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Video quality evaluation using DWT-SPIHT based watermarking technique

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Rajeev Kumar ; Sanjeet Kumar ; Sukhreet Singh Brar **All Authors**

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Abstract

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- V. Simulation Results

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Abstract:
The video quality analysis is very important in today's video broadcasting and transmission quality control because the quality is a key factor in customer satisfaction. This paper presents a full reference based video quality evaluation technique, using the application of watermarking. Frames with low complexity value are selected for the insertion of the watermark, on the selected video frames; DWT is applied up to third level to get the DWT coefficients. Then SPIHT encoding/decoding is applied which helps in finding the significant coefficients for the insertion of watermark. The significant coefficients are converted into bit-planes and 3rd bit plane (from LSB side) of each coefficient is selected for watermark. The SPIHT algorithm ensures that the watermark bits are inserted uniformly throughout the frames. After embedding the watermark, the IDWT is applied and we get the watermarked frames which are then incorporated in the video file. The simulation results show no visible difference between watermarked frame and original frame. The video quality is estimated in terms of peak signal to noise ratio (PSNR), structure similarity (SSIM) and true detection rates (TDR) against various attacks like Salt pepper noise, rotation Gaussian noise and compression attacks. The results indicate that the proposed technique for quality evaluation of the video, accurately calculates the quality of a video and also it is robust against various attacks.

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Conference Location: Roorkee, India

I. Introduction
In the recent years with the advent of the Internet, the digital data is being generated in abundance. This has urged the requirement for computerized rights authority, which can protect the copyright of the owner and the solution is to use digital watermarking [1]. A watermark is a digital data that is embedded into the multimedia data such that it can be discovered or extracted at later times for the proof of ownership. Watermarking is to embed information imperceptibly and robustly in the cover data. Watermark may contain the information about the source, ownership, receiver, copy control etc. After watermark embedding, the original cover media becomes slightly modified, and the modified content is called the

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- Authors**
- Rajeev Kumar**
Department of CSE, Moti Babu Institute of technology, Forbesganj, Bihar, India
 - Sanjeet Kumar**
Department of CSE, Moti Babu Institute of technology, Forbesganj, Bihar, India
 - Sukhreet Singh Brar**
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Resolving the celestial classification using fine k-NN classifier

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Abstract:

With the rapid growth in space technology, space exploration is on the high demand. With each such type of mission, data is accumulating in heaps. Be it manned or unmanned mission, its credibility is defined by the quality of research which can be conducted on the data collected in such missions through remote or on the capsule experiments. Thus there is huge demand of soft techniques, which can make the space or celestial data as useful as possible. One of the major issues is dearth of automated technique for image classification of celestial bodies. Though many image classification techniques exist, but none of them is totally attributed to celestial bodies. An artificial neural network based classifier is proposed to classify celestial object from its image. Texture features are extracted from 90 images of size of 225*225 of different planets. Different classifiers were applied on this training data. Accuracy of different classifiers is compared to find out the best classifier for space data classification. Different validation schemes are applied and the results are compared to figure out the best validation scheme.

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Publisher: IEEE

Conference Location: Wagnghat, India

I. Introduction

It is an ever remaining interest for scientist and folks to know our universe more and more. And this thrust enables them to reach more and more unreached celestial objects. It can be Mars, Venus etc. With each space expedition, the data is rising in heaps. The size of data is so big that it will take months to process manually. In digital era, this manual classification must be replaced by some automated image classification techniques. This is the mark of space scientist. Hence there is a need to develop an image classification technique which fits best for celestial data. This paper will describe an image classification technique for celestial data.

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Sangeeta Yadav

Computer Science and Technology, Central University of Punjab Bathinda, Punjab, India

Amandeep Kaur

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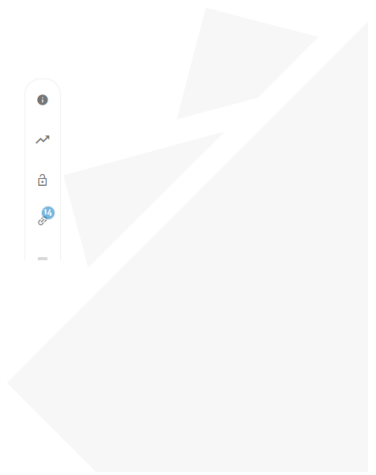
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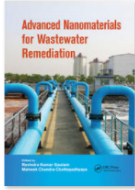


