. In order to surmount the workers' poverty and vulnerability, we have made several policy recommendations in the concluding section. The study concludes with a fundamental question why the tea workers continue their jobs in the tea gardens for ages despite the long standing poverty and vulnerability which warrants a further study.

6. Non-structural flood management measures to support the Boro rice farmers of haor areas: a qualitative analysis

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Abstract

The food security of Bangladesh has been adversely affected by every major flood. The most recent early flood in haor areas washed away about 220 billion hectares of ready-to-be harvested 'boro' paddy. To develop sustainable solutions to this problem, the status and potential of existing non-structural flood management measures have rarely investigated, especially in haor areas. The study aimed to address the gap using qualitative case study research methods. In-depth interviews were conducted with twenty boro rice farmers and government officials in Sunamganj district. Farmers who received training from Upazila Agriculture Office were found aware of the maturity duration of rice varieties that would escape the flood. With regards to flood preparedness, farmers mostly use indigenous knowledge and seldom received flood forecast from formal sources. Farmers also reported that flood forecasting just before a week of occurrence of occurrence would not benefit them as they are dependent on labor-intensive harvesting. Awareness about flood insurance, land planning, and farmer's participation in flood management was found very low. However, government officials emphasized to plan suitable rice farming area so that flood water could be carried out to a low-lying area, which would save the paddy cultivated in relatively elevated grounds.

Keywords: Non-Structural Flood Management Measures, Boro Rice Farmers, Haor

7. Local government support project (LGSP): measuring the accountability, efficiency and participation at local level government

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Abstract

Local Government Support Project (LGSP) was started with piloting in 2007 at several districts in North Bengal of Bangladesh. It got a permanent face of six years (2011-2017) in all around the country. The development objective of the Local Governance Support Project for Bangladesh is to strengthen Union Parishads (UPs) to become accountable and responsive, supported by an efficient and transparent intergovernmental fiscal system. The project has four components which aim at strengthening the activities, ensuring accountability and transperency at loval level governmetn. Before the commencement of the project Union Parishods used to work with the direction of District level offices and the decision making process rarely involved the people who desire the expected development. Before LGSP, the financial governance lacked in accountability and transparency as the mobilization of money did not have any proper way and goal to its implementation. From the government side there were no accountability mechanism for such monetary activities, from people's side, there were no way of ensuring their participation. The chairmen were the unequivocal decision makers. Information of local functioning revolved around the chairmen and members of the related Ups. People had very little access to information and services on their wish. Thus a gap between the ruler and the ruled was created and stayed unchanged till the current LGSP. But with almost a total of 10 years of experience the questions rises on the accountability and transparency and level of mass participation in the activities and decision making process under the project. Aiming at the understanding and actual changes for LGSP at local level government, this work found that, the LGSP can be measured as an effective tool and technoque for strenthening local government, encouraging local participation, and ensuring transperencuy and accountability at local level government. But the the problems still prevail with the people that govern local people. Lack of education and understanding about development and importance of mass participation has been unwillingly denied by the local elite in almost every sphere of activities at local areas. This work bases on survey method. The population of this research is the Union Parishads of entire Sylhet District. There are 88 Union Parishads (UPs) here in Sylhet. But working with all the UPs are costly and time consuming. To save both money and time 10 UPs is selected randomly. Along with selectded UPs, core respondent from each UP, the people's representatives, mass people and people from different civil society organizations have also become interviewed. For qualitative data, FGDs has been conducted. For analysing the data, different techniques of descriptive statistics have been followed.

8. e-Governance: Ensuring access to information and services to the migrant workers

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Abstract

This work is a fundamental/basic research in the field of labour migration from Bangladesh. The study showed that the pattern and trend of labour migration from Bangladesh has been upward sloping since the establishment of BMET in 1976, and has been continuously contributing to the country's GDP on a large scale after RMG sector. The study has been undertaken at organizational and personal level over the years on migrants' status, their conditions and rights. However, research with the instruments and process of E-governance of migration from Bangladesh is not adequate. This study tried to understand the current system of migration governance of e-Governing process in the governing mechanisms for labour migration at grassroots level. Emphasis has been given on the scope of e-Governing process, opportunities and setbacks for e-Governing process for labour

migration. The study especially tried to find the way of e-Governance as substitute of traditional governing system of labour migration from Bangladesh.

This work followed blended methods. As a dual-impact research, both the supply and demand side were the major data points. Here, DEMOs were supply side and the service recipients were demand side. Service recipients belong to migrants and their left behind family members. Along with DEMOs officials and migrants, civil society members, local level community leaders, representatives of government and migration related NGOs have also become the respondents of this research. Since all DEMOs follow the same circular issued by BMET and their working procedure is almost same, purposive sampling technique has been followed to select DEMOs. Sample size and location have been selected from major migration prone areas, Sylhet and Moulavibazar. To collect qualitative data, interview schedules, formal meetings and focus group discussion have been conducted with the sampled DEMO. To collect quantitative data from demand side this study undertook survey method with a closed ended questionnaire.

Although the DEMOs are the only governing mechanism for labour migration at grassroots, the study found only four among 42 DEMOs in Bangladesh that provide digital or e-Governance services like taking fingerprint, online visa checking and job advertisements for migrants. Among other services including awareness campaign and skill development initiatives are to be seen very poor. The study provides ways how to enhance and ensure better services at the local level governing mechanism for labour migration without increasing manpower and expenses.

9. Learning Style Preferences of Undergraduate Learners in English Language Classrooms in SUST

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Abstract

The reason of this study was to identify the Learning Style Preferences of Undergraduate Learners in English Language Classrooms in SUST. A questionnaire was administered to 50 randomly selected students from the third year, second semester students of English department of the Shahajalal University of Sciences and Technology (SUST). The questionnaire prepared by Reid (1984) consists of thirty items of learning style preferences and is divided into six different learning styles such as visual, auditory, kinesthetic, tactile, group and individual styles. The items of the questionnaire are designed on a five-point Likert Scale ranging from *strongly agree* to *strongly disagree*. For collecting the qualitative data for the study the second section contains one open ended question to elicit the participant's opinion about their most commonly used learning styles. This dissertation comprises two published books and 13 journal articles published in the last thirty years that give information about different learning styles and their detailed description. At first the researchers describe the definition of learning style and dimensions of learning styles. Then they give different views on The Learning Style Inventory and its criticism along with Learning Modalities and also on the importance of identifying students' learning styles in Bangladesh. This research mainly focuses on identifying the learning style preferences of the undergraduate learners in English department of SUST.

10. The 'Silsilla'of enclave (re)settlement: exploring the problems and contemporary situation of Dashiyarchara enclave, Kurigram, Bangladesh

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Abstract

India and Bangladesh resolved the problem by exchanging 162 enclaves, through this concern of settling down the dispute of border line. Local residents get released from the 'Blocked condition'. 17160 acres' land of 111

enclaves had been included in the land of Bangladesh and 7110 acres' land of 51 enclaves had been included in border of India. On considering these issues, we focused on the linkage among 'Space', 'Nationalism 'as well as the 'Identity Politics 'among the residents of Dashiyarchara village, an obsolete enclave area of Bangladesh. This village is located in Fulbari Upazilla of Kurigram District. This research is an attempt to investigate the 'Silsilla' of the settlement 'Problems' and management of the enclave in the light of post structural perspective. In this study, we analyze the historical background in consider to current condition which various perspectives, explanations, struggles, power relation of various classified individual and institutions which discover how the perception become 'Discursive'. This research has been conducted through an ethnographic approach where the statement of various stratified group of people of obsolete Dashiyarchara area has been presented. In this case, participants are employed following sample technique by classifying the residents of Balatari village of Dashiyarchara enclave on the basis of land ownership, whose land area is between 0-5 bighas,5-10 bighas and more than 10 bigha has of landowners and their family members. Based on this observation and analysis, efforts have been made to evaluate the present situation of the residents of the obsolete Dashiyarchara area. Considering, these issues in concern, the illustration of this study has been followed by development, governmentality and bio power through critical analysis in the light of relevant theoretical ground.

Keywords: Enclave, Silsilla, Space, Nationalism, Identity Politics, Development, Governmentality, Bio Power

11. Arguing with the environmentalists: understanding the nature and dynamics of environmental government and movements around Ratargul Swamp Forest of Sylhet, Bangladesh

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Abstract

Environmental movement, particularly Chipkos or tree hugging movement are not the only suppositions through which South Asian environmental scholarship has developed but later it also built upon them in many traditions and stratums. Although, there is a long history of environmental movement to protect and conserve the natural resource along with the other parts of the world but very limited academic discussion around this issue in Bangladesh. This paper is an outcome of our research project funded by the University Research Centre of Shahjalal University of Science and Technology where we employed in-depth interview, FGD and case study as the primary research methods to investigate the nature and the dynamics of recent 'environmental movement' centred to Ratargul Swamp Forest of Sylhet. This paper actually tries to shed light on the effects of the environmental movement on the conservation of Ratargul Swamp Forest of Sylhet, Bangladesh. Since the exposure of Ratargul as a tourist place, this spot has been experiencing by over visits, uncontrolled tourism related activities, conflicts with local people and mismanagement that actually drives civil society organizations and local community to demonstrates their agitations and demands for protecting the site from the rapid damages and destructions. Here we try to explore and analyze the scope and nature of environmental movement that may shape the existing management. It is revealed that as a result of different movements, people of Ratargul villages are now more aware about the harmful activities of uncontrolled tourism and the forest department reshapes and reform the existing management (CREL) in response to the local and civil pressure but It is also revealed that CREL works as a means to make the on-going movement weak rather as a conservation strategy to protect the bio-diversity of Ratargul Swamp Forest.

Keywords: Environmental movement, conservation, sustainable development.

১২. দেশভাগ–উত্তর সিলেটের সংস্কৃতিক সংগঠন ও সাংস্কৃতিক আন্দোলন (১৯৪৭-২০১৫)

ড. নিলুফা আক্তার

বাংলা বিভাগ, শাহজালাল বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়, সিলেট। যোগাযোগ: //nilufa.akter_sust@yahoo.com//

সার-সংক্ষেপ

সমতট পাহাড় হাওড় অরণ্য আবৃত সিলেট ভূ-খণ্ডের আর্থ-সামাজিক রাজনৈতিক ইতিহাস যেমন বৈচিত্র্যময় তেমনি সংগ্রামপূর্ণ ও গৌরবমণ্ডিত। '৪৭ সালে দেশভাগকালিন সারা ভারতবর্ষের অধিকাংশ ভূ-খণ্ড, ভারত ও নব্য গঠিত পাকিস্তানের অন্তর্ভূক্ত হয় নীরবে, রাজনৈতিক মারপ্যাঁচে। কিন্তু সিলেট এক্ষেত্রে সম্পূর্ণ ব্যতিক্রম। তার প্রমাণ *Refarendum* অর্থাৎ *গণভোট।* বৃহত্তর ভারতবর্ষ পরবর্তীতে পূর্ববঙ্গের বিভিন্ন অঞ্চলের মধ্যে আত্মমর্যাদার প্রশ্নে সিলেট অঞ্চলের মানুষ বরাবরই অনেক বেশি স্পষ্ট ও সক্রিয়। পূর্ব ও পরবর্তী ইতিহাসের দিকে দৃষ্টি ফেরালেও এই ভূ-খণ্ডের মানুষের স্বাতন্ত্র ও অনন্যতার সুপ্রচুর প্রমান মেলে। পলাশীর যুদ্ধের মাত্র পঁচিশ বছরের মাথায় ১৭৮২ সালে বৃটিশ বিরোধী আন্দোলনে সর্বপ্রথম আওয়াজ ওঠে এই পূণ্যভূমি থেকেই। নেতৃত্বদানকারী ভাতৃদ্বয় *হাদা মিয়া* ও *মাদা মিয়া* ভারতবর্ষের স্বাধীনতার ইতিহাসে সর্বপ্রথম শহীদের মর্যাদায় স্বীকৃত। ১৯৫২ সালে রাষ্ট্রভাষা *বাংলা* প্রতিষ্ঠার প্রশ্নে পাক-শাসনের অন্যায়ের বিরুদ্ধে প্রথম প্রতিবাদ প্রকাশিত হয় *আল ইসলাহ* পত্রিকায় ১৩৫৪ বাংলার শ্রাবণ সংখ্যায়। পরবর্তীতে '৬০ এর দশকের স্বৈরাচার বিরোধী আন্দোলন, '৬৯ এর গণঅভ্যুত্থান, '৭১ এর মুক্তিযুদ্ধ, '৮০ এর দশকে এরশাদ বিরোধী আন্দোলন '৯০ এর গণতন্ত্র প্রতিষ্ঠার আন্দোলন এবং অতি সাম্প্রতিক যুদ্ধাপরাধীদের বিচারের দাবীতে জেগে ওঠা *গণজাগরণ মঞ্চ* এ আপামর জনতার কাণ্ডারী হয়ে সিলেটের সাংস্কৃতিক সংগঠনগুলো সংস্কৃতিচর্চার অপরিহার্য অংশ হিসেবে নানা সামাজিক, জাতীয়, বৈশ্বিক সাংস্কৃতিক আন্দোলনে তাৎপর্যপূর্ণ ভূমিকা রাখছে। সুতরাং এটি সুস্পষ্ট যে, সিলেট ভূ-খণ্ডের ইতিহাস-ঐতিহ্যের পথ ধরেই সে অঞ্চলের মানুষের সংস্কৃতির ভিত্তি গড়ে ওঠেছে।

সংস্কৃতি কী? এই বিষয়ে নানা মনীষীদের ব্যাখ্যা বিশ্লেষণ থেকে একটি সিদ্ধান্ত নেয়া যায়, সংস্কৃতি হল মানুষের আমৃত্যু বেঁচে থাকার লড়াইয়ে স্বত:উৎসারিত ও প্রয়োজনে পরিবেশ থেকে আহরিত মানবিক সৃজন এবং তার উৎকর্ষ সাধন। অর্থাৎ মানুষের যাপিত জীবনকে কেন্দ্র করে প্রবহমান ও দৃশ্যত-অদৃশ্য বিচিত্র জীবনাচরণ তার সংস্কৃতিবোধ। মানবচিত্তের সকুমারবৃত্তি বা ললিতকলা এই সংস্কৃতিবোধের অন্যতম অংশ যা মানুষ কে মানুষ থেকে মানবিক হয়ে উঠতে গুরুত্বপূর্ণ ভূমিকা পালন করে। ফলে মানুষ তার বিচিত্র সুকুমারচর্চার মাধ্যমে জাগতিক ও মানসিক জগতকে জাগ্রত রাখার সুতীব্র আকাঙ্ক্ষা ও দায়বদ্ধতা থেকে সংস্কৃতিচর্চাকে বাঁচিয়ে রাখায় মহৎ উদ্দেশ্যে গোষ্ঠীভুক্ত হয়ে গড়ে তোলে সাংস্কৃতিক সংগঠন।

সাহিত্যচর্চা সব অঞ্চলের সংস্কৃতিচর্চার আতুড় ঘর। এই ভূ-খণ্ডও এর ব্যতিক্রম নয়। সিলেটের সাহিত্যচর্চা সু-প্রাচীন ও সুসমৃদ্ধ হলেও সাংগঠনিক মর্যাদা এবং সাংস্কৃতিক আন্দোলনের পটভূমির বিবেচনায় নাট্যচর্চাকে প্রাচীনত্বের মর্যাদা দেয়া যেতে পারে। সুদূর অতীত থেকে গড়ে ওঠা সিলেটের নানা সাংস্কৃতিক সংগঠনগুলোর মধ্যে অন্যতম হচ্ছে– সাহিত্য, নাট্য, নৃত্য, সংগীত, কবিতা ও আবৃত্তি, ক্রীড়া ইত্যাদি। সিলেটের সংস্কৃতিচর্চার ধারায় এ অঞ্চলের সাংস্কৃতিক সংগঠনগলো নিজস্ব পরিমণ্ডলে সংস্কৃতিচর্চা ও আন্দোলনের মাধ্যমে অঞ্চল থেকে অনুশীলনের ধারা সৃষ্টি করে জাতীয় সংস্কৃতির প্রবাহকে গতিশীলকরণের সঙ্গে সঙ্গে বিশ্ব সাংস্কৃতিক আন্দোলনের সেতুবন্ধনকে দৃঢ়তর করতে নিরলস কাজ করে যাচ্ছে।