ABSTRACT

Software defect in today's era is most important in the field of software engineering. Most of the organizations used various techniques to predict defects in their products before they are delivered. Defect prediction techniques help the organizations to use their resources effectively which results in lower cost and time requirements. There are various techniques that are used for predicting defects in software before it has to be delivered. For example clustering, neural networks, support vector machine (SVM) etc. In this paper two defect prediction techniques: - K-means Clustering and Multilayer Perceptron model (MLP), are compared. Both the techniques are implemented on different platforms. K-means clustering is implemented using WEKA tool and MLP is implemented using SPSS. The results are compared to find which algorithm produces better results. In this paper Object-Oriented metrics are used for predicting defects in the software.

References





Chapter

Nanomaterial-Supported Biopolymers for Water Purification

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Topological insulator behavior of WS₂ monolayer with square-octagon ring structure

AIP Conference Proceedings 1731, 140049 (2016); <https://doi.org/10.1063/1.4948215>Ashok Kumar¹, Ravindra Pandey², P. K. Ahluwalia³, and K. Tankeshwar⁴
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¹Centre for Physical Sciences, School of Basic and Applied Sciences, Central University of Punjab, Bathinda, India 151001²Department of Physics, Michigan Technological University Houghton, MI, USA³Department of Physics, Himachal Pradesh University Shimla, India, 171005⁴Department of Physics, Panjab University Chandigarh, India 160014

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- Spin-orbit interactions
- Semiconductors
- Electronic transport
- Topological insulator
- Spintronics
- Density functional theory
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ABSTRACT

We report electronic behavior of an allotrope of monolayer WS₂ with a square octagon ring structure, refereed to as (so-WS₂) within state-of-the-art density functional theory (DFT) calculations. The WS₂ monolayer shows semi-metallic characteristics with Dirac-cone like features around Γ . Unlike p-orbital's Dirac-cone in graphene, the Dirac-cone in the so-WS₂ monolayer originates from the d-electrons of the W atom in the lattice. Most interestingly, the spin-orbit interaction associated with d-electrons induce a finite band-gap that results into the metal-semiconductor transition and topological insulator-like behavior in the so-WS₂ monolayer. These characteristics suggest the so-WS₂ monolayer to be a promising candidate for the next-generation electronic and spintronics devices.



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Effect of sintering temperature on the optical properties of BiFeO₃ nanoparticles

AIP Conference Proceedings 1728, 020437 (2016); <https://doi.org/10.1063/1.4946488>

Devender Jalandhara^{a)}, Gurdhir Singh, and Kamlesh Yadav^{b)}
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- Optical properties
- Sintering
- Catalysts and Catalysis
- Multiferroics
- Fourier transform spectroscopy
- Nonvolatile memory
- Nanoparticles
- Spintronics

ABSTRACT

BiFeO₃ is a multiferroic material which exhibits excellent optical properties. BiFeO₃ nanoparticles are synthesized by using sol-gel method. The nanoparticles are synthesized at different sintering temperatures of 500°C, 600°C, 700°C, 800°C and 850°C. In this paper, the effect of sintering temperature on the optical properties in BiFeO₃ nanoparticles is studied. Field emission scanning electron microscopy (FESEM) images show that particles are nearly spherical in shape. The average particles size increases from 37 nm to 51 nm with increasing sintering temperature.



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Electronic properties and mechanical strength of nano-ribbons

AIP Conference Proceedings **1728**, 020600 (2016); <https://doi.org/10.1063/1.4946651>

Ram Swaroop, Pradeep Bhatia, and Ashok Kumar*

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TOPICS

- First-principle calculations
- Materials properties

ABSTRACT

We have performed first principles calculations to find out the electronic properties of zig-zag edged nano ribbons of β -electronic band-gap get opened-up to 2.61 eV by passivation. Similarly, the mechanical strength is found to be increase from unpassivated nano ribbons to passivated ones along with tensile strain. The band-gap value of passivated ribbon gets closed strain up to which the ribbon does not break. These tunable



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Sodium-ion-conducting polymer nanocomposite electrolyte of TiO₂/PEO/PAN complexed with NaPF₆

AIP Conference Proceedings 1728, 020346 (2016); <https://doi.org/10.1063/1.4946397>Chandni Bhatt, Ram Swaroop, Parul Kumar Sharma, and A. L. Sharma^{*}
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TOPICS

- Electrolytes
- Electrical conductivity
- Ions and properties
- Nanomaterials
- Electrochemical potential
- Polymers
- Cyclic voltammetry
- Scanning electron microscopy

ABSTRACT

A free standing transparent film of solid state polymer electrolyte based on PEO/PAN+NaPF₆ with different compositions of nano sized TiO₂ in weight percent ($x = 0, 1, 2, 5, 10, 15, 20$) is synthesized by using standard solution cast technique. The homogeneous surface of above polymer composition is examined by FESEM. The microscopic interaction among polymer, salt and nanoceramic filler has been analyzed by Fourier Transformed Infra-Red (FTIR) spectroscopy. The reduction of ion pair formation in polymeric separator is clearly observed on addition of nanofiller in the polymer salt complex film. Electrical conductivity has been recorded of the prepared polymeric separator which is of the order of $\sim 10^{-4} \text{ Scm}^{-1}$ after addition of nanofiller (15% wt/wt) which support the FTIR results. Electrochemical potential window has been observed of the order of $\sim 6\text{V}$ by the cyclic voltammetry results. The observed data of the prepared separator are at par with the desirable value for device applications

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Role of salt concentration in blend polymer for energy storage conversion devices

AIP Conference Proceedings **1728**, 020364 (2016); <https://doi.org/10.1063/1.4946415>Anil Arya¹, M. Sadiq², and A. L. Sharma^{1, a)}
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- Polymer electrolyte
- Ultracapacitors
- Energy storage
- Display devices
- Energy conversion
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- Chemical elements

ABSTRACT

Solid Polymer Electrolytes (SPE) are materials of considerable interest worldwide, which serves dual purpose of electrolyte and separator between electrode compartments in renewable energy conversion/storage devices such as; high energy density batteries, electrochromic display devices, and supercapacitors. Polymer blend electrolytes are prepared for various concentration of salt (O^-/Li) with the constant ratio (0.5 gm) of each PEO and PAN polymers (blend polymer) using solution casting technique. Solid polymeric ionic conductor as a separator is the ultimate substitute to eliminate the drawback related to liquid and gel polymer ionic conductors. In the present work, solid polymer electrolyte film consisting of PEO, PAN and LiPF_6 are examined for various concentration of lithium salt by keeping PEO/PAN blend ratio as a constant with a view to optimize the dominant salt concentration which could give the maximum conductivity at ambient temperature.

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Shape-dependent electronic properties of blue phosphorene nano-flakes

AIP Conference Proceedings **1728**, 020598 (2016); <https://doi.org/10.1063/1.4946649>Pradeep Bhatia, Ram Swaroop, and Ashok Kumar
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ABSTRACT

In recent year's considerable attention has been given to the first principles method for modifying and controlling electronic properties of nano-materials. We performed DFT-based calculations on the electronic properties of zigzag-edged nano-flakes of blue phosphorene with three possible shapes namely rectangular, triangular and hexagonal. We observed that HOMO-LUMO gap of zigzag phosphorene nano-flakes with different shapes is ~ 2.9 eV with H-passivations and $\sim 0.7 - 1.2$ eV in pristine cases. Electronic properties of blue phosphorene nano-flakes show the strong dependence on their shape. We observed that distributions of molecular orbitals were strongly affected by the different shapes. Zigzag edged considered nanostructures are non-magnetic and semiconducting in nature. The shape dependent electronic properties may find applications in tunable nano-electronics.

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Topological insulator behavior of WS₂ monolayer with square octagon ring structure

AIP Conference Proceedings **1731**, 140049 (2016); <https://doi.org/10.1063/1.4948215>Ashok Kumar^{1,*}, Ravindra Pandey², P. K. Ahluwalia³, and K. Tankeshwar⁴
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ABSTRACT

We report electronic behavior of an allotrope of monolayer WS₂ with a square octagon structure, referred to as (so-WS₂) within state-of-the-art density functional theory calculations. The WS₂ monolayer shows semi-metallic characteristics with Dirac-cone features around Γ . Unlike p-orbital's Dirac-cone in graphene, the Dirac-cone in the monolayer originates from the d-electrons of the W atom in the lattice. Most interestingly, the spin-orbit interaction associated with d-electrons induces a finite band-gap that leads to the metal-semiconductor transition and topological insulator-like behavior in WS₂ monolayer. These characteristics suggest the so-WS₂ monolayer to be a promising candidate for the next-generation electronic and spintronics devices.