শিল্প সংস্কৃতি যখন সর্বগামী সার্বজনীন মাধ্যম হয়ে ওঠে তখনই তা মানব বন্ধনের মূল চালিকা শক্তি হতে পারে। সিলেটের বিভিন্ন সাংস্কৃতিক সংগঠনগুলো নানা সামাজিক, রাজনৈতিক বৈশ্বিক টানাপোড়েনের পরও ১৯৪৭–২০১৫ সাল পর্যন্ত নানা সময়োপযোগী, যুগপযোগী বিচিত্র সৃজনকর্ম ও অন্যান্য সাংগঠনিক কর্মপন্থায় এই গৌরবদীপ্ত সাফল্য প্রমাণিত। ফলে আজ সিলেটের সাংস্কৃতিক সংগঠনগুলো শুধুমাত্র বিনোদনধর্মী সংস্কৃতিচর্চার মাধ্যম না হয়ে দেশ ও দশের কল্যাণার্থে সাংস্কৃতিক আন্দোলনের মাধ্যমে বাঙালি তথা বাংলাদেশের ইতিহাস ঐতিহ্যের গুরুত্বপূর্ণ এবং গৌরবময় অংশীদার। বাঙালির আত্মজাগরণ গণজাগরণ এ মশালচির ভূমিকায় উত্তীর্ণ।

চাবিশব্দ: সংস্কৃতি, সাংস্কৃতিক সংগঠন, দেশভাগ, ভাষা আন্দোলন, স্বৈরাচার আন্দোলন, গণজাগরণ মঞ্চ।

১৩. সিলেটের তাম্রশাসন : ইতিহাস, সমাজ-সংস্কৃতি এবং ভাষা-সাহিত্য অনুসন্ধান

মো. জফির উদ্দিন, মো. মাসুদ পারভেজ

বাংলা বিভাগ, শাহজালাল বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়, সিলেট।

সার-সংক্ষেপ

পূর্ব-ভারতভূমির বরাক-সুরমা উপত্যকা ভারত-আর্য সংস্কৃতির একটি বিশিষ্ট কেন্দ্র হিসেবে প্রাচীনকালেই আত্মপ্রকাশ করেছিল, যদিও এই প্রাচীনত্বের সীমারেখাটা প্রশ্নসাপেক্ষ। এ-পর্যন্ত প্রাপ্ত পুরাণ ও শাস্ত্রগ্রন্থ, জনশ্রুতি ও কিংবদন্তি, সাহিত্যকীর্তি, ভ্রমণবৃত্তান্ত এবং তাম্রশাসনাবলি ও মুদ্রা তথা নানা প্রত্নতাত্ত্বিক নিদর্শনসমূহ সুদূর অতীতে আর্য-অস্ট্রিক-দ্রাবিড় ও মোঙ্গলীয় ইত্যাদি জনতাত্ত্বিক সংমিশ্রণ শ্রীহট্ট বা সিলেটের ভূগোল, ইতিহাস ও সমাজ-সংস্কৃতির ধারণাটি নির্দেশ করে। সূত্রমতে বৈশিষ্ট্যপূর্ণ ভৌগোলিক গঠনানুসারে অঞ্চলটি প্রাচীনকালেই আন্তর্জাতিক সভ্যতা-সংস্কৃতির সঙ্গে পরিচিত হয়ে স্বতন্ত্র বৈশিষ্ট্যপূর্ণ সাংস্কৃতিক পরিমণ্ডল গঠন করতে সমর্থ হয়েছিল। শুধুমাত্র সাংস্কৃতিক গুরুত্ব নয়, অর্থনৈতিক ও রাজনৈতিক ক্ষেত্রে শ্রীহট্টের উজ্জ্বল অংশগ্রহণও সর্বত্র সুবিদিত। তার বাস্তব প্রমাণ শ্রীহট্টে তাম্রশাসনাবলি। শ্রীহট্টের প্রাচীন রাজনৈতিক ও সমাজ-সাংস্কৃতিক ইতিহাস এবং ঐতিহ্য ও জীবনপ্রণালীর স্বাক্ষী হিসেবে এসব তাম্রশাসন খুবই গুরুত্বপূর্ণ। এ-পর্যন্ত প্রাপ্ত সিলেটের তাম্রশাসনগুলোর লিপিরূপ, লিপি-জটিলতা, দুর্বোধ্যতা, ক্ষয়ে-যাওয়ার কারণে অস্পষ্টতা, সংখ্যা-ভ্রম প্রভৃতি কারণে পাঠ বা পাঠার্থ নিয়ে বিতর্ক হয়; তারিখ নিয়ে তৈরি হয় নানা জটিলতা। কিছু ক্ষেত্রে সংখ্যা-ভ্রমের কারণে শাসন-প্রদানের সন-তারিখ নির্ণয়ও দুরূহ হয়ে ওঠে। তৈরি হয় নানা প্রতর্ক। শুধু তাই নয়, শাসনগুলোর পাঠকে কেন্দ্র করে রাজনৈতিক ও ভৌগোলিক ইতিহাস নিয়েও নতুন বিতর্ক তৈরি হয় । তা হলেও, অনেক গবেষক তাম্রশাসনাবলির কালবিচারসহ সমকালীন শ্রীহট্টের ভৌগোলিক ও প্রকৃতিক পরিবেশ অনুসন্ধানের সঙ্গে ভূ-রাজনৈতিক পরিস্থিতি, জন-অভিবাসন, ভূমি-ব্যবস্থাপনা, প্রশাসনিক বিন্যাস ও ধর্মীয় প্রতিবেশের চিত্র উদ্‌ঘাটনে আত্মনিয়োগ করেছেন। কিন্তু তাম্রশাসন

অবলম্বনে প্রাচীন সিলেট-ইতিহাসের পুনর্নির্মাণ কিংবা সমাজ-সংস্কৃতি এবং ভাষা-সাহিত্য নিয়ে গভীর পর্যক্ষেণ চোখে পড়ে না। অন্যদিকে তাম্রশাসনের ঐতিহাসিক মূল্যায়ন করতে গিয়ে অনেকে খণ্ডিতভাবে দু-একটি তাম্রশাসনের সাহিত্যবিচারও করেছেন। প্রসঙ্গক্রমে তাম্রশাসনের ভাষা প্রসঙ্গে আলোচিত হয়েছে সাধারণ ধারণা, যেমন ভাষার নাম, লিপি ইত্যাদি। সিলেটের তাম্রশাসনের কিছু কিছু পাঠ অজ্ঞাত ভাষার বলে পরিলক্ষিত হয় এবং ভাষার প্রকৃতি-বিচারে কিছু পাঠকে গবেষকরা ওড়িয়া এবং স্থানীয় বাংলা ভাষায় প্রভাবিত বলে মত দিয়েছেন। তবে এ-সংক্রান্ত বিস্তৃত আলোচনার অবকাশ পাননি কেউ এখনো। হয়নি এর ভাষাবৈজ্ঞানিক কোনও পর্যক্ষেণও। বর্তমান গবেষণায় তাম্রশাসনের আলোকে ও অপরাপর উৎসের তথ্য-উপাত্তের সমর্থন নিয়ে সিলেটের প্রাচীন-ইতিহাসের পুনর্নির্মাণ, সমাজ-সংস্কৃতি এবং ভাষা-সাহিত্যের অনুসন্ধানমূলক অনুবেদনের চেষ্টা করা হয়েছে।

14. Quality of community clinic health service delivery, Sylhet: Does management matter?

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Abstract

Community clinic (CC) is the lowest unit of health administration which provides basic health services to rural remote population in Bangladesh. Effective and efficient management is regarded as influential factor in delivering quality health services. This study deals with how various management tools and techniques are applied in operating quality of CC health services at remote areas in Sylhet Sadar upazila. This is mainly a qualitative study for understanding how managerial activities contribute to quality health care. In addition, quantitative data has been used for examining some critical issues of CC management and satisfaction of health services. In-depth interview(30), focus group discussion(20) and survey questionnaire(60) are used in the study for understanding the role of management and the quality of health care from the two selected union parishad in sylhet sadar upazila.The respondents for this study are health care providers, elected officials, committee members of CC and the community clinic service users.

The findings of the study show that insufficient responsibility of health officials are highly responsible to poor supervision and monitoring which lead to poor quality of health services. Moreover, local level coordination with community clinic stakeholders is not strong as required for effective health services which contribute to inadequate health care. In addition, lack of motivation for health officials because their job is project based, less incentive and have limited scope to be promoted higher post and position as well as for getting better facilities.

Quantitative data represent the opinion of respondents with regard to health service management, service satisfaction, and the quality of health care. This study finds that the reason of poor supervision is 32.20% for poor accountability, 20.03% for poor responsibility among other factors. Besides this, 51.7 % respondents claim that health care providers visit to CC monthly and 3.3% claim weekly. With regard to monitoring to CC health care, 23% express weak management, 22% poor initiative and 47% have poor understanding on monitoring management. With regard to response on health service satisfaction, 44% are satisfied with existing health service but 27.12% are dissatisfied with community clinic health services.

The study recommends effective decentralization, close supervision, adequate accountability and strengthening organizational and financial capacity of community clinic for promoting quality of health services.

15. Adaptation to climate change: role of social network in Hakaluki Haor 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.

Key words: Climate Change, Haor Basin area, Social Capital, and Climate Risk Adaptation

16. Water Diplomacy and the Water Sharing problem between Bangladesh and India: A study on the Teesta River.

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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 other 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.

Technical Session 4

Day 1 (27.09.2018); Time: 2:30 pm - 6:00 pm; Venue: SUST Research Centre

Session Chair: Prof. Dr. Akhtarul Islam, CEP, SUST

Resource Person:Prof. Dr. Mohammad Iqbal, IPE, SUST

Coordination: Prof. Dr. Md. Mizanur Rahman, CHE, SUST

1. Design and fabrication of a micro-respirometer to measure the short term respiratory quotient (RQ) of wastewater samples

Mohammad Shahidur Rahman and Nur Md. Robiul Hoque

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Abstract

Biological parameter analysis is an important issue in regard to biological treatment of wastewater. At present, biochemical oxygen demand (BOD) is being widely used as a unique bioactivity performance indicator in our local effluent treatment plants (ETPs). However, application of a special technology known as 'Respirometry' may be an important alternative in the operation and maintenance of wastewater treatment plants. The main objective of the study is to develop a low-cost wastewater micro-respirometer to determine some important respirometric parameters such as oxygen consumption rate (OCR), carbon dioxide evolution rate (CER) and respiratory quotient (RQ) of wastewater samples. The device was fabricated in a cost effective approach using locally available materials along with some commercial accessories to ensure serviceability and accuracy. The developed apparatus was comprised of two major parts, a reaction chamber and a measuring unit. The measuring section was equipped with a well type vertical volumeter to estimate the gas consumption and evolution in the attached reaction chamber. Validation of the newly fabricated respirometer was done by checking the repeatability of the test results using standard sodium sulfite deoxygenation method. The qualities of the wastewater collected from different municipal and industrial sources were characterized in terms of pH, total solid (TS), total dissolved solid (TDS) and chemical oxygen demand (COD) according to the standard analytical methods. Finally, five wastewater samples (both municipal and industrial type) covering low range COD were tested in the respirometer for three hours of incubation period to obtain respirograms for calculating OCR, CER and RQ under room temparature. Similar fashion of experiments were conducted with another five wastewater samples covering high range COD. Samples originated from a pharmaceutical industry under high range COD category had shown highest value of CER (180 mg/L.min) and the corresponding RQ was constantly above one. Under low range category domestic wastewater samples had shown the highest respiration rate. However, irregular pattern of RQ for some samples revealed that these were of mixed type composition. In most analyses CER was found higher than OCR because of the presence of anaerobic micro-organisms which regulated anaerobic respiration. However, using the device ETP personnel could make a rough idea about the type of influent wastewater and subsequent follow-up steps could be formulated and maintained through the continuous monitoring of respiratory quotient of the representing test samples collected from the plant.

2. Use of welded and trussed reinforcement in concrete beams

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Abstract

Generally, vertical rectangular stirrup is used to fit up the shear capacity of beam. The purpose of this research was to assess the behavior and strength of beams with different types of shear reinforcement and to suggest a

better alternative. In this study, a new type of inclined shear reinforcement, looking as truss, was introduced. Total four types of beam, i.e.Non-welded Rectangular Stirrup Beam (NRSB), Welded Rectangular Stirrup Beam (WRSB), Non-welded Warren Truss Beam (NWTB) and Welded Warren Truss Beam (WWTB) were used with a fixed dimension of 36 inch×6 inch×9 inch. Two #6 (diameter-20 mm) steel bars as bottom longitudinal reinforcement, two #5 (diameter-16 mm) bars as top longitudinal reinforcement, #3 (diameter-10 mm) bars as web reinforcement and a water cement ratio of 0.40 were used in all beams. Three different mix ratios, i.e. 1:1.5:1.5, 1:2.5:2.5 and 1:3:3 (by volume) were taken into consideration for concrete mixture. So, total 36 beams (4 types×3 mix ratios×3 beams for each category) were examined. The usage of total reinforcement in each beam kept same to observe the variation of result. From the test results, average strength enhancement of WRSB, NWTB and WWTB were found to be 17.6%, 14.9% and 34.2% for 1:1.5:1.5 mix ratio and 17.3%, 11% and 30.2% for 1:2.5:2.5 mix ratio, comparing with conventional NRSB. Almost identical result also found for 1:3:3. Evidently, Welded Warren Truss Beam was found to be the best alternative. A simplified equation for WWTB was also proposed. Based on the comparison of the test result and analysis it is concluded that, Welded Warren Truss reinforcement system can be used as alternative shear reinforcement in beams where high shear strength is required with a limited cross sectional area of the beams.

Keywords: *Beam, stirrup, strength enhancement, warren truss, welding*

3. Biogas production from co-digestion of hazardous tannery solid waste by mixing with primary and secondary sludge

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Abstract

Tannery industry is a leading export oriented sector in Bangladesh. It earns significant amount of foreign currency which contribute on our national economy. Leather processing units generate a large volume of waste of varying nature. In past most of the tanneries of Bangladesh were located at Hazaribagh in Dhaka city. Crude disposal of waste made the surrounding area of Hazaribagh unlivable. To save the environment and the nearby Buriganga river, a mega project comprising all the treatment unit of waste was taken by the Government for building a sustainable industrial estate in Savar. Presently by govt. pressure 101 tanneries of Hazaribagh has been shifted to Savar Tannery Estate and also in operation there. But the fact is that there is only a CETP unit for treating liquid waste now and the huge quantity of solid waste of tannery estate is being remain untreated and dumped here and there which ultimately polluting the environment. Now development of a sustainable solid waste management system is a prerequisite for creating sustainable Tannery Estate. An attempt has been made to analyze the present scenario of Savar Tannery Estate and also to find out an appropriate option for solid waste management. As the conventional energy sources are depleting day by day with rapid urban growth. Discovering energy from waste is becoming increasingly important for the sustainable development. A major portion of the solid waste from leather industry is fleshing which contains mainly fat, protein and residual chemicals such as lime and sulphide used in the unhairing process. The other tannery wastes are primary and secondary sludge from CETP of the estate. Experimental results showed that fleshing contains considerable amount of volatile solids (81.43%) which is amenable to generate biogas. Further characterization of raw materials showed that the C/N ratio of flehing (2.64), primary sludge (0.89) and secondary sludge (0.87) are very low. These characteristics were not suitable for using them as substrate for anaerobic digestion, for this reason all wastes were mixed with cowdung as co-substrate to increase the C/N ratio. For this study set up of six laboratory scale reactors were done. To study the potentiality of gas generation from tannery wastes, six different laboratory scale reactors with different proportion of substrate were operated for 30 days of digestion period at room temperature 30°c ±3 and the pH of the slurry was maintained by the process itself. A comparative study was carried out in two different trials. The inoculums were synthesized by the cowdung and water in the laboratory in the same environmental condition taken for the study. The performance of anaerobic co-digestion of tannery solid wastes

has been evaluated in terms of VS destruction, biogas yield and COD destruction rate. Among all the reactors R3 reactor of second trial showed favorable trend of biogas production. Fleshings (300gm) were mixed with PS and SS at 1:1 basis where PS and SS were at 70:30 ratio. 20% of working volume of the slurry was cowdung there. In terms of volatile solids fed yield of gas generation of R3 reactor in the second trial was observed 0.025 l/g which was quite low. VS destruction rate was observed 28% there. COD removal was observed 27% after 30 days of digestion period which was considerable. The study has shown some indications on gas generation potentiality of tannery wastes. But for conclusive results further research is necessary in this field.

Key Words: Primary Sludge (PS), Secondary Sludge (SS), Anaerobic Digestion, Volatile Solid (VS), Biogas Production, Savar Tannery Estate (STE), Central Effluent Treatment Plant (CETP).

4. Evaluation of environmentally sustainable manufacturing practices and their effect on competitive outcomes

Syed Misbah Uddin*, Chowdury M. L. Rahman, Nahian Ismail Chowdhury, Md. Parvez Shaikh, Fayeq Al-Amin

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Abstract

In today's competitive market providing products only in low cost and high quality is not enough. Environmental concern in manufacturing is also an important issue now. To attract investors and customers organizations need to practice environmental manufacturing. This study is focused to present the relationships between some specific environmental manufacturing practices and their relative specific competitive outcomes in the important and vast industry of garment's knitting sector in Bangladesh. Although there are several studies on the impact of environmental practices on the organizations outcomes but they are less construable due to many limitations. This study explores the environmental manufacturing practices under two categories pollution prevention and product stewardship and shows their relative competitive outcomes and establishes the relation between them. Based on the surveys and research it is found that some competitive outcomes are positively affected by some of the practices. These findings are believed to motivate the companies to turn towards the green manufacturing.

Keywords: ECM, Competitive outcomes, Knitwear, Pollution prevention, Product stewardship.

5. Prediction and validation of oxygen transport in organic liquids

Mohammad Nurunnabi Siddique[1], Md Abdullah Al Mamun[2]

[1]Dept of CEP, SUST. [2]Dept of MAT, SUST

Abstract

Not Submitted

6. Recycled polymer based lightweight and energy efficient building materials

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Abstract

The rapid urbanization and industrialization all over the world has resulted in large deposition of waste polymer materials. Although few amount of the post consumer waste polymer materials are being recycled, huge amount of waste polymer materials especially, polystyrene (EPS) based packaging materials are mostly abandoned. These

waste polymer materials cause problems like clogging in drainage system, land infertility, wastage of resources and environmental pollution. As an important waste material in terms of environmental pollution, this material has to be recycled and re-economized. Expanded polystyrene (EPS) has very lightweight and thermal insulation properties. Utilization of waste EPS as construction material is important both in terms of its contribution to economy and as a solution to environmental solution problem. This study focuses on the use of EPS in the concrete composition as a partial replacement of conventional aggregates (sand and stone chips). A series of concrete specimens have been prepared using various contents of the EPS as a partial replacement of aggregates following standard method. The effect of EPS aggregates on the physical, mechanical and thermal properties of the concrete specimens has been studied. Concrete specimens have been prepared using 10-70 vol% of recycled EPS by replacing aggregates (sand and stone chips). The prepared specimens have been evaluated on the basis of Mechanical (compressive strength), thermal (thermal conductivity, heat flux) and physical properties (water absorption) following standard methods. Porosity of the specimens are determined from water absorption data. An apparatus has been designed and developed under this study to measure thermal conductivity of the specimens in the laboratory.

The experimental result shows that addition of EPS reduces thermal conductivity, heat flux, and density significantly. It is found that incorporation of only 10 vol% of EPS reduces thermal conductivity 3 times compared to standard specimens (containing no EPS). Heat flow rate through the concrete specimens decreases with the EPS content, addition of 10 vol% of EPS reduces heat flux about 35% compared to standard specimen. However, incorporation of 10 vol% EPS reduces compressive strength 28% compared to standard concrete specimens. Addition of EPS in the concrete composition decreases water absorption of the specimens due to hydrophobic nature of EPS. The result suggests that recycled EPS have the potential to be utilized in the concrete composition that will minimize the environmental impact and maximize thermal insulation properties of the building materials that will result significant saving in heating and cooling energy of a structure.

7. Biofuel (Biodiesel) production from Microalgae as a feedstock

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Dept. of CEP, SUST

Abstract

Not Submitted

8. Post-consumer PET bottle recycling: chemical dose optimization

Md. Shahadat Hossain, Mohammad Rakib Uddin

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Abstract

Polyethylene terephthalate (PET) bottles are using in our daily life and consequently go to the landfills after their use. Additionally, virgin PET resins are produced from nonrenewable resources such fossil fuels which reserves are depleting continuously. Therefore, to maintain ecological and environmental balances as well as for sustainable development, post consumer PET bottles should be recycled. Among many recycling processes, mechanical recycling of post consumer PET is attractive due to lower cost involvement. One of the most crucial and important processes of mechanical recycling is hot washing for contaminants removal. Hot washing uses a cleaning solution made of caustic soda and detergent at elevated temperature. In this paper, caustic soda and detergent doses were changed gradually to investigate effective contaminants removal through colorimetric study. Finally, concentration vs. absorbance graphs from colorimetric study suggests that 2% caustic soda and 2% detergent is the optimum chemical dose at hot washing for post consumer PET recycling in Bangladesh.

9. Tailoring the photocatalytic efficiency of laboratory made activated carbon doped thermally treated commercial ZnO photocatalyst on Rhodamine-B

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Abstract

One of the largest groups of pollutants released from the textile and other industrial processes containing in the industrial waste water are organic dyes. As an advanced oxidation process, semiconductor photocatalysis has profound efficiency to remove persistent organic dyes and microorganism. In this study, our laboratory made activated carbon (AC) doped thermally treated commercial ZnO photocatalyst was used to degrade industrial Rhodamine-B (RB) dye. For our specified reactor condition, the optimal catalyst dosage is 0.16 gm ZnO to degrade 20 ppm 200 ml Rhodamine-B and it was considered as a standard one throughout the study. The effect of thermal treatment and doping on the efficiency of ZnO photocatalyst was also evaluated. It was found that commercial ZnO calcined at 500°C and then doped with AC showed better efficiency to degrade RB under UV and Visible light. It also revealed that our laboratory made AC doped thermally treated commercial ZnO photocatalyst could be a promising one to degrade RB. The experimental data were then fitted into four kinetic models: Zero order, Pseudo first order, Parabolic diffusion and Modified Freundlich models and the data were fitted well into the Modified Freundlich Model.

Keywords: ZnO, Activated carbon, Photocatalyst, Rhodamine-B dye, Kinetic models.

10. Enhancement of CO_2 capture and storage (CCS) process leads maximize pure CO_2 production from flue gas.

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Abstract

This works exhibit an investigation of the continuous absorption of carbon dioxide into aqueous solutions of Monoethanolamine (MEA), Diethanolamine (DEA), Chilled ammonia and other blended solvent Piperazine (PZ), Methyl-di-ethylamine (MDEA), Amiono-methyl-propanol (AMP) with MEA and DEA. The use of amine solvents for CO_2 capture has been investigated using process simulation programs called ASPEN PLUS. The main of this study is to build preliminary design and solvent selection for carbon dioxide capture process. Different process factors are selected and studied in order to see their effects on process performance. In this simulation process, CO_2 reacts with the basic aqueous Alkanolamine solution via an exothermic, reversible reaction in an absorber. The effects of temperature, the flow rate of amine and stage on absorption efficiency were studied. Studied shown that, CO_2 absorption increased when lean amine flow increased. The CO_2 capture efficiency was greatly influenced by the number of stage applied in an adsorption process; increased with increasing the stages. Applying blended solvent system; any solvent in MEA decreased the CO_2 capture efficiency while mixed with DEA increased the efficiency. Blending of 5% other solvent with 25% DEA showed the maximum (more than 99%) CO_2 absorption efficiency.

11. Design and Development of a Security System using Renewable Energy and Its Feasibility Study

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Abstract

The demand of energy is growing rapidly, and the countrywide concern is to increase the production of energy to satisfy the demands for its inhabitants. In line with the Government's approach, therefore, public and private sectors are investing a notable amount to keep a sign for the enhancement of renewable energy use in power sector. The academic buildings of state owned universities, colleges, government offices have a wide spread space which is currently unused. These abundant roof-top spaces can be used for solar based power generation, which is sufficient to meet up the demand of on-grid power consumption. This research, is therefore, focuses on the design and development of solar power-based lighting and security system for the Department of Industrial and Production Engineering at Shahjalal University of Science and Technology, Sylhet, Bangladesh, to provide sufficient lighting and a visual security for the department at off-grid power state, and to demonstrate other feasibility conditions as the power can be used for altered systems. A design with every detail of a lighting and visual security systems for the aforestated department based on solar power has been completed. As a part of this research, the installation has already been accomplished with six CC camera based visual security system (One database storages and monitor) with suitable lighting facilities (15 bulbs in the corridor) has been mounted in the corridor of the Dept of IPE, SUST. Till now the system is in under observation in order to identify the barrier present in the designed renewable energy-based security system. The lights glow at night which are completely detached to the on-grid power line. During the vacation period, only the off-grid power system worked in the floor, and the cameras were in full running condition. Now, it is now proved that the system developed can run only with the off-grid power system. The long-term sustainability checking is under investigation. After investigation, it will be clear that the project might fulfill the long-term sustainability as well as it will be effective for the university campus. From the research it is also demonstrated that the arrangements based on renewable energy source is easily possible for the whole university campus in order to minimize the use of ultimate on-grid power consumption. The imminent system is designed based on photovoltaic power source as primary demonstration of the long-term sustainability in terms of energy consumption, effectiveness, use, pay-back period, etc.

12. Improvement of nitrogen (ammonium, nitrite and nitrate) removal from wastewater through nitrification and denitrification

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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 is essential for denitrification and enhanced the nitrogen removal efficiency through the increasing the conversion rate of nitrate to nitrite and then to nitrogen gas. In the model simulation studies, it was confirmed that X_{AOB} has the high oxygen affinity of then X_{NOB} and at very low oxygen concentration, X_{NOB} was outcompeted by X_{AOB}. The anoxic

heterotrophs on nitrite ($X_{H,NO2}$) and anoxic heterotrophs on nitrate ($X_{H,NO3}$) were completely outcompeted by aerobic heterotrophs ($X_{H,O2}$) at high oxygen concentration. At low organic substrate concentration all the heterotrophs were outcompete and only X_{AOB} and X_{NOB} were present. The activities of anaerobic heterotrophs on nitrite ($X_{H,NO2}$) 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 X_{AOB}. 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

13. Semiconductor photocatalytic process: a sustainable technology for the treatment of textile dye containing wastewater

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Abstract

Development of clean waste treatment methods avoiding the use of tricky materials and the formation of polluting by-products still remains a key environmental issue at the global level. One of the most promising alternatives is the photocatalytic decomposition of organic wastes by using semi-conducting oxide nanoparticles as catalyst. However, this approach still suffers from some limitations due to the fast recombination of the photogenerated electron-hole pairs hampering industrial applications of photocatalytic techniques in the decomposition of contaminants in water and air. In this context, we have focused our attention on developing heterostructure zinc oxide/tin Oxide (ZnO/SnO_2) photocatalysts. The target heterostructure was prepared by polyol method using zinc acetate as the precursor for ZnO and tin tetrachloride as precursor for SnO_2. The resulting photocatalysts were characterized by X-ray diffraction (XRD), FTIR and scanning electron microscopy (SEM). The results showed that the heterostructure SnO_2/ZnO photocatalyst mainly consisted of wurtzite ZnO and cassiterite SnO_2 nanoparticles. It was found that the size of crystallite of ZnO significantly increased and aggregated with calcination whereas there was no appreciable change in the crystallite size of SnO_2 with calcination. The photocatalytic activity of the as-prepared photocatalysts was investigated by degrading methylene blue (MB) dye. The photocatalytic decomposition of methylene blue in solution under UV light irradiation revealed that the heterostructure ZnO/SnO_2 photocatalysts catalyst led to higher activities than pure ZnO and SnO_2. This higher photocatalytic activity was rationalized in terms of higher charge separation achieved by the heterostructure ZnO/SnO_2 nanocatalysts related to the suitable band alignment of both components. The results also showed that the pH of solution had a direct influence on the photocatalysis process and basic pH was favorable for the degradation of MB. Thus, the above results suggested that the as-prepared ZnO/SnO_2 nanoparticles can be applied as a promising photocatalyst for the treatment of organic containing wastewater.

Keywords: Nanoparticles, heterostructure ZnO/SnO_2 photocatalyst, photodegradation.

14. Fresh water bearing zone identification using VES at Shahjalal University of Science and Technology Campus, Sylhet, Bangladesh

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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.

15. Conversion of Waste Plastics into Liquid Fuel by Pyrolysis

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Abstract

Plastic is an indispensable piece of our everyday life. Its production and application has 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 450^0C to 650^0C. Pyrolysis process of LDPE gives its maximum yield of 80.55% at 550^0C 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.

Technical Session 5

Day 2 (30.09.2018); Time 10:00 am – 1:15 pm; Venue: SUST Research Centre

Session Chair: Prof. Dr. Md. Elias Uddin Biswas, Treasurer, SUST

Resource Person: Prof. Dr. Md. Sajedul Karim, MAT, SUST

Coordination: Prof. Dr. Md. Zakir Hossain, STA, SUST

1. Developing a comprehensive corpus for Sentiment Analysis in Bangla Text

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Abstract

Corpus is a large collection of texts. It is a body of written or spoken material upon which a linguistic analysis is based. A corpus provides grammarians, lexicographers, and other interested parties with better descriptions of a language. Computer-processable corpora allow linguists to adopt the principle of total accountability, retrieving all the occurrences of a particular word or structure for inspection or randomly selected samples.

We already build a 20000 Bengali single line and multiline sentiment tag dataset from popular blogging websites, news article comments, Social network user comments and tagged each of the comments to either positive or negative or neutral by taking opinions from different types of people by surveys. This corpus is already functional and we are collecting more tagged data from different university students. Already prepare a conference article on sentiment analysis which will be submitted to upcoming IEEE conference in Bangladesh. we tagged each of them with more precise tag such as like, smile, blush, rocking, love, wow, haha, consciousness, protestant, bad, shocking, evil, skeptical, angry, fail, sad, provocative. We separated our whole dataset into different subsets specially three subset of positive comments, negative comments and neutral comments by taking their opinions into considerations. We are aiming for another 100 people specially the students of different public and private university to participate in our surveys and data collection process, so that our corpus could perform better in terms of accuracy and precision.