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Thickness dependent optical properties of PEMA and (PEMA)_{0.85}/(ZnO)_{0.15} nanocomposite films deposited by spray pyrolysis technique on ITO substrate

AIP Conference Proceedings **1728**, 020412 (2016); <https://doi.org/10.1063/1.4946463>Anjna Thakur^{a)}, Priya Thakur, and Kamlesh Yadav^{b)}
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- Nanocomposites

ABSTRACT

In this paper, poly (ethyl methacrylate) (PEMA) and (PEMA)_{0.85}/(ZnO)_{0.15} nanocomposite films for 2, 3, 4 and 5 minutes have been deposited by spray pyrolysis technique on indium tin oxide (ITO) coated substrate. The effect of thickness of the film on the morphological and optical properties of PEMA and (PEMA)_{0.85}/(ZnO)_{0.15} nanocomposite films are studied. The morphological and optical properties of pure PEMA and (PEMA)_{0.85}/(ZnO)_{0.15} nanocomposite films are compared. The field emission scanning electron microscopy (FESEM) shows that as the thickness of film increases, uniformity of films increases. It is found from UV-Visible spectra that the energy band gap decreases with increasing the deposition time and refractive index increases with increasing the thickness of the film. The band gap of the nanocomposites is found less than the pure polymer film and opposite trend is observed for refractive index. The optical absorption of PEMA/ZnO nanocomposite films is higher than pure PEMA film. The thickness of the nanocomposite film plays a significant role in the tunability of the optical properties.

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Stability, structural and electronic properties of benzene molecule adsorbed on free standing Au layer

AIP Conference Proceedings **1731**, 090039 (2016); <https://doi.org/10.1063/1.4948003>Neha Katoch^{1,*}, Pooja Kapoor¹, Munish Sharma¹, Ashok Kumar², and P. K. Ahluwalia¹[View Affiliations](#) [View Contributors](#)[ABSTRACT](#)[CITED BY](#)[TOOLS](#)[SHARE](#)

TOPICS

- Probability theory
- Heterocyclic compounds

ABSTRACT

We report stability and electronic properties of benzene molecule adsorbed on the Au atomic layer within the framework of density function theory (DFT). Horizontal configuration of benzene on the top site of Au monolayer prefers energetically over other studied configurations. On the adsorption of benzene, the ballistic conductance of Au monolayer is found to decrease from $4G_0$ to $2G_0$ suggesting its applications for the fabrications of organic sensor devices based on the Au atomic layers.

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Effect of grain size on optical properties of iron oxide nanoparticles

AIP Conference Proceedings 1728, 020409 (2016); <https://doi.org/10.1063/1.4946460>

Gurdhir Singh^{a)}, Devender Jalandhara, and Kamlesh Yadav^{b)}

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- Scanning electron microscopy

ABSTRACT

In the present paper, iron oxide nanoparticles are successfully synthesized by the sol-gel method. The grain size is varied by sintering the nanoparticles at different temperature 400, 500, 600, 700 and 800 °C. Field emission scanning electron microscope (FESEM) image shows that the grains are uniformly distributed. The grain size increases from 15 nm to 35 nm with increasing the sintering temperature (400–800 °C). Energy dispersive X-ray spectroscopy (EDS) analysis shows that Fe is present in the stoichiometric ratio in all the synthesized samples. Fourier transform infrared spectroscopy (FTIR) spectra show that Fe–O stretching peaks appears at $\sim 495\text{ cm}^{-1}$. The value of energy band gap are found 2.75, 2.67, 2.62, 2.59, and 2.57 eV for the samples sintered at 400, 500, 600, 700 and 800 °C respectively. Therefore, the decrease in band gap with increasing the temperature has been observed. In this paper, the structural and optical properties have been explained on the basis of variation in the grain size with the temperature. The present studied samples more widely used in gas sensors and as catalysts.

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Structural, electronic and magnetic properties of Au-based monolayer derivatives in honeycomb structure

AIP Conference Proceedings **1731**, 050080 (2016); <https://doi.org/10.1063/1.4947734>Pooja Kapoor^{1,*}, Munish Sharma¹, Ashok Kumar², and P. K. Ahluwalia¹[View Affiliations](#) [View Contributors](#)

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ABSTRACT

We present electronic properties of atomic layer of Au, Au₂-N, Au₂-O and Au₂-F in graphene like structure within the framework of density functional theory (DFT). The lattice constant of derived monolayers are found to be higher than the pristine Au monolayer. Au monolayer is metallic in nature with quantum ballistic conductance calculated as 4G₀. Similarly, Au₂-N and Au₂-F monolayers show 4G₀ and 2G₀ quantum conductance respectively while semiconducting nature with calculated band gap of 0.28 eV has been observed for Au₂-O monolayer. Most interestingly, half metallicity has been predicted for Au₂-N and Au₂-F monolayers. Our findings may have importance for the application of these monolayers in nanoelectronic and spintronics.