2. SUST Virtual Tour

Biswapriyo Chakrabarty, Mohammad Shahidur Rahman
Dept. of CSE, SUST

Abstract

Not Submitted

3. Automatic access system using biometric recognition

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Abstract

Fingerprint is used for unique identification of any person. "Finger Print Based Attendance and Door Lock-Unlock System" can be used for higher security in different offices or institutions. We did this project for a computer lab in Shahjalal University of Science and Technology. We took the fingerprints of the students who are given access to the lab and the fingerprints are stored in the internal memory of fingerprint scanner. At the same time the

information of each student was taken and we kept the information in the database of the server. When a student presses finger then the system compares the input fingerprint with the fingerprints that are stored in the internal memory of the scanner. If the input fingerprint matches with the stored fingerprints, it prints "Allowed" and the Id no. of the student on the screen and the door is opened as well as the entrance time is sent to the server through wi-fi module.

Keywords: Fingerprint, Fingerprint Scanner, Server, Micro-controller, Door locker, Wi-fi module, HTTP request.

4. Multipurpose automated guided vehicle (AGV)

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Abstract

Autonomous mobile robots are a highly important field of interest, not only for science but also for industry or developers of household appliances. Within the near future, our world will see such many service robots that could do surveillance or rescue tasks in dangerous environment or which simply help us in daily household activities. Precious laboratory equipment can be saved from getting stolen by mapping the laboratory condition in a periodic manner. In this research, we developed an autonomous robot that can take images of any room by using LIDAR and can navigate all around the floor. By utilizing this technology; many autonomous expeditions can be performed. It can be used as a disaster management tool by exploring a broken down building or risky anti-terrorist operations. This reduces the chance of severe injuries if human interaction is applied. On the other hand, this robot can work as a patrol-bot around a guided place of interest. In this report we described the detailed processes followed to build this robot; hardware used; software implemented and assembly of the whole system as a functional robot. The system incorporates an user friendly UI software where we can track the mapping process. The system utilizes rechargeable power bricks which makes it a stand-alone system. Flexibility, portability, scalability and the user friendly UI are the main perks of our designed system.

5. Affect of spatial and temporal discretization in the numerical solution of one-dimensional variably saturated flow equation.

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Abstract

Numerical solution of the Richards' equation in variably saturated-unsaturated soils continues to be a challenging task due to its highly non-linear behavior. This is particularly true as soils approach saturation and the behavior of the fundamental partial differential equation changes from elliptic to parabolic. In this work, a general numerical algorithm in the context of finite element scheme is developed to solve Richards' equation, in which pressure head based scheme is proposed to approximate the governing equation, and mass-lumping techniques are used to maintain stability of the numerical simulation. Adaptive time stepping approach is implemented in the Picard and Newton linearization schemes. The robustness and accuracy of the numerical model were demonstrated through simulation of two difficult tests, including sharp moisture front that infiltrates into the soil column with time dependent boundary condition and flow into a layered soil with variable initial conditions. The two cases presented highlight different aspects of the performance of the two iterative methods and the

different factors that can affect their convergence and efficiency, spatial and temporal discretization, convergence error norm, time weighting, conductivity and moisture content characteristics and the extent of fully saturated zones in the soil. The accuracy, mass balance character and iteration efficiency of Picard and Newton schemes is compared using different step sizes and spatial resolutions. Results showed that the developed scheme is robust and accurate in simulating variably saturated flows and outcomes of some hydrologic process simulations are affected significantly by the spatial and temporal grid scales. Hence it is suggested that the method can be effectively implemented and used in numerical models of Richards' equation.

6. English to Bangla neural machine translation

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Abstract

In this era of globalization, interaction between speakers of different languages continues to increase, the ever present problem of language barriers must be overcome. Machine translation (MT) research field works with the vision of removing this language barrier. Significant improvements have been achieved in MT over the past few years, mostly motivated by the appearance of neural machine translation (NMT) technology, which is currently considered the best way to perform MT of natural languages. Our research focus is to build neural models and resources for a NMT system from English to Bangla. NMT systems always need a good amount of quality sentence by sentence aligned parallel data for the system training. The good amount of quality monolingual and parallel data helps in producing better quality translation results. This thesis focuses on the strategies to build monolingual corpus for Bangla and parallel corpus for English and Bangla. One of the difficulties NMT systems face are differences in word order. When translating from a language with rather fixed Subject-Verb-Object (SOV) word order, such as English, to a language where the preferred word order is dramatically different, such as the Subject-Object-Verb (SOV) order of Bangla, the system has to learn long-distance reordering of the words. Higher degree of freedom of the word order of the target language is usually accompanied by higher morphological diversity, i.e. word affixes have to be generated based on the fixed word order in the source sentence. This thesis addresses these two classes of problems here and discusses the steps required to develop a baseline system using NMT technology.

7. Optical and electronic properties of semiconducting polymers for organic photocells

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Abstract

The active films of high-efficiency OPV devices are comprised of electron donor (D) and electron acceptor (A) species, a bulk-heterojunction (BHJ) device. Exciton dissociation at donor–acceptor heterojunctions is one of the key processes that determine the energy conversion efficiency of organic photovoltaic cells. Evidence for photoinduced electron transfer from the excited state of a conducting polymer onto buckminsterfullerene, C_{60}, is reported. [1] After photo-excitation of the conjugated polymer with light of energy greater than the π-π* gap, an electron transfer to the C_{60} molecule is initiated.

The optical absorption, optical excitation and the photoluminescence spectra of poly(3-hexylthiophene) (P3HT), small band gap fullerene (C_{60}), poly{[N,N'-bis(2-octyldodecyl)naphthalene-1,4,5,8-bis(dicarboximide)-2,6-diyl]-alt-5,5'-(2,2'-bithiophene)} (N2200) and blends of donor P3HT and acceptor C_{60} or N2200 were measured at room

temperature. The photoluminescence (PL) spectra of the blends are used as an indicator of how well excitons can diffuse to a donor-acceptor interface. PL quenching parameter (q) for P3HT/C_{60} blends at different concentrations were obtained. It is found that quenching is increased with concentration of C_{60} which implies enhanced exciton dissociation.

REFERENCES: 1. Savoie, B. M., Jackson, N. E., Chen, L. X., Marks, T. J. & Ratner, M. A. Mesoscopic features of charge generation in organic semiconductors. Acc.Chem. Res. 47, 3385–3394 (2014).

8. Status of the quantum information near black holes due to wigner rotation

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Abstract

We have represented special and most general Lorentz transformations. The velocity addition formula for special and most general Lorentz transformations are clearly explained. We have derived the formula of Wigner rotation in two different ways. We have calculated the numerical values of Wigner rotation for different cases. The graph of the Wigner rotation with respect to different velocities has plotted. We have explained the different types of black holes on the basis of their mass, magnetic field and spin. The line element of the Schwarzschild black hole has been derived. The line elements of Schwarzschild de- sitter black hole, Schwarzschild Anti-de sitter black hole, Kerr black hole, Kerr de sitter black hole, Kerr Anti-de sitter black hole, Reissner-Nordstrom black hole, Reissner-Nordstromde- sitter black hole and Reissner-Nordstrom Anti-de sitter black hole has been introduced. Rapidity is a hyperbolic angle that differentiates two frames of reference in relative motion. We demonstrate how this space can be calculated to get various effects resulting from the successive application of non-collinear Lorentz boosts and the relativistic addition of non-collinear velocities. We have also observed the relation between rapidity and velocity of a moving particle. The Wigner rotation for a curved space time has also explained. Using the expression of Wigner rotation for curved space time we can observe the status of the Wigner rotation near the event horizon of Black Holes.

9. Elongated dependence of the c axis on the critical concentration of x in $Ni_xZn_{1-x}Cr_2O_4$

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Abstracts

Strong magneto-structural coupling in the spinel structure of $Ni_xZn_{1-x}Cr_2O_4$ results in rich behaviors such as the co-operative Jahn-Teller (JT) distortion and the spin liquid state. The $Ni_xZn_{1-x}Cr_2O_4$ system has both interactions. These compounds are normal cubic spinel with a space group $Fd\bar{3}m$ above 310 K for $NiCr_2O_4$ and at above 12 K for $ZnCr_2O_4$. In the normal spinel structure, such as $NiCr_2O_4$, magnetic Ni^{2+} ion occupy A-sites, that is the tetrahedral sites, and magnetic Cr^{3+} ions occupy B-sites, that is octahedral sites. The B-sites in the spinel structure form a network of tetrahedral sharing involving their corners. Consequently, magnetic Cr^{3+} (S=3/2) ions on the B-sites are geometrically frustrated with respect to the antiferromagnetic interaction between the nearest neighbors. So even the Curie-Weiss temperature θ of $ZnCr_2O_4$ is -390 K indicating strong antiferromagnetic interaction, yet chromium spins remain in a paramagnetic phase down to about 12 K. Since Cr^{3+} ion in cubic crystal is not a JT ion, that is, the ground state of Cr^{3+} has no orbital degeneracy, $ZnCr_2O_4$ distorts to break the symmetry of the degenerated frustrated spin states by the spin-Peierls-like phase transition. Experimental results of low temperature X-ray diffraction (LTXRD), Y. Xue et al. showed that below the transition temperature, the profile of (800) Bragg reflection splits into two peaks with the lower angle peak having intensity twice that of the

higher peak. The crystal distorted from cubic to tetragonal with c < a with space group $I4_1/amd$. However, frustration driven magnetostructural coupling is not expected in the ferrimagnetic spinel $NiCr_2O_4$. This is because Ni^{2+}-O-Cr^{3+} interaction can be stronger than the frustrated interaction between the Cr^{3+} ions. Furthermore, JT ion Ni^{2+} can cause tetragonal distortions that should further alleviate frustration in the Cr^{3+} sublattice. Low temperature structures and magnetic spin structures of $NiCr_2O_4$ have been studied by many authors. At 310 K co-operative JT distortion occurs with the lowering of the structural symmetry from cubic ($Fd\bar{3}m$) to tetragonal ($I4_1/amd$). Measurement of heat capacity, magnetic susceptibility and X-ray diffraction (XRD) show that the JT phase transition of $NiCr_2O_4$ compound occurs at T_S= 310 K with the elongated NiO_4 tetrahedron along the c-axis that is c > a giving rise to the tetragonal structure with space group $Fd\bar{3}m$ to $I4_1/amd$. In the tetragonal phase, the lattice constants ratio c/a > 1, in contrast with $ZnCr_2O_4$. Ishibashi and Yasumi reported another magnetic transition in $NiCr_2O_4$ at 31 K. With the substitution of nonmagnetic Zn^{2+} ion in addition to magnetic Ni^{2+} ion in $NiCr_2O_4$, the magnetic interactions can be weakened and also the geometrical frustration can be enhanced. Study on $Ni_xZn_{1-x}Cr_2O_4$ system shows that the JT and magnetic phase transitions depend on the Ni concentration. In $Ni_xZn_{1-x}Cr_2O_4$ system, $ZnCr_2O_4$ and $Ni_{0.5}Zn_{0.5}Cr_2O_4$, already published. $Ni_{0.5}Zn_{0.5}Cr_2O_4$ shows the transition temperatures at T_S= 20 K and T_c = 16.5 K respectively. We are interested to measure the critical concentration at which the c axis starts to elongate. For this purpose we have made samples $Ni_xZn_{1-x}Cr_2O_4$ with x = 0.2, 0.3, 0.4 0. and 0.6. Now, Powder X-ray diffraction (XRD) pattern at room temperature will be performed to confirm the crystal structure.

10. Non-monotonic potential description of the cross-section, vector and tensor analyzing powers of the $^6Li+^{12}C$ elastic scattering at 30 and 50 MeV

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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 $^6Li+^{12}C$ 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 [Bruekner et al., Phys. Rev., 168 (1968) 1184] using a realistic two-nucleon potential 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 incompressibility K.

11. Mathematical Modeling and Analyzing of Transmission Dynamics of Dengue and Chikungunya in Bangladesh

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Abstract

Dengue and chikungunya diseases are one of the major public health problems in Bangladesh. Recently, 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 only done by the empirical way. 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 transition of dengue and chikungunya diseases. Nonlinear incidence rates are considered for the disease transformation 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 will be performed based on the data collected from several health institutes of Bangladesh. Both analytical and numerical results will give a mathematical analysis about the dynamics of the both diseases throughout the country.

12. Numerical Simulation of Non-Newtonian Blood Flow through Stenosed Artery

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Abstract

Blood is a constantly circulating body fluid in humans and other animals. Blood circulation in the body delivers necessary substances to the cells. However, blood flow is disturbed while plaque is deposited in artery which is widely known as arterial stenosis and the parameters of blood flow may affect significantly in presence of stenosis. This work aims to study the effects of Reynolds number on blood flow with spiral velocity through regular arterial stenosis. In addition numerical simulation of pulsatile blood flow through symmetric artery with multiple stenoses is also performed. To investigate the effect of spiral blood flow in artery due to stenosis with varying Reynolds numbers (*Re*), the simulation has been performed by using the standard *k-w* model and artery has been created with a single stenosis of 75% cross-sectional area reduction. Blood has been treated as a non-newtonian fluid and numerically modelled by using the well-known Carreau model. Parameters of Carreau model have been chosen in a manner to establish a reasonable non-newtonian phenomenon. To simulate pulsatile transitional blood flow through symmetric stenosed arteries with different area reduction similar method is used. In both cases, the change in velocity distribution, pressure drop and wall shear stress in arteries is observed. In the first study, we found that pressure dropped at 0m axial position and remain constant for rest of the artery. The effect of *Re* was found negligible for pressure. Both the axial velocity and spiral velocity were found to be increase with the increase of *Re*. The peak of Turbulent Kinetic Energy (TKE) was found to be peaked at stenosis and increased with the increase of *Re*. Similar to TKE, wall shear stress also peaked at the stenosis and increased with the increase of *Re*. In the second study, a significant difference in stated fluid properties among the three types of arteries is found. The fluid properties showed a peak in occurrence at the stenosis for both in the artery with single and double stenosis. We also found that the magnitudes of stated fluid properties increase with the increase of the area reduction. These findings may enable for risk assessment of patients with cardiovascular diseases and can play a significant role to find solution of such type of diseases.

13. Theory of semilattices and its subclasses.

Shamsun Naher Begum, Himadri Shekhar Chakrabort

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Abstract

In this project we give a necessary and sufficient condition for a prime ideal of a 0-distributive semilattice to be an annihilator ideal. We give some properties of annihilator ideals. We also prove Stone type separation theorem for annihilator ideals of a 0-distributive semilattice. Further we show that the set of annihilator ideals of a 0-distributive semilattice is a Boolean algebra.

14. Theory of ordered sets as a generalization of lattice theory and its application to searching techniques

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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 0's, block of 1's and consecutive blocks of 1's 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.

15. Analysis of a particular class of piecewise linear equations with wired dynamics

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Abstract

Genetic networks play a fundamental role in the regulation and control of the development and function of organisms. A simple model of gene networks assumes that a gene can be switched on or off as regulatory inputs to the gene cross critical thresholds. In studies of dynamics of such networks, we found unusual behavior in which phase plane trajectories display irregular dynamics that shrink over long times. This observation leads us to identify a type of dynamics that can be described as collapsing chaos, in which the Lyapunov exponent is positive, but points on the trajectory approach the origin in the long time limit.