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Electronic properties of phosphorene/graphene heterostructures: Effect of external electric field

AIP Conference Proceedings 1731, 050012 (2016); <https://doi.org/10.1063/1.4947666>Sumandeep Kaur¹, Ashok Kumar², Sunita Srivastava¹, and K. Tankeshwar¹[View Affiliations](#) [View Contributors](#)

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- Doping
- Electronic devices
- Electronic transport
- Electric fields

ABSTRACT

We report the electronic properties of electrically gated heterostructures of black and blue phosphorene with graphene. The heterostructure of blue phosphorene with graphene is energetically more favorable than black phosphorene/graphene. However, both are bound by weak interlayer interactions. Graphene induces the Dirac cone character in both heterostructure which shows tunabilities with external electric field. It is found that Dirac cone get shifted depending on the polarity of external electric field that results into the called self induced p-type or n-type doping effect. These features have importance in the fabrication of nano-electronic devices based on the phosphorene/graphene heterostructures.

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Study of variation in the band gap with concentration of $\text{TiO}_2/\text{In}(\text{LaMnO}_3)_{1-x} / (\text{TiO}_2)_x$ (where $x = 0.0, 0.1, 0.2, 0.3$ and 0.4) nanocomposites

AIP Conference Proceedings 1728, 020414 (2016); <https://doi.org/10.1063/1.4946465>Priya Thakur^{a)}, Anjna Thakur, and Kamlesh Yadav^{b)}
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- Optical properties
- Transition metal oxides
- Nanoparticles
- Minerals
- Hydrogenation process
- Nanocomposites
- Chemical elements
- Particle size analysis

ABSTRACT

In this paper $(\text{LaMnO}_3)_{1-x}/(\text{TiO}_2)_x$ (where $x = 0.0, 0.1, 0.2, 0.3$ and 0.4) nanocomposite are prepared by mixing the LaMnO_3 and TiO_2 (Sigma Chemicals, particle size ~ 21 nm) nanoparticle in appropriate ratio. These samples were characterized by using FESEM, EDS and FTIR to study the optical properties. Field Emission Scanning Electron Microscopy (FESEM) image of pure LaMnO_3 sample shows that the uniform particle size distribution is observed. The average particle size of the LaMnO_3 nanoparticles is 43 nm. The crystallite size increases from 16-24 nm with increasing the weight percentage of TiO_2 in $\text{LaMnO}_3/\text{TiO}_2$ nanocomposite up to $x = 0.4$. The Fourier transform infrared spectroscopy (FTIR) spectra show that the absorption peaks appear at 450 cm^{-1} and 491 cm^{-1} which represent the Mn-O bending and Ti-O stretching mode respectively. The broadening of these peaks with increasing the concentration of TiO_2 is also observed. It gives an evidence for the formation of metal oxygen bond. The absorption band at 600 cm^{-1} corresponds to the stretching mode, which indicates the perovskite phase present in the sample. The values of band gap are found 2.1, 1.9, 1.5, 1.3 and 1.2 eV for the $x = 0.0, 0.1, 0.2, 0.3,$ and 0.4 respectively. Thus, the decrease in band gap and increase in refractive index with increasing concentration of TiO_2 has been observed. These prepared nanocomposites can be used in the energy applications, to make the electrical devices and as a catalyst for photocatalytic processes e.g. hydrogenation.

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Interactions of gas molecules with monolayer MoSe₂: A first principle study

AIP Conference Proceedings **1731**, 140045 (2016); <https://doi.org/10.1063/1.4948211>

Munish Sharma^{*,1}, Pooja Jamdagni¹, Ashok Kumar², and P. K. Ahluwalia¹
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TOPICS

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- First-principle calculations
- Transition metal chalcogenides
- Semiconductors

ABSTRACT

We present a first principle study of interaction of toxic gas molecules (NO, NO₂ and SO₂) with monolayer MoSe₂. The predicted order of sensitivity of gas molecule is NO₂ > SO₂ > NO. Adsorbed molecules strongly influence the electronic behaviour of monolayer MoSe₂ by inducing impurity levels in the vicinity of Fermi energy. NO and SO₂ is found to induce p-type doping effect while semiconductor to metallic transitions occur on NO₂ adsorption. Our findings may guide the experimentalist for fabricating sensor devices based on MoSe₂ monolayer.

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No Access • Published Online: 10 May 2016

Improved electrochemical performance of the Cr doped cathode materials for energy storage/conversion devices

AIP Conference Proceedings 1728, 020380 (2016); <https://doi.org/10.1063/1.4946431>

Sangeeta, Shruti Agnihotri, Anil Arya, and A. L. Sharma*

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 - Doping
 - Electrical conductivity
 - Minerals
 - Chemical analysis
 - Electric measurements
 - Ions and properties
 - Energy storage
 - Energy dispersive X-ray spectroscopy
 - Scanning electron microscopy


ABSTRACT

Successful synthesis of a nanostructured Cr-doped LiFePO_4 cathode material has been prepared by a sol-gel technique followed by a single step thermal treatment at 750°C for 12 hours. As olivine type LiFePO_4 has already gained much attention due to its advantages over other cathode materials, doping of metal ion is done in the paper to improve its drawback of lower conductivity, FESEM couples with EDX were done to characterize the morphology and particle size of the materials. $\text{LiFe}_{(1-x)}\text{Cr}_x\text{PO}_4$ ($x=0.1, 0.2, 0.3$) materials have average particle size of 30 to 50 nm. EDX analysis confirmed the precursor used and also confirmed the presence of carbon which is in good agreement with chemical analysis result. Electrical conductivity of the prepared cathode materials is estimated of the order of 10^{-5} Scm^{-1} by AC impedance analysis. The energy density and power density of the cathode materials is improved drastically after addition of Cr as dopant. The estimated parameters appear at desirable value for use of materials as cathode in energy storage/conversion devices.

Electronic properties and mechanical strength of β -phosphorene nano-ribbons

AIP Conference Proceedings 1728, 020600 (2016); <https://doi.org/10.1063/1.4946651>Ram Swaroop, Pradeep Bhatia, and Ashok Kumar[†]
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- First-principle calculations
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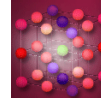
ABSTRACT

We have performed first principles calculations to find out the effect of mechanical strain on the electronic properties of zig-zag edged nano ribbons of β -phosphorene. It is found that electronic band-gap get opened-up to 2.61 eV by passivation of the edges of ribbons. Similarly, the mechanical strength is found to be increase from 1.75 GPa to 2.65 GPa on going from unpassivated nano ribbons to passivated ones along with the 2% increase in ultimate tensile strain. The band-gap value of passivated ribbon gets decreased to 0.43 eV on applying strain up to which the ribbon does not break. These tunable properties of β -phosphorene with passivation with H-atom and applying mechanical strain offer its use in tunable nano electronics.

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Energetics and electronic properties of Pt wires topologies on monolayer MoSe₂

AIP Conference Proceedings **1731**, 090028 (2016); <https://doi.org/10.1063/1.4947992>

Pooja Jamdagni^{1,*}, Ashok Kumar², Anil Thakur³, Ravindra Pandey⁴, and P. K. Ahluwalia¹
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TOPICS

- Nanoelectronics
- Transition metal chalcogenides
- Energy economics
- Density functional theory

ABSTRACT

The energetics and electronic properties of different topology zigzag and ladder structures on MoSe₂ monolayer have been investigated using density functional theory (DFT). The predicted order of stability of the monolayer is found to be: linear > ladder > zigzag. Pt wires induced on MoSe₂ that results into metallic characteristics of Pt-wire/monolayer. The valence band charge density signifies most of the contribution

Correlation of ion-ion interaction with electrical conductivity in solid state polymeric separator for energy storage applications

AIP Conference Proceedings 1728, 020368 (2016); <https://doi.org/10.1063/1.4946419>Parul Kumar Sharma, M. Sadiq, Chandni Bhatt, and A. L. Sharma[†]
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- Materials properties
- Electrochemical impedance spectroscopy
- Energy storage
- Polarizable force fields
- Electrical conductivity

ABSTRACT

In the present study, we report innovative study on the prepared high quality solid state free standing thin polymeric separator. In prepared free standing polymeric separator, polymer (PEO) has been used as host matrix; appropriate bulky anion salt (LiPF_6) as conducting species and Nano ceramic filler (BaTiO_3) is used to enrich the mechanical and thermal stability of separator used for the device applications. The Fourier Transform Infra-Red (FTIR) result has been analysed properly of the prepared materials to look the microscopic interaction among polymer-ion, ion-ion and polymer-ion-clay interaction. Electrical conductivity results has been recorded using the impedance spectroscopy results which gives the estimated value of the order of $\sim 10^{-3} \text{ Scm}^{-1}$ of the nano ceramic doped polymeric separator which is desirable for energy storage application. A fine correlation has been established between the obtained results by this two analysis.