16. Study of gamma rings for the advancement of algebra

Md. Mahbubur Rashid, Sujoy Chakraborty

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Abstract

Not submitted

Technical Session 6

Day 2 (30.09.2018); Time 10:00 am – 1:15 pm; Venue: Conference Room of IQAC, SUST

Session Chair: Prof. Dr. Kamal Ahmed Chowdhury, SOC, SUST

Resource Person: Prof. Dr. Md. Abdul Ghani, SOC, SUST

Coordination: Prof. Dr. Md. Nazrul Islam, BUS, SUST

1. Male students perception towards female labor force participation: a study among university students of Sylhet City, Bangladesh

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Abstract

This study investigates male students' perception towards female labor force participation (FLP). More specifically, it has explored the following few issues: to know students' family background, parental education, social status, social values and norms and other related factors that shapes male students perception about female work force participation. Mixed (both survey and FGD) research method has been applied for questionnaire survey to collect data from 222 students of SUST and Leading University by face to face interview. At the same time two FGDs have been conducted in two different universities consisted with 6 students each (equal number of male and female). Majority of the respondents are 20-22 years old (63 percent); 70 percent of the respondents belong to SUST and 30 percent are from LU. Among them 59.9 percentage are male and rest are female. 56.23 percent students belong to School of Engineering & 6.77 percent students belong to physical sciences and rests are from School of Social Sciences. The results indicate that most of the respondent's belong to nuclear families (81.50 percent); where they have average 3 siblings. Only 37 percent respondents father are highly educated who has completed graduation where as only 16% of the respondents mother are graduate. Study results have shown that 23 percent respondent strongly agreed or agreed that women cannot properly maintain their 'Purdha' after joining labor market and 18.9 remain neutral. 69.4 percent respondent strongly agreed or agreed that after marriage husband and husbands' family members' permission is essential for joining labor market. From this study data shows that 43.7 percent respondent strongly agreed or agreed that if husbands are economically established then their wives do not need to join labor market. 48.6 Percent respondent agreed with that women's first and foremost duty is to give importance on their conjugal life. 50.9 percent respondent agreed with those women should select such kind of jobs that are socially recognized for women. 82.2 percent respondent strongly agreed that job sector selection is related to family's status. 62 percent respondents strongly agreed or agreed that government service is suitable for women. To choose a preferable job 62 percent respondent gives importance on grade pay/salary structure; above 85 percent students strongly agreed or agreed that posting location is mandatory to select job for women. Women labor force participation depends on daily working hour. 73.4 percent agreed that women are interested to join permanent job, 73 percent strongly agreed or agreed that women participation rate in job market depends on work hour because they don't want to work at night. 36 percent strongly agreed with that statement 'women should not go outside work at night. Working distance discourage women to join work; 36 percent strongly agreed or agreed with that statement women remain from workplace for distance; 84.7percent respondents strongly greed or agreed with that accommodation facilities dispirit women to join labor market. Finally work environment is the bargaining question for a woman to join or not to join in paid work; 53.6 percent students strongly agreed or agreed with that statement working environment are not safe for women. In our country women face many obstacles just by the virtue of being women if they are engaging with any kinds of paid work then the work environment push them back, sometimes they face various sexual harassment; 67.1 percent strongly agreed or greed with that statement, as a result women remains out of labor market. After running a multiple regression the value of R^2 indicates that the model can explain 30.2% of the variability of the predictors. The study also reviles that being

male is related to attitude towards FLP. Findings from FGD also suggest that family peace and family concern should be prime responsibility to take a job for female, as for the female to do paid job our society is not yet ready and due to some problems like sexual harassments, lack of transpiration facilities, safe working environment are for women. That is why even some male and even female students perceived that women should not participate in job market.

Keywords: Participation, Female, Workforce, Attitude, Bangladesh

2. Social safety net floor and protection level for older persons in Bangladesh: A needs assessment

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Abstract

Demographic transition has been occurring rapidly for the last few decades in Bangladesh. This change is characterized by the decrease in population growth, the increased in the proportion of middle-aged and elderly people. Hence, the young dependence rate is falling and old dependence is increasing. This demographic transformation necessitates to be managed competently for better and sustainable development. Thus the government has introduced the Social Safety Nets Programs (SSNPs) with a vision to prevent vulnerability and poverty. Accordingly, it could contribute to relieve financial burden and reduce the extent of poverty. Old Age Allowance (OAA) is a program for country's poor elderly people meeting their basic needs, enhancing their status at home, and improving their psychological well-being. About 4 million selected elderly receive BDT500 per month (about $6), though it started only one hundred. The objective of the study is to evaluate the financial capacity of the OAA beneficiaries. Besides, the study estimated the financial needs and potential financial care provider for beneficiaries in Sylhet district of Bangladesh. This study used a quantitative method based on primary data collected randomly by survey with structured questionnaire technique. More than six hundred respondents were surveyed from rural (55%) and urban (45%). Financial capacity is explained by the ratio of the international and local poverty line. The local poverty line is estimated from the same areas where the respondents have market access by Cost of Basic Need (CBN) method. The financial needs is estimated considering their expected and current spending. The binary logistic regression model is used to analyse the potential financial care provider for the beneficiaries besides government. Finding shows that OAA covers only about 10 percent of the international poverty line irrespective of the beneficiaries' living areas, in urban or rural. In rural areas, respondents can fulfil about half of the food poverty line with the monthly benefit. On the other hand, it covers less than 50 percent of the food poverty line in urban areas. In addition, the program benefit covers only 44 and 34 percent in the rural areas and 38 and 29 percent in the rural areas of the lower and upper poverty line. Hence it is evident that there is a mammoth difference between required as a basic need and present expenditure per capita. Various mean differences show that their current financial needs might be from BDT1247 to BDT1670. Besides, the logistic model reports that the number of the children and living arrangement, whether they live with child are more important financial care providers though their support is not sufficient as they required. The policy makers need to revise and increase to at least three times more of the allowance so that the elderly can survive at their last stage of life. Working facilities for increasing their earning can be provided if they are able and intend to do that. They also need to access in healthcare facilities. These processes might help to achieve sustainable development of the country.

Keywords: Old Age Allowance, financial need, poverty line, financial care providers

3. The consumption and savings pattern of tea garden workers: A case study of Sylhet in Bangladesh

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Abstract

The tea industry of Bangladesh accounts for 3% of global tea production, and employs more than 4 million people. The total number of tea factories is 114 and total garden area is 115629.76 hectors. The working condition of the tea workers, who spend most of the time under the scorching sun or getting soaked in the rain, is a concern. Although the workers get rations at a concession, a family can hardly have decent food. They indeed have very poor quality and protein-deficient meals and so they save so few. The objective of this study is to find the determinants of consumption and savings behaviors of tea garden workers. Questionnaire survey and semi-structured interviews are used for primary data collection. A sample of 275 households is selected for this study. A random sampling method is used for selecting the samples. Female has comprised 75% percent of the total respondents. Total three tea gardens have been randomly selected from Sylhet to collect data. Linear regression and probit regression are deployed to achieve the objectives. This study found that cereal is the most preferred consumption item among the tea worker. Pulses, roots, vegetables, oil and drinks make their daily meals. Only a few households can manage to eat dairy products, eggs, fish, meat and fruits. With only 85 taka per day it is an irony of fate that some workers eat tea leaves to meet hunger. It reveals the miserable conditions of the tea workers in Sylhet. This study also postulates that 68.36% of households do not save anything. They just maintain a smooth consumption pattern. They don't care for future issues. The linear regression model finds age of head, ration received(kg), number of family member more than 5, dependency ratio, log of non-food expense, owner of bicycle, owner of motor cycle and latrine to be the significant determinants of household consumption behavior. On the other hand, age of head, education of household head, dietary diversity, chronic illness, health cost (>3000) and number of family member (3-5) are found significant determinants of savings behaviors by the probit regression analysis.

4. Social capital, health status and household welfare of tea garden workers

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Abstract

Social capital generated mainly through group membership is an important tool of risk management in developing countries. In particular, participation in social groups, have received a lot of attention in the recent past due to their possible role in securing household welfare in the presence of adverse events. Using survey data of 315 households from different Tea Gardens in Sylhet, the present paper tests this potential by first examining the factors associated with group participation and the intensity of participation across group types. The factors which correlate to self-reported health status of the excluded group are also investigated. Subsequently, we investigate the relationship between social and political capital and household welfare among the tea garden labours, addressing the inherent endogeneity with the help of instrumental variables. We have measured social capital, political capital and physical capital by constructing different indices in our sample households. The data suggest that the tea garden labours are members of different groups overall. Other than Ponchayet group which is mostly common in tea gardens, the inhabitants participate in different professional groups, NGO and credit groups, Festival, Sports and Voluntary groups etc. Furthermore, there is evidence for a positive association of social and political capital with household-level welfare by different outcome variables. The association is mainly driven by social capital and particularly with income and asset holdings of the households. Interestingly, our results suggest that this effect is not driven by mere participation in groups, but also by other aspects of social capital such as informal networks, density of participation etc. Finally the study

also investigates and finds that health cost of a household is positively related to social capital of the excluded community. Therefore to enhance the welfare of tea garden workers, excludability can be minimized through bonding and bridging. Furthermore, future research could look at whether the effects of active group participation differ by the role played in the group and investigate whether there are persistent effects with more long-term data.

5. Brand switching or consumption curtailing? exploring the adaptation strategy of tobacco smokers in the face of taxation in Sylhet metropolitan area

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Abstract

In this study, we examined the influence of cigarette taxes on tobacco consumption, with an emphasis on smokers' choice between reducing cigarette consumption and switching brands in Sylhet Metropolitan Area. We constructed three scenario-based models to study the following two subjects: (1) the relationship between deciding whether to reduce one's cigarette consumption and to practice brand switching (simultaneous or sequential); (2) the key determinants that affect smokers' decisions in terms of their consumption and brand switching when facing higher taxes. We applied data collected from a survey in Sylhet Metropolitan Area, and the results indicated that where independent decision has an effect on consumption but two-stage decision making models differ from the earlier results. The sample selection model finds that price has insignificant effect to reduce consumption. We also found that, current living status, age of the smoker contributed to reduce cigarette consumption. In multinomial logit analysis, we find that marital status, employment, non-tobacco expenditure and loyalty to brand have significant effect on the two-stage decision process in cigarette consumption. As increase in price has a strong effect on brand-switching rather than reducing consumption, increase in tax on tobacco is not a viable policy. Social awareness could play an important role to reduce consumption.

6. Prevalence of corporal punishment in govt. primary schools: A study on Sylhet district

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Abstract

Schools are one of the safest places for children to be educated and socialized. It is recognized as the second home for them. Friendship relationship between teachers and students are essential preconditions for successful learning. Love and affection creates interest among the children, whereas corporal punishment destroys their interest for learning. However, many of the school teachers use corporal punishment which has negative consequences on school going children. Therefore, this study intends to explore the pattern of corporal punishment used in the government primary schools' and the impacts of corporal punishment in early educational lives of students. Based on the data collected from a sample survey, the study finds that corporal punishment (CP) is widely practiced in the Government Primary Schools (GPS) of Bangladesh. Corporal punishment has been used as a conventional method for disciplining children. Corporal punishment by teachers has an in depth influence on children's behaviors and their academic achievements. While the study has found some positive remarks of CP, like, making the student polite, attentive and reducing the recurrence of similar offence, punished children have been found to exhibit poor academic performance, aggressive behavior, poor self-respect, loneliness, irregularity in school and developed negative attitude towards teachers.

The study suggests that child friendly school environment should be created through positive discipline, positive reinforcement, and motivation, democratic participation of students and guardians in learning process. Teachers need to be trained about child psychology and education. Similarly, parents and guardians should be aware about the negative effects of corporal punishment and child psychology, education and development. Best teacher awards can encourage teachers to build friendship relationship with the students. Incorporation of entertainment education and regular participation of parents in the guardian meetings can enhance child friendly environment at school.

7. Leasing system and fisherman community: A study on Hakaluki Haor

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Abstract

Prior to British rule, fishermen of Bangladesh enjoyed customary rights to fish in river, haor, baors and beels. After the independence of the country, the customary rights of fishermen have been gradually eroded by policy changes. Now most of the haors, jalmahals and beels are regulated and controlled by lease holders. Jalmahal Policy, 2009 is designed to allow original fishermen for fishing under certain conditions. Establishing the rights of real fishermen to water bodies, earning higher state revenue, ensuring conservation of wetland fish and other biodiversity are the main objectives of the policy. Following the guideline of mixed method, this research was designed to explore the present leasing practices of water bodies in Hakaluki haor areas and their impacts on fisherman. Interview, FGD, KII and observation were applied as techniques of data collection from 131 respondents who were selected through village census. Multistage sampling technique was adopted to select three villages in Hakaluki haor. All household heads of selected 3 villages were included as respondents. The difference between leasing policy and leasing practices were explored and analyzed to understand its impact upon the fishermen community.

Data shows that the water bodies in Hakaluki haor are mostly leased to the influential people. Respondents mentioned that the local influential people get lease making fake fishermen's association and government officials help them in this process. Most of the ancestral fishermen are found to be uprooted and excluded from the leasing system because of not having money, power and political affiliation. Respondents opined that they are struggling to continue their inherited occupation and the number of fake fisherman is increasing rapidly. All of the respondents opined that their accesses to open water bodies are denied due to the restrictions imposed by the lease holders most of whom are not fishermen. A small section of the respondents were found to be engaged as fishing laborers of lease holders. These laborers mentioned how the workers of lease holders catch fishes indiscriminately and how does it affect the gross fish production in Hakaluki haor. Key informants and FGD participants noticed that loosing access to water bodies the poor fishermen were struggling to lead their life and poverty forced them against fulfilling basic needs of their families. All of the respondents recommended for the appropriate implementation of Jalmohal policy, 2009 so that real fishermen can get access to the water bodies. They opined that this access can change their socioeconomic conditions and can preserve and protect fish resources as well as the bio-diversity of haor basin.

8. Representations of the female body in Bangladesh: a study on embodiment, agency and empowerment

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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.

9. Migration, individual modernity and fertility preferences: A study among the slum dwellers in Sylhet City corporation area

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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. Scholars 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 industry. 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.

Researchers generally are interested in whether or not modernity functions as an intervening variable linking status factors to fertility behaviour. They have mostly used modernity as a proxy for several attitudinal variables through which structural factors affect individuals' fertility preferences. The present study took a closer look into migration, modernity and fertility preferences from sociological point of view. The objective of this study is to measure the level of individual modernity and how modernity relates to the fertility preferences in Sylhet. In doing so, however, the individual modernity construct was conceptualized to reflect the attitudinal, behavioral/ lifestyle, and perceptual as well as the knowledge components of the individual pertinent to family size preferences. This was done with the view to identifying the causal structure among the individual modernity variables in particular and between the structural variables and individual modernity variables in general.

The empirical data of this study was collected from 204 migrants living in slum in Sylhet City Corporation area. Questions were formulated to identify the respondent's orientation toward modern versus traditional values with respect to six dimensions: non-fatalistic attitudes, activity orientation, planning values, kinship orientation, gender beliefs, consciousness and alienation. A five-point response scale was used to measure the dimensions, with lower scores representing more traditional attitudes and higher scores, more modern attitudes. Scales were

constructed by the Likert scaling technique. One of the findings of the study shows that the level of modernity among the respondents represents lower score. However, modern attitude contributes significantly to the explanation of fertility preferences independent of social status variables.

10. Does Financial inclusion through mobile banking increase financial resilience in flood prone region? A case of Sunamganj haor basin in Bangladesh

A. H M Belayeth Hussain, Mohammed Anwar Hossain

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Abstract

Not submitted

11. Livehood dynamics and community resilience: Wetland and drought-ready communities in Bangladesh

Mohammed Faruque Uddin[1], Mohammad Mizanur Rahman[2]

[1]Dept. of SOC, SUST, Sylhet. [2]Dept. of English, SUST

Abstract

Not submitted

12. Modelling environmental change, internal migration and risk sharing network using survey data

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Abstract

This project aims to provide a general modelling approach to handling, accounting for and quantifying environmentally induced migration as the formation of risk-sharing network. In the case of temporary migration, we will examine whether temporary migrants due to climatic shocks form a risk-sharing network to maximize the potential for income risk sharing. In the case of permanent internal migration or displacement regarding the destination choice, households use their available financial and social capital to form the risk-sharing network. Here, we will examine the factors determining the formation of risk-sharing networks of environmentally induced permanent move and the extent to which these networks de facto shape and encourage subsequent other neighbor of origin, without any history of migration, to migrate.

The analyses are based on an Environmental Migrants Survey conducted in Bangladesh by one of the investigators in 2010 and 2011. This survey was household based, and covered border areas of three upazillas (Companiganj, Jaintiapur, and Gowainghat) of greater Sylhet district in the North-East of Bangladesh. Of the 1770 households in the total sample, 750 households were environmental migrants, 768 households were drawn from natives, and the remaining 252 households were drawn from the Indigenous group (for a detailed sampling, see Joarder and Miller (2013); *Global Environmental Change,* 23(6):1511-1524). We have also collected data from the same permanent migrant households again in 2018.

The current research is in progress. The general approach to analyzing environmentally induced migration as a risk sharing network will provide an explanation of the motive to migrate (permanent or temporary) and whether the networks really matter for employment opportunity and coping with strategies by new migrants at destination. Clearly the answer to these can be applied to several policy-important areas of potential climate

change mitigation and adaptation, namely disaster risk reduction, migration management, development, land and property rights arrangements, and capacity building.

13. 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 proportionate stratified random 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 severely 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. Although government and many other 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.

14. Preconceptions and misconceptions about menstruation: experiences of adolescent girls in Sylhet City

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Abstract

Menstruation is one of the natural changes that occur in female in her normal life. In developing countries like Bangladesh, menstruation related education and management is not prime concern in the sector of reproductive health. Though it is a natural phenomenon, most of the adolescent girls as well as women have some wrong beliefs and behavior regarding menstruation. With an objective to understand perceptions and misconceptions about menstruation among adolescent girls living in Sylhet city, this qualitative research was conducted. To understand the changes and to explore their sources of knowledge and gaps in getting proper information,

mothers of the girls were also included. Using in-depth interview data were collected and analyzed. Adolescents were from 8 to 10 standard from three different secondary schools and most of mothers were between 35 to 45 years. Findings indicated that sharp changes are taken place as girls have better idea than their mothers. Where most of the girls were informed about menstruation before their first onset, here situation of mothers were nearly opposite. Due to different intervention taken by government, text book and media, adolescents have wider opportunity to know, to changes their mind and to manage menstrual hygiene. Even adolescents used modern commodities and more freedom than their mothers. A fear factor always work in their mind but support and access helped them to minimize their problem. Despite those changes various misconceptions and related restrictions are still prevailing among them. Still they depend on the traditional sources of learning that lead the girls to follow traditional misconceptions. Even they have little, in some context restricted opportunity to share at home and at school about their menstruation related problems. Many mothers restricted their daughter to go to school, go outside home at evening, and play during menstruation. Similarly restrictions in particular food consumption, frequent movement inside the home, sharing common bed also faced by some of the respondents. Gender based difference and influence are seen and cultural restrictions bound them to hide it. In urban context, mothers and elder sisters are the prime sources of getting information and advice, and basically they visited doctors only when traditional healing methods failed to give solution. Not all schools have necessary and proper sanitation facilities that often disturb them, even such experiences also bound them to travel during this period. It can be said that changes are happening but need more interventions to reduce social and cultural barriers regarding the issue.

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

15. Rape and remedies: some observations about the causes and consequences of rape in Sylhet and Sunamganj

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Abstract

Rape is often considered as the most serious crime against a person after murder. But the information on rape frequency comes from victims, who are often very reluctant to classify their experience as rape. Victims all over the world are extremely hesitant to identify their experiences as rape. Firstly, because they live in a society that blame rape victims and denigrate them as ‘damaged goods’. There is no denying the fact that the physical control and sexual use of another's body without that person's consent is wrong. As many as 4,896 women and girls were subjected to multiple forms of torture throughout 2016 (Bangladesh Mohila Parishad 2016). The number of women raped rose alarmingly during last couple of years. In 2016, 1,050 women and girls were raped including 166 gang rape victims and 44 killing after being raped. The number of gang rapes was 199 in 2015 (BMS 2016). According to One Stop Crisis Centre in Osmani Medical College, a number of 208 rape cases have been done in Sylhet the year of 2016 (OSCC 2016). It has been revealed from several studies that about 71% of rape cases go unreported and underreported. From this background, this study aimed to reveal the major causes and consequences of rape in Sylhet and Sunamganj area. It also attempts to find out some ways to reduce rape and see whether Cognitive Bahavioural Therapy (CBT) works for the sex offenders. Foundational within CBT is the idea that many offenders suffer from ‘‘cognitive distortions’’ or ‘‘thinking errors,’’ especially the propensity to harbor and act on incorrect or fallacious ideas that allow them to justify, minimize, and deny responsibility for their sexual crimes. A number of 10 rape cases were selected from Sylhet and Sunamganj district of Sylhet division with the help of One Stop Crisis Centre at Osmani Medical College Hospital and with the Civil Service’s Office, Sunamganj. In-depth interviewing, Focus Group Discussions, Case Studies, and Life History Method were followed for the purpose of the present study.

Technical Session 7

Day 2 (30.09.2018); Time 2:00 pm – 5:30 pm; Venue: SUST Research Centre

Session Chair: Prof Dr A. Z. M. Mazoor Rashid, FES, SUST

Resource Person: Prof. Dr. Md. Nazrul Islam, BUS, SUST

Coordination: Prof. Dr. Mohammad Iqbal, IPE, SUST

1. Optimization of the factors affecting black tea fermentation by observing their combined effects on the quality parameters of fermentation using response surface methodology (RSM)

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Abstract

This study was undertaken to optimize the factors affecting black tea fermentation by evaluating their combined effects on the quality parameters of fermentation using Response Surface Methodology (RSM). Three independent variables such as temperature (°C), time (min) and Relative Humidity (RH %) were studied to optimize the fermentation conditions. After preparation of dry tea samples by 15 different fermentation conditions; total phenolic content, catechin content, caffeine content, theaflavin (TF), thearubigin (TR), High Polymeric Substances (HPS), Total Liquor Color (TLC), Color Index (CI), TF:TR ratio and sensory evaluations of infused tea leaves were done. The highest total phenolic content (265.69 mg/L) was found in case of sample fermented for 85 minutes at 35 °C temperature and 75% RH. Catechin content (17.30 mg/L) was found highest at 35 °C temperature and 75% RH, fermented for 100 minutes. The highest caffeine content was found for sample fermented for 100 minutes at 35 °C temperature and 85% RH which was 213.60 mg/L. The optimum TF:TR ratio as well as High Polymeric Substances (HPS) were found at samples which were fermented at 30 °C temperature and 85% RH for 85 minutes. At this condition Total Liquor Color (TLC) was also satisfactory. However, Total liquor Color (TLC) was found highest (4.07) at 35 °C temperature and 85% RH, fermented for 100 minutes. For color index, the maximum value was found at the lightest fermentation condition, viz. 85 minutes, 25 °C and 75% RH. In case of sensory values, the fermentation condition combined by 30 °C temperature and 85% RH for 85 minutes provided the best acceptance by the panel tasters.

2. Optimization of pectinase production by *Aspergillus niger* under solid state fermentation using response surface methodology

Md Rahmatuzzaman Rana*, Rowshon Ara

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Abstract

Pectinase is a very important hydrolytic enzyme with broad industrial and commercial applications. The objective of this work was to study the solid state fermentation conditions for pectinase production using wheat bran and *Aspergillus niger*. Response surface methodology (RSM) in combination with Box-Behnken design was performed in this study in order to observe and find out the best combinations of the independent variables namely wheat bran, moisture percentage and incubation time in the medium that affects the pectinase yield. The Box-Behnken design was applied with three factors, wheat bran X_1 (10-20gm), moisture percentage X_2 (60-80%) and incubation time X_3 (72-120 hours) at three level for optimizing the composition of the fermentation medium. Different combinations of three variables were observed for the maximum pectinase activity and the design contained a

total of 15 experimental runs. From the experimental runs, maximum pectinase production (1.2583 µmole/ml) was achieved in run number 14 where the variables were X_1 (10 gm), X_2 (70%), X_3 (72 hours). As the same time, minimum pectinase production (0.5682 µmole/ml) was observed in run number 5 where the variables were X_1 (20 gm), X_2 (70%), X_3 (120 hours). The response surface methodology was applied effectively to optimize the production of pectinase by *Aspergillus niger* under suitable fermentation condition to make the process cost effective in solid state fermentation by using wheat bran as a substrate.

3. Effects of edible coating and osmotic dehydration on the quality retention of green and ripe papaya during drying and storage

Md Zohurul Islam[1*], Kamrunnaher Monalisa[1] and A.S.M. Sayem[1]

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Abstract

Papaya (*Carica papaya* L.) is highly perishable fruits due to the presence of higher water content 80-90 %. The postharvest losses of papaya in Bangladesh approximately 40 to 50 % and there is increased interest in preventing these losses by processing the fruits and incorporating the processed fruits in products.

The aim of this study was to make an effort to preserve the green and ripe papaya by using an edible coating of potato starch and studying the quality parameters during osmotic dehydration and air drying.

Potatoes and papayas were collected from cultivars. Starch was isolated from potatoes according to the method described by Kaur et al. (2002). Starch coating 1%, 2%, and 3% were done and osmotic solution concentrations were 40, 50 and 60°Brix and dehydration was carried out at 35, 45 and 55°C. Air drying was done at 70°C and drying time was 8 hours. The physicochemical and bioactive compounds were determined by standard methods.

The present study demonstrated that edible starch was successfully extracted from underutilized potatoes. The recovery percentages were about 83%. Then the potato starch was applied as a pretreatment (coating) before drying of the papaya. The moisture content and water activity of the air-dried papayas showed in the ranges of (6.5-7.8%) and (0.15-0.25) respectively. In case of bioactive compounds, ascorbic acid retention was 69.07% for 3% starch coated samples during drying at 50°C. The highest total phenolic content (128.62 ± 1.76 mg GAE/100g) and DPPH scavenging activity (85.88 ± 1.14) was obtained in coated samples than the uncoated samples. The osmotic dehydration and mass transfer kinetics were determined by various empirical models (Peleg, Penetration and Lewis (Newton) model). The results showed that higher osmotic solution temperature 55°C with a low concentration of 40 °Brix resulted in a significant decrease in antioxidant activity, vitamin C, and β-carotene content. Results of the storage of green papaya showed that 2% and 3% starch coating prolonged the shelf life up to 14 days whereas 1% coated and without coated papayas were damaged within one week.

The present study concluded that, the prominent beneficial effect of potato starch as an edible coating in preserving bioactive compounds and preventing postharvest loss of papaya in a most economic and available way.

4. Heavy metal residues assessment in Tilapia (Oreochromis mossambicus) available in local market of Sylhet

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Abstract

Heavy Metal pollution has been increased in human body by foods such as meat, fish, vegetables across the different countries over the world. Tilapia (*Oreochromis Mossambicus*) is one of the prime sources of protein in

Bangladesh and widely consumed by common people of this country. Hence, this study was conducted to find out the health detrimental heavy metal concentration like as Zn, Cu, Mn, Pb and Cd estimated in muscle, grill and liver of Tilapia collected from Sylhet. Nitric acid digestion and atomic absorption spectrophotometer (AAS) were used to determine the concentration of metals. In edible part of Tilapia fish (muscle) concentrations of Zn, Cu, Mn, Pb and Cd was found 77.602 mg/kg, 3.307 mg/kg, 10.570 mg/kg, 0.982 mg/kg and 0.090 mg/kg respectively. These concentrations of Zn, Cu, Mn, Pb and Cd were found higher than the safe limit for consumption and human health given by FAO/WHO. The findings do not mean only the severe concentration of detrimental heavy metals in studied fish but it also indicates an unwanted prone towards carcinogenic effect over those people who are continuously taking these contaminated fish.

Keywords: Heavy metal, Tilapia, Sylhet, Health Risk

5. Sustainable and Successful Process Improvement through Lean and Six Sigma Model in Frozen Food Industry: A Study for Food Safety Establishment

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Abstract

Recently, global frozen food market is being expanding, as people are being busier with their job and responsibilities. Like other countries, Bangladeshi frozen food industry is also growing considerably; to make it faster and sustainable, this study would be a milestone to conduct in any other frozen food industry. Because it was observed that with the implementation of lean six sigma in the frozen production line of Golden Harvest Company, the process cycle efficiency will be improved up 21.40% from 14.31%.

6. Intra departmental document transferring system using smart quad copter

Md Anik Hossain, Muntasir Mahdi, Robi Paul, Md Saiful Islam, Sajid Hasan, Faiaad Rahman, Ruhul Amin Akash, Dip Sarkar, Faiyaz Bin Hassan, Arif Ahammad, Md Mohsinur Rahman Adnan

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Abstract

The thought of an autonomous Smart quad copter occurred when we tried to increase the efficiency in the office works & the official & documentary connection between the buildings. As a public university, some buildings are relatively far from each other & it's a bit difficult & time consuming to send official documents & paper works like applications, invitations etc. Sometimes there are emergencies & the papers need immediate attention of the respective authorities. At those times, sending those papers in old conventional ways might exceed the time limits of certain programs or documents. So, it would be a far wise choice to use Autonomous Quad Copter to transfer those documents from department to department.

The quad copter will be programmed to follow a specific projected path & reach the destination perfectly. Whenever a document will be needed to deliver to a certain building, we just must command the copter & it will reach the projected destination with those documents with immediate effect. In this report, the functions of the quad copter, assembling, hardware & software implementations are described elaborately. In the end descriptions of future plans & development proposals of the project are also suggested according to our ideas.

7. Discovering Sylhet: A spatial assessment framework to study historic urban landscape of Sylhet City

Kawshik Saha, Mohammad Shamsul Arefin

Dept of ARC, SUST. Sylhet.

Abstract

Not submitted

8. Assessing suitable tree species for biochar manufacture and their performance in enriching soil quality and plant growth

Narayan Saha* and Nur Uddin Ahamad**

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Abstract

Biochar is a biomass derived black carbon. It is capable of improving soil fertility as well as subsequent storage of carbon in the soil for long term, reducing atmospheric carbon dioxide and mitigating climate change. Global climate risk index (CRI) shows that Bangladesh is one of the most vulnerable countries to climate change and global warming. The country is highly populated with limited land resources. The country needs more food production from limited agricultural crop lands. For the aforesaid reasons, sustainable agriculture is thus becoming popular. Biochar is capable of becoming the soil innovation of the 21st Century. It is an alternative product of sawmill wastes. The tree species uses for biochar manufacture influences the biochar yield and its quality in increasing soil fertility. There are few studies on biochar in Bangladesh and no studies ever seen on assessing suitable tree species for biochar manufacture and their performance in enriching soil quality and plant growth. Available sawmill offcuts, such as Kathal, Mango, Mahagony, Rain tree, Chambul and Kadam were collected as feedstock materials to produce biochar. It should be noted that this study used intermediate pyrolysis process, which usually yields 20-35% biochar. However, Chambul was found the best among six selected species for biochar yield (41.5%), it's application showed better paddy seed germination (89%), considerable effects on paddy plant growth and soil nutrients amendments. The negative effects of some biochar on some studied parameters were also observed. They indicated that biochar of some tree species might have harmful effects on those parameters. Further studies on such relevant areas of biochar will give clear messages about the most suitable tree species for biochar yield and their applications for ensuring food security through sustainable agriculture.