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Effect of sintering temperature on the optical properties of BiFeO₃ nanoparticles

AIP Conference Proceedings 1728, 020437 (2016); <https://doi.org/10.1063/1.4946488>Devender Jalandhara^{a)}, Gurdhir Singh, and Kamlesh Yadav^{b)}
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- Multiferroics
- Fourier transform spectroscopy
- Nonvolatile memory
- Nanoparticles
- Spintronics
- Scanning electron microscopy

ABSTRACT

BiFeO₃ is a multiferroic material which exhibits excellent optical properties. BiFeO₃ nanoparticles are synthesized by using sol-gel method. The prepared samples are sintered at 500°C, 600°C, 700°C, 800°C and 850°C. In this paper, the effect of sintering temperature on the optical properties in BiFeO₃ nanoparticles is studied. Field emission electron microscopy (FESEM) images show that particles are nearly spherical in shape. It is found that the particles size increases from 37 nm to 51 nm with increasing the sintering temperature. FESEM images also reveal a homogenous size distribution of nanoparticles. All the functional groups are indexed in the Fourier transform infrared spectroscopy (FTIR) spectra. It is found that Fe-O stretching peaks are appeared in the wave number range 447 and 507 cm⁻¹. The value of energy band gap are found 2.14, 2.26, 2.30, 2.36, and 2.54 eV for the samples sintered at 500°C, 600°C, 700°C, 800°C and 850°C respectively. Thus, the increase in band gap with increasing temperature has been observed. The present samples can be used as photo-catalyst, in non-volatile memories and to make spintronics devices.

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Effect of MWCNT on prepared cathode materi $x)SiO_4)$ for energy storage applications

AIP Conference Proceedings 1728, 020439 (2016); <https://doi.org/10.1063/1.4946490>

Shruti Agnihotri^{a)}, Sangeeta Rattan, and A. L. Sharma^{b)}
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ABSTRACT

TOOLS

TOPICS


- Sol-gel process
- Electrochemical impedance spectroscopy
- Energy storage
- Electrical conductivity
- Electrochemistry
- Nanotubes
- Scanning electron microscopy

ABSTRACT

The electrode material $Li_2MnFeSiO_4$ was successfully synthesized by sol-gel method and further modified with multiwalled carbon nanotubes to improve its electrochemical properties. Our strategy helps us to improve the specific capacity as compared with the bare material. This novel structure provides an efficient cation (Li^+) and electron channel which significantly increases the specific capacity and reduced charge transfer resistance. Hence, the specific capacity is improved. Characterization technique like Field emission scanning electron microscopy (FESEM) has been used to confirm its morphology.



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Improved electrical properties of free standing blend of polymer electrolyte and renewable energy resources

AIP Conference Proceedings 1731, 110034 (2016); <https://doi.org/10.1063/1.4948055>

Anil Arya, Sweety Sharma, and A. L. Sharma ^{*}
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- TOPICS**
- Thin films
 - Polymer electrolyte
 - Renewable energy
 - Energy storage
 - Ionic conductivity
 - Electrical properties and parameters
 - Electrical conductivity
 - Scanning electron microscopy

ABSTRACT

Blend polymer electrolytes are prepared for salt concentration (0.5 gm) of PEO and PAN using solution casting technique. The solid polymeric film is characterized by Field Emission Scanning Electron Microscopy (FESEM) which confirms the homogeneous distribution of dissociated ions in the matrix. After addition of salt the ionic conductivity value is found to be 10^{-5} Scm^{-1} which is three orders higher when compared with pure polymer electrolyte. Fourier Transform Infrared (FTIR) Spectroscopy. A very fine correlation has been observed between the FTIR spectra of the blend and the pure components.