9. An Assessment of major ecosystem services of tropical hill forest in the north-eastern region of Bangladesh

Debit Datta and Mohammad Belal Uddin*

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Abstract

Ecosystem services supply from tropical forests is declining day by day owing to intense forest degradation and deforestation. Identification and evaluation of multiple ecosystem services of the forests are essential for sustainable and effective management. This study was conducted at Lawachara National Park (LNP) in

Bangladesh. Simple random sampling technique was undertaken for primary data collection. We used proxy methods for measuring ecosystem services such as oxygen production, global climate regulation, and energy provision indirectly. However, social surveys through semi-structured questionnaire were conducted to identify cultural service. The forest produces 21.05 million kg oxygen (O_2) per year and has stored in total 0.56 million ton of atmospheric carbon (CO_2). Total oxygen produced by LNP is equivalent to total amount required by 25.06 million people per day. Ecosystem services differed by natural and plantation forests a lot. The amount of ecosystem services is higher in plantation stand than natural stand because natural patch is highly disturbed in the forest. This forest has high-quality timber stock of 5.08 million ft^3 which value is USD 63.56 million. Market value stands at USD 5.26 million for oxygen production and USD 1.74 million for energy provision. Similarly, the regulating and cultural services values stand at USD 8.42 and USD 1.15 million respectively. A comprehensive economic evaluation of the total stock of other ecosystem services is important to find out the thresholds of sustainable yield in a changing climate. It would be valuable for enhancing sustainable management of the studied and other forest ecosystems too.

Keywords: ecosystem Services; millennium ecosystem assessment; proxy methods; economic evaluation; sustainable management

10. Dependency analysis of surrounding people on Rema-Kalenga wildlife sanctuary: An approach to the Co-management

Farzana Raihan[1] and Sk. Nasrin Haque[2]

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Abstract

Co-management approach holds potential for more comprehensively integrating the social dimension into decision making in protected areas by providing alternative livelihood to resource dependent communities. However, its implementation in conservation policies is still in its infancy in developing countries and their protected areas due to poor governance system that impede the development and living standard of those people living in and around these areas. Therefore, policy or institutional arrangements are required to promote better governance system for local communities to improve their living standard as well as enabling effective management and protection of natural resources. To address this need, the study has been conducted in Rema-kalenga Wildlife Sanctuary (RKWS) with an aim to analyze the impact of co-management on the stakeholders and wildlife sanctuary. A stratified random sampling technique was employed. A semi-structured interview and focus group discussion (FGD) were carried out to collect information from different stakeholders belong to with AIG and without AIG group. Collected data were dependency level on forest, demographic status of households, and livelihood condition. A binary logistic regression model was developed to know about the impact of alternative income generation (AIG) activities on livelihood along with forest dependency. Results indicate that, there is a significant and positive relation between forest dependency and the participants of co-management. The findings also reveal that villagers who are forest dependent for forest resource collection to meet their needs, have selected as participants of co-management system and get AIG support (livelihood materials) from CREL to manage the forest. AIG support has significant contribution to reduce forest dependency of local people. Local leader shows opportunistic behavior and put substantial contribution in the member selection of giving AIG from their kinship. They decide who would be the participants of co-management from their locality which is a major constrains to achieve the co-management goals regarding forest resource conservation. So, selection of actual forest dependent local people at grass root level for giving AIG would ensure successful co-management governance for forest resource conservation. Overall, the outcome of this research shows that application of co-management approach leads to a significant reduction in traditional anthropogenic pressure on the natural resources and concurrently facilitate tourism development and inclusive management of protected areas.

11. Identification of powdery mildew diseases in *Acacia auriculiformis* and its control measures using natural products

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Abstract

The study focused on the identification of causal organism and management of powdery mildew disease infested Acacia aulicuriformis seedling at the nursery of Forestry and Environmental Science, SUST. The disease appeared in growing season in the older leaves and spread rapidly within the stock. The study identified Oidium sp as the causal organism of powdery mildew. The tests of various unconventional materials like plant leaf extracts, garlic extract, fresh milk and backing powder showed to control the disease. However, the degree of effectiveness varies with the origin of the controlling agents compared to the negative control and fungicide treatment. Garlic and Neem extracts were found equally effective as like as fungicide while milk and backing powder showed an intermediate effect in controlling the powdery mildew in the field. When Neem extract was used in the in vitro condition to control the isolated fungus (Oidium spp) of powdery mildew grown in PDA, it shows the similar effectiveness like the field condition. Compared to control, it reduced 98.5% growth of the fungus but not controlling fully as like as fungicide (100% control) in the PDA media. Similarly the huge growth of Oidium spp mycelia was observed in the PDA media containing no fungicide or garlic extract while no growth was found in the media containing garlic extract or fungicide. Further study was carried out in the nursery to screen out the resistant species to powdery mildew. Oidium spp was inoculated onto the leaves of 9 month old 10 healthy species of 6 different families at nursery. The result shows Chikrasi (Chukrasia tubularis), Dhaki Jam (Syzygium grande), Kadam (Neolamarckia cadamba), Koroi (Albizia lebbeck), Mahagoni (Swietenia macrophylla), Shunalu (Cassia fistula) and Telshur (Hopea odorata) are resistant and Krishnachura (Delonix regia) was partially resistant to powdery mildew (Oidium spp). Most susceptible species are Mengium (Acacia mangium) and Rubber (Hevea brasilinensis) as observed in the study. The study indicates the presence of anti microbial properties in garlic and neem extract that was able to control powdery mildew like fungicide. To avoid the hazardous effects of chemicals fungicide, the extracts of Neem or Garlic are recommended to control the disease in the field. Biological control measures are simultaneously eco-friendly and cost-effective. Further study is recommended to assess dose responses of Neem and garlic extracts in controlling the disease.

12. Effect of forest management systems on biodiversity - A case study from the hill forest areas of Bangladesh

Kazi Mohammad Masum

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Abstract

Comparison between Chunati Forest Range and Chunati Wildlife Range have been done in this project from the composition of their vascular plant and bird diversity. Biodiversity Indices have been created and compared for these areas. Phytosociological (IVI) analysis of these two ranges has also been done. Rare fraction curve, Rank abundance curve have been created and compared. Then I looked up in the results of analysis to see if there is any positive result accumulated in the vegetation structure or diversity in CWR as it has enjoyed co-management since last decade. There was no significant difference between CFR and CWR from their average vascular plant diversity point of view. But Simpson_1-D, Shannon_H, Evenness_e^H/S and Equitability_J values for CWR indicates more diverse community and healthy ecosystem compared to CFR. Moreover, species abundance was found more evenly distributed in CWR compared to CFR. The IVI's of species have shown dominance of Acacia in both ranges. In the case of bird diversity, higher Shannon H and Simpson_1-D values for WR indicate more diverse bird community in WR than FR. Although Evenness_e^H/S and Equitability_J values of FR were slightly higher in

FR indicating slightly healthier ecosystem. Plant traits have been tested with micro-environmental variables to search the existence of inter-relation. As both ranges are suffering similar types of disturbances, plant traits in both ranges were found inclined to canopy coverage, canopy height and elevation. The triplot scores of bird abundance for the plant and environment data with respect to sites in the coordination axes has shown that maximum number of plots from both HFR and PHF were intensely influenced by canopy cover, tree species richness, sapling species richness, disturbance score, canopy height and average sapling height. This implies that bird species richness was less affected by tree average diameter, tree abundance, seedling abundance, sapling abundance and elevation. Because of co-management, CWR is more diverse and have healthy vegetation than CFR. Moreover increase of urban area and decrease of forest area was more in CFR compared to CWR. The socio-economic development through the income of the CMC has resulted in less illegal felling and lesser encroachment than CFR. In future, the FD and CMC should prioritize other native species while making a garden in the sanctuary.

13. Forecasting mangrove distributions in the Sundarbans under climate change: Implications for conservation

Swapan Kumar Sarker* and Nusrat Islam

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Abstract

The Sundarbans world heritage ecosystem, the largest continuous mangrove forest in the world, is now under severe pressures. Sundarbans' tree species population sizes, forest stock, structure and composition have drastically changed since the construction of the Farakka barrage in 1974 in India. Despite the drastic nature of these changes, we lack a comprehensive knowledge on mangroves current habitat preferences and how their populations may change under future climate change. This study aimed to reduce these knowledge gaps by developing species distribution models (SDMs) for the eight major mangrove tree species. The dataset included tree species abundance and critical environmental variables such as salinity, silt, NH_4, P, K, elevation, upriver position, historical harvesting, disease outbreaks, and density of all stems (DAS). Generalized additive modelling framework was used to uncover mangrove responses to variables. This study reaveled that mangroves responses in Sundarbans varied across the salinity and nutrient gradients. Whilst Amur, Singra and Sundari showed a clear negative response, Keora, Baen, Goran, Gewa, and Posur showed a clear positive response to increased soil salinity. Heavy siltation was related to abundance decline in Amur, Keora and Sundri. Amur, Singra, Baen and Posur preferred upstream habitats while Keora and Goran preferred downstream areas. The inclusion of DAS in the best models indicates the potential influence of biotic filtering in environmentally stressed mangrove ecosystems. Historical harvesting had a strong negative effect on the abundances of Amur, Keora, Baen, Goran and Posur. Disease outbreaks contributed to population declines in Sundri and Gewa. Currently, the eastern region of the Sundarbans supports the Sundari hotspots, the western and southern regions support the Gewa and Goran hotspots, and the far northern habitats support the Posur and Amur hotspots. Keora, Singra and Baen show an extremely sporadic distribution. The forecasted density maps quantify a 50% decline in Sundri, 32% increase in Goran and 49% increase in Gewa's overall populations in the entire Sundarbans by 2070. This study reveals that the density hotspots of the mangrove species are not covered by the existing protected area network (except a part of the Sundri and Keora density hotspots). The low predictive abilities of the SDMs for the rare species suggest for more sampling efforts in future studies. These novel findings can help to improve the present and future forest management and conservation initiatives in the Sundarbans.

Key Words: biodiversity conservation, climate change, generalized additive models, protected areas, salinity intrusion

14. Climate change-potential adaptive crop (foxtail millet) to develop a new product (noodles) for enhancing the food security of ultra poor people in north-western part of Bangladesh

Md. Mozammel Hoque* and Razia Sultana Choudhury

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Abstract

Rising sea level and changing the intensity of temperature causes the severe drought, and the land becomes uncultivable in the northwestern part in Bangladesh. In order to get along this adverse situation, farmers need to adapt their farming systems while replacing wheat with foxtail millet (FTM) (*Setaria italica*) which has the health-promoting effects. The consumption of noodles has risen dramatically, and in the world, it is the most widely consumed breakfast and snakes item. Using FTM, the present study, therefore, was undertaken to develop value-added foods of commercial importance. FTM flour was incorporated with wheat flour at a proportion of 60%, 55%, and 50%. The study demonstrates that sensory scores of 50% millet flour have better colour, flavour, texture and overall acceptability when compared with control and other samples. The instant noodles with 50% millet flour, 40% wheat flour, 5% rice bran and 5% mushroom powder had 11.51% protein, 0.53% fiber and 474.17 kcal energy which is significantly higher ($p<0.05$) than the commercially available noodles. It enriched with Na (88.48 mg/100g), P (695.07 mg/100g), Fe (5.40 mg/100g) and K (122.29 mg/100g) which is also significantly higher ($p<0.05$) than the commercially available noodles. Like commercial noodles, FTM noodles can be equally consumed because of its high nutritive value.

15. Characterization and optimization of rice noodles with different rice cultivars: Perspective of food product development

Iftekhar Ahmad and Ms. Mukta Roy

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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 amylose content on the quality characteristics of Rice Noodles. In order to do so, Three rice genotypes of Kalo Beruin, BR 26, BRRI 28 were taken. Half of the work has already been done and the rest of the work is in progress. 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. It is also found that low amylose content showed no Noodle Sheet can be formed.

The rice flour, starch, salt were 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 ⅓-inch wide pieces.

In order to do so, Rice genotypes of Beruin, Binni , Rata LahayaBanshful were taken.

Noodles samples will be evaluated in terms of moisture, ash, fat, carbohydrate, protein contents. It is found that moisture and Ash content has profound effect on firmness and lightness of the finished product. It is also found that low amylose content showed no Noodle Sheet can be formed. The Color, Texture and Sensory properties will also be analyzed in upcoming days.

Technical Session 8

Day 2 (30.09.2018); Time 2:00 pm – 5:30 pm; Venue: Conference Room of IQAC, SUST

Session Chair: Prof. Dr. Sabina Islam, STA, SUST

Resource Person: Prof. Dr. Md. Zakir Hossain, STA, SUST

Coordination: Prof. Dr. Md. Shamsul Haque Prodhan, GEB, SUST

1. The impact of information and communication technology (ICT) on quality education at the secondary school of Bangladesh: An empirical study

Mohammad Mizenur Rahaman and Mohammad Shahidul Hoque

Department of Business Administration, Shahjalal University of Science and Technology, Sylhet-3114

Abstract

The study examines impact of ICT on quality education at secondary school level of Bangladesh. ICT is a part of the economic infrastructure that updates education systems of the country which is backbone of a nation. Specifically, the ICT industry is the main driver of the economies of developing countries like India, China, and Bangladesh etc. through different sectoral development while education is one of key sector of the economic development. Though the developed nation proved their efficiency in education sector by using ICT in different level of education systems but the education sector in Bangladesh has been experiencing ICT application in preliminary level for ensuring quality education. Again, by considering performance of using ICT in education sector in Bangladesh a little study has been done to investigate efficiency and effectiveness in secondary level education. That's why, study is rationale to understand the level of impact of using ICT in secondary level to develop quality education in Bangladesh and role of ICT usage in learning process and academic curriculum is yet to be proved. Thus, the core objective of this study is to assess the impact of ICT on quality education in the secondary school level of Bangladesh and another important specific objective of this study is to focus on ICT's contribution to an increased quality in teaching and learning and a broad access to learning materials. This study has conducted based on the quantitative method. Data was collected mainly from the primary as well as secondary sources. Student and Teachers are the main sources of primary data while report of ICT ministry, data from BBS were considered as sources of secondary data. Data were analyzed by using SPSS 22 and spread sheet analysis. Chi square Test, ANOVA, and logistics regression analysis were used as analytical tools in this study. Conclusion was drawn based on the findings of the study. The study conclude that ICT has great impact on teaching learning quality at secondary school level of Bangladesh but practicing of ICT at this level far behind the standard which creates challenges to achieve one of the important SDGs of Bangladesh.

Key words: ICT; Quality Education, Secondary School, Teaching-Learning environment.

2. Cross-gender and cross-sector analyses of work-life balance (WLB) of university teachers and bankers in the Sylhet City corporation area.

Mazharul Hasan Mazumder and Md. Khairul Islam

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

Abstract

Work-Life Balance (WLB) is one of the important yardsticks of assessing happiness-at-work, which is a major determinant of overall happiness of the people of a country. The World Happiness Report 2017 has used six measurement criteria—viz. per capita GDP, healthy life expectancy, freedom, generosity, social support, and absence of corruption in government or business—to rank among the countries of the world in terms of work-

life balance, which is an indicator of *happiness-at-work* along three different trajectories including (i) employment status; (ii) types of work—blue collar (or manual) jobs versus white collar jobs; (iii) characteristics of jobs or job quality meaning work-life balance, job security, health and safety, job satisfaction, and freedom at workplaces. This paper is a qualitative appraisal of job quality of two of the important employment sectors of Bangladesh, namely, University Teachers and Bankers so that their prevailing states of work-life balance can be portrayed and appropriate policy measures advocated.

It is found that, unlike the university teachers, job security is less important a factor of WLB than remuneration package to the bankers, while flexible work schedule is the singularly important indicator of WLB to the university teachers. Female respondents of both the professions have identified extended maternity leave facility as an important yardstick of WLB. Other determiners of job quality and work-life balance include insurance coverage, healthcare support. Furthermore the paper advocates further research on the issue covering more employment sectors, which would reduce the existing scarcity of secondary literature.

3. Why firms' should use green supply chain management? A model of environmental responsiveness

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Abstract

The purpose of this study was to identify the motivational factors to use Green Supply Chain Management (GSCM) in organization especially in Ready Made Garments (RMG) sectors. Data were collected from 300 employees and employers from Ready Made Garments, Bangladesh, using systematic sampling technique. Factor analyses was used to test the reliability and validity, and then Structural Equation Modeling were used to test the hypotheses. Among the six hypotheses proposed, five paths were supported. The supported hypotheses were Customer Demand, Environmental concern, Minimizing waste, Government rule ,Competitive advantage positively influenced to use GSCM, but the influence of Economic performance were not significant that is why this paths was not supported the hypothesis. The main goal of this study was to know the underlying motivation to use GSCM, which would help organizations to make policy and strategy so that they could use GSCM.

Key Words: Green Supply Chain Management, Ready Made Garments, SEM. Environmental concern.

4. Corporate environmental management accounting practicing and reporting in Bangladesh

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Abstract

The aim of first global conference on environment by United Nations held in 1972, in Stockholm was to protect and improve the human environment and prevent its impact. The Millennium Development Goals (MDGs) were set in 2012 by United Nations and upon the MDGs, a set (17) of Sustainable Development Goals (SDGs) were undertaken in 2105. Among the 17 SDGs, SDG-6, SDG-7, SDG-8, SDG-9 and SDG-12 are directly related to environmental management. In the management of environment the Environmental Management Accounting(EMA) is essential for corporate or companies because corporate sectors are the main parties of environmental humiliation as they are existed in the environment and for protecting environment a branch of accounting is emerged which is called environmental management accounting. Environmental Reporting (ER) is the output of the implementation of EMA and ER is essential for sustainable development as the environment is degrading seriously by the industrial activities resulting negative impact on human body. Considering the EMA, many national and international bodies viz. UNEP and UNCTD are working on this issue and the most influential

and pioneering effort on environmental reporting is Global Reporting Initiative (GRI) and ISO 14001:2015. Government of Bangladesh enacted laws regarding environment viz. Bangladesh Environment Conservation Act, 1995. The legal framework for accounting and reporting in Bangladesh is primarily governed Bangladesh Accounting Standard and Bangladesh Financial Reporting Standard, Securities and Exchange Commission Rules 1987 and the Income Tax Ordinance-1984. These laws do not prescribe any mandatory environmental accounting disclosure by the companies. EMA will help in this case and it is the motivation of the study. The core objective of the study is to develop a compliance framework for EMA and appraise the ER practices in selected industries in Bangladesh. In conducting the study, 50 environmental sensitive industries were selected from DSE. The study is based on secondary data. The theoretical date has been collected from the standard of different international bodies on EMA/ER and the practical data has been collected from the annual reports and others published documents of the selected companies of DSE. A compliance checklist was developed on 75 aspects of EMA and ER under 13 groups. In developing the compliance index binary method is used i.e. 1= if ER practices; 0= if not practices. Further the level of EMR/ER practices have been evaluated in terms of selected independent variables of the company viz. total assets, total sales, return on equity and size of board. The study showed that the level of ER ranges between 30% to 58% and on average 40% and only the total sales has significant impact on ER.

Key words: Environment protection, Industrial activities and Sustainable Development.

5. Factors affecting socio-economic condition of nurses in Sylhet City

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Abstract

Nursing career is one of the fastest growing sectors all over the world. But Nurses and nursing profession are both neglected in Bangladesh. The study is an attempt to assess the socio-economic condition of the nurses at Sylhet district. A total of 151 nurses of both male and female are interviewed by a structure questionnaire. Descriptive statistics and multiple linear regression model are applied to analyze the data. The result shows that most of the nurses are from Sylhet division and the female nurses (95.4%) are comparatively higher than that of male nurses. Majority (59.6%) of the nurses are married. The findings also show that more than two-third of the nurses have completed nursing diploma course. Most of the nurses (76.8%) are satisfied with their job. Average monthly income of the nurses is 27,843 (in Tk.). Only a few nurses (30.5%) have received training. The multiple linear regression analysis shows that nurse's satisfaction level, length of service and BMI are significant factors associated with their income.

Key words: Nurses, socio-economic, regression model, satisfaction level.

6. An extension to the world bank small area estimation method for analysing spatial distribution of diarrhoea prevalence among under-5 children in Bangladesh

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Abstract

Diarrhoea prevalence among under-5 children in Bangladesh has not yet been examined at disaggregate level (district/sub-district) due to data unavailability. The small area estimation (SAE) technique can be employed to estimate diarrhoea prevalence at micro-level administrative units. The World Bank SAE technique known as ELL method for poverty mapping is based on continuous response variable, while occurance of diarrhoea is dichotomous and hence the existing ELL method cannot be implemented. Here the idea of ELL approach has

been utilized after developing a generalized linear mixed model for the binary response variable. The specific objectives are to develop an SAE method for binary response variable and implement the developed SAE method in estimation of diarrhoea prevalence at disaggregate levels. Bangladesh Demographic and Health Survey (BDHS) 2011 data have been used as the survey data and Bangladesh Population and Housing Census 2011 as the census data. Children diarrhoea and nutrition data have been extracted from BDHS 2011. The development of the SAE method has been examined through model-based simulation study and empirical validation study using children height-for-age Z-score (HAZ) data. The HAZ score is considered as continuous response variable and the nutrition status stunting (HAZ < -2.00 SD) and severe stunting (HAZ < -3.00 SD) as two binary variables. The proposed SAE estimator for binary variable (ELL.B) is assumed to behave very similar to the existing ELL estimator for continuous variable (ELL.C). The ELL.B estimator is applied to estimate diarrhoea prevalence at division, district and sub-district levels with their accuracy measures. Simulation studies indicate that ELL.B performs better than ELL.C in terms of relative bias (RB), while ELL.C provides slightly lower relative root mean squared errors (RRMSE). The empirical validation study also shows that the ELL.B provides better estimates than ELL.C, but ELL.C provides lower RMSEs. The estimated division level diarrhoea prevalence are very similar to the DIR estimator with slightly higher estimated RMSE. The prevalence ranges within 2.4-7.3% at district and within 1.6-9.4% at sub-district levels. Most of north-eastern districts, three eastern districts, two southern districts, two south-eastern and one western district are found highly vulnerable to child diarrhoea. Sub-district level map shows that a significant number of north-eastern, eastern and south-eastern sub-districts had diarrhoea prevalence within 6.9-9.5%. The concerned government and non-government organizations can use the disaggregate level statistics of diarrhoea prevalence to prepare and implement their aid-related programs. The developed SAE method can also be implemented easily to other indicator type variables.

Keywords: Height-for-age Z-score, Census Data, Demographic and Health Survey Data, ELL method, Model-based Simulation, Mapping, Stunting

7. An assessment of environmental and social impact of Alipur industrial area, Habiganj

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Abstract

The prevailing tendency of industrialization and urbanization in emerging countries like Bangladesh, has a mammoth impact on natural and cultural environments. The present research aims to find out the impact on environment and socio-economic condition due to industrialization at Alipur in Habigang district which is experiencing rapid industrial development during last decade. Pollution sources upsurge with the development of industrialization and cause contamination of air, water, and soil. To fulfill the objectives of the research, a questionnaire survey was carried out by random sampling to find out the impact on socio-economic condition at Nurpur union under Saistaganj upailla and soil, air and water samples were collected. Most of the measured physicochemical parameters exceeded permissible limit of inland surface water. The p^H of the effluent water ranged from 4.83 to 8.58 which did not satisfy standard level. The DO was within the range of 1.98 to 3.32 mg/L indicating that aquatic life is in under stress. BOD ranged from 133 to 255.8 mg/L while COD ranged from 330 to 566 mg/L. Total suspended solids (TSS) values of the study area ranged from 1960 to 2170 mg/L while TDS ranged from 4110 to 5500 mg/L. Average concentration of air pollutants such as CO, NO_2, SO_2 was found close to permissible limit which means air was moderately polluted. The sound level was considerably higher than standard level at day and night for industrial area. Industrialization has brought occupational diversification in the study area along with created problems related to social structure. The anti-social activities are rapidly growing, heterogeneity is increasing, and people are becoming more disintegrated as well. Lack of urban environmental planning and management strategies has led to better concern for upcoming urban expansion.

This may hinder the economic growth by hampering agricultural production and creating several health problems that are local people facing at the same time.

8. Assessing salinity intrusion and salt load of Gorai-Passur River network, Bangladesh

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Abstract

Salinity intrusion is a major problem in the south-western part of Bangladesh which affects many activities including agriculture, fishing, forestry and health issues. Areas near to Bay of Bengal, Khulna, Chalna, Mongla, and Nalianala-Hadda are more affected by salinity intrusion. They have increasing salinity intrusion rate of 651.93, 83.677, 113.399 and 407.649 mS/cm per year in high tide and 551.42, 220.275, 184.952, and 11.519 mS/cm per year in low tide respectively. This salinity intrusion is dependent on many variables, among which river discharge and water level is significant in some areas. Kamarkhali has negative correlation with discharge in terms of salinity at 6.70%. Jhikargacha and Mongla is significantly dependent on water level at 12.07% and 29.66% respectively where Jhikargacha shows positive relation and Mongla shows negative. Khulna station is upward than Chalna, Mongla and Nalianala-Hadda station, but shows more salinity concentration and has a positive relation with Gorai river discharge, which is different than other stations. Gorai and Jhikargacha station shows positive correlation between their discharge and water level at 24.61% and 22.95% respectively. Various statistical methods have been conducted to measure these rate, relation and trend which are MK test, Sen's Slope estimator and Pearson's correlation. SPSS, Microsoft Excel and STATA softwares were used to conduct the calculations and Graphs. ArcGIS was used to prepare maps. Salt load measurement is important to know the actual condition of intrusion. For tidal rivers where inflow water doesn't carry saline particles, a new method is suggested to calculate salt load.

9. Devastating flood of April 2017 in haor area of Mithamoin upazilla, Kishoreganj – how much impacts of climate change on the livelihoods of the people?

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Abstract

This study attempts to see changes in temperature and rainfall based on trend analysis, and to analyze the impacts of climate change on the livelihoods of the people and determine the factors that significantly affect farmers' adaptation using logistic regression analysis in *Haor* area of Mithamoin Upazilla under Kishoreganj in Bangladesh. The temperature in the first quarter along with other quarters has been increased considerably and it is found a constraint to rice production and cause a significant yield reduction. The average rainfall in each quarter has been found increasing from 2009 to 2017 and it is recorded pretty much higher than the previous three years that explains the devastating flash flood of 2017 in haor region of Kishoreganj district. The people of Khoishore village are affected by riverbank erosion and lost their property and infrastructure. While the people of Dalargaon and Hasimpur village suffered from riverbed fill up due to heavy sediment carried by flash flood and seasonal flood. For Khoishore village, possession of own farming land was found statistically significant for practicing homestead gardening and tree plantation. Their education level was statistically 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 following weather forecast. For Dalargaon village, possession of own farming land was found statistically 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. 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 adopt the duck rearing. For Hasimpur village, yearly income significantly influences practicing modern and effective seed; the people with lower education level (signatory or less) migrate or 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 strategies.

Keywords: Climate change, Adaptation strategies, Trend analysis, Logit regression analysis, Bangladesh.

10. Obesity and Food Habits of Primary School Going Children: A Longitudinal Study

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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 done in Sylhet city. Therefore, the aim of this study was to reveal the health status and food habits over time of primary school going children in this city based on a longitudinal study.

Initially we built a cohort, selecting 94 primary school going children in Sylhet. We collected height, weight and other relevant information from the children by visiting the primary schools as well as households at total three time points. That is, we collected the information from the same children at the initial time (T_0), after six month (T_6) and after twelve month (T_{12}). Principal Component Analysis (PCA), Multi-factor Analysis (MFA) and Linear Mixed model (LMM) have been applied to analyze the data.

We observed that the rate of overweight & obesity has decreased among the male children; the obesity rate remained almost same for the female children at T_0 and T_6. Food habits revealed that obese children consumed more bread, meat and junk foods than others and most of the children ignored fruits and vegetables.

Although the level of obesity is not so high, proper steps should be taken to minimize the existing rate through developing both school and family based programs on consuming proper nutritional foods; 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.

Keywords: Obesity, Food Habits, Longitudinal study.

11. Exploring the pattern of children's disability in Sylhet Division

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Abstract

Psychological or physiological deterioration, which hinders a person from living a conventional lifestyle, is termed as disability. Disability, be it permanent or temporary, is faced by almost every human being at some point of his/her lifespan, if that person survives to an older age. However, the traditional definition of disability focuses on impairment due to birth defect or any accidental cause. Disabled individuals are deprived of their social, economical, educational and personal rights. As a result, their progress in the society gets obstructed, making them unproductive to the nation. A noteworthy portion of approximately 10% of the overall population of

Bangladesh consists of disabled persons. It is immensely challenging for this developing country to ensure the rights of disabled persons and making them a productive part of the progress of the country. This purpose requires a deeper understanding of the social, economical, biological and environmental cause of impairment and to discover the associations of these to the patterns of disability. There is lack of sole study of the pattern of disability of children under 12 years in Sylhet Division.

Data on 413 children was collected through detailed questionnaire from the patients of Sylhet Osmani Medical College Hospital and from chambers of various private medical practitioners. To understand the nature of the data, descriptive analysis has been performed. To find the patterns of multiple disabilities and also their causes and effects, association rule mining technique has been employed.

Among the disabilities, the prevalence of cerebral palsy is 82%, which is the highest of all. The other significant disabilities are autism (9.8%), down syndrome (2.5%), epilepsy (6%) and so on. Almost 41.6% have seizures disorder with lack of normal cognition (98.2%), abnormal gross motor (82%) and fine motor (76.7%) etc. From analyzing the association rules, antenatal jaundice has been found connected with several disabilities like abnormal gross and fine motor, abnormal behavior, socialization and communication etc. Normal delivery, natal low weight and seizures at birth are associated with Spastic Diplegic cerebral palsy; normal delivery, birth asphyxia and poor neonatal feeding found associated with Spastic Tetraplegic cerebral palsy. A combination of abnormal speech, hearing and vision is effected by antenatal illness, pneumonia and underweight. Besides, previous abortion is found connected with cerebral palsy.

This study adopts advanced data mining technique of association rule mining in categorizing and analyzing reasons and patterns of disabilities among children in Sylhet division. The finding aims to help the initiative of helping the steps taken for turning disabled population as differently able to make changes in the society for greater welfare of the nation.

12. Institutional accessibility and credit is influential for adaptation: challenges and barriers of farms adaptation after flash flood

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Abstract

Bangladesh is reported to be one of the most vulnerable countries to future climate change. Agricultural adaptation and mitigation will be crucial for maintaining food production and availability. This study focuses on to analyze the determinants of taking adaptation strategies by lowland rice farmers on climate change and variability, and the impact of climate change adaptation on productivity using household data from lowland rice farmers of selected haor areas in Sylhet. This project's first objective was to explore the extent of awareness and perceptions of lowland rice farmers on climate change and variability. To serve this purpose, we evaluate farmer's perceptions and attitude of climate change vulnerability through severity index (SI). The respondents were asked about the facts they were facing in their daily life for climate change. The SI index ranges from 69.18% to 93.52%. The SI of the perception of "Climate change affects rice production" is 93.52%. The logistic regression has been done to see the impact of socio-economic and institutional effect on adaptation. The results show that credit from non-government organization is highly statistically significant for adaptation and rural market structure is also working positive to adaptation. Institutional training is most important factor which is highly significantly works with the adaptation. The Gov. should provide seasonal training activities for marginal farmers distributing the knowledge of adaptation during flash flood. They should also provide some credit during the early flash flood so farmer can take initiative to adaptation and enhance their livelihood.