Rural indebtedness in Punjab and other states : problems and the way out : based on proceedings of the National Seminar on Rural Credit and Financial Penetration in Punjab, organised by RBI Chair CRRID on March 21-22, 2016 /

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- 5.2. Vermitechnology for Organic Waste Recycling
- 5.3. Earthworms
- 5.4. Role of Earthworms in Vermicomposting
- 5.5. Various Stages in the Vermicomposting Process
- 5.6. Influence of Process Parameters on Vermicomposting
- 5.7. Physical and Biochemical Changes in Waste During V...
- 5.8. Vermicomposting of Urban Waste
- 5.9. Vermicompost: Importance
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5 - Vermitechnology for Organic Waste

R. Gupta ¹, V.K. Garg ², *

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
Abstract

The disposal and management of solid wastes is a technical and challenge throughout the globe because of their quantities and nature. Vermicomposting is one of the most ecologically and eco technologies for handling the biodegradable organic fraction of a variety of such wastes of plant and animal origins can be gainfull at different scales varying from a household bin to a city level. Ve has excellent manurial properties as a soil conditioner and fertili of nitrogen, phosphorus, potassium, and other nutrients for plan make vermicomposting a good option for processing the enorm biodegradable organic solid wastes that are generated in huge qu chapter, a review of the state of the art of vermicomposting techr including the process, various stages, characteristics, and benefit

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 OPEN ACCESS PEER-REVIEWED CHAPTER

Oxidative Stress in Invertebrate Systems

WRITTEN BY

R.K. Chaitanya, K. Shashank and P. Sridevi

Submitted: September 22nd, 2015, Reviewed: June 9th, 2016, Published: October 26th, 2016

DOI: 10.5772/64573



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Abstract

Invertebrates have been valuable research models in the discovery of many scientific principles owing to the numerous advantages they provide. Throughout the life cycle, many of them thrive in pathogen-rich environments, manage harsh weathers, exposed to a number of allochemicals, and adapt well to both terrestrial and marine ecosystems. Their remarkable ability to cope up with the enormous oxidative stress generated in all these circumstances, make them attractive models in this field of research. Endocrine control of oxidative stress in insects is recently emerging. Adipokinetic hormone, glucagon, ecdysteroids and juvenile hormone have been implicated in antioxidative protective role in insects. *Drosophila* and *Caenorhabditis elegans* have provided the largest body of evidence addressing the free radical theory of ageing. Oxidative stress is also induced by pesticides/insecticides. In mollusks, pesticides exert their biological effects via generation of ROS. Oxidative stress has been shown to be associated with exposure to several organophosphorous compounds and different classes of pyrethroids. Malathion is a potential hazard to the environment. Adverse effects induced by malathion in earthworms and insects have been reported. Information is now available in great detail on the role of ROS in modulating insect immunity during parasite invasion and bacterial infection. In *Drosophila melanogaster* ROS are actively produced in the midgut at a basal level in the presence of commensal microbiota and highly generated upon bacterial challenge. The involvement of reactive oxygen species (ROS) in mosquito immunity against bacteria and Plasmodium was investigated in the malaria vector *Anopheles gambiae*. The concentration of ROS increased in sand fly midguts after they fed on the insect pathogen *Serratia marcescens*. Elevated oxidative stress was previously reported for a mosquito line experimentally infected with *Wolbachia*, indicating that oxidative stress may be important for *Wolbachia*-mediated antiviral protection. In a nutshell, this chapter highlights the current advances of oxidative stress in invertebrate model systems and its implications.

Keywords

oxidative stress

invertebrates

reactive oxygen species

antioxidative system

Usha Tandon (Ed.)

CLIMATE CHANGE
LAW, POLICY AND GOVERNANCE

CLIMATE CHANGE

LAW, POLICY AND GOVERNANCE

Foreword by Justice A.K. Sikri
Editor: Usha Tandon

Introduction by Mohan Parasaran
Epilogue by Sidharth Luthra



Contributors

Mr. Akash Anand
Mr. Amar Roopanand Mahadew
Mr. Amrendra Kumar
Ms. Anam Soomro
Mr. Benoît Mayer
Ms. Chandreshwari Minhas
Prof. Dian Agung Wicaksono
Mr. Ghassem Mayah
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Prof. Wahyu Yun Santosa
Mr. Younes Charbgo



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CHAPTER 14

HUMAN RIGHTS AND CLIMATE CHANGE

[PUNEET PATHAK]
[ASSISTANT PROFESSOR, CENTRE FOR
ENVIRONMENTAL LAW SCHOOL OF
LEGAL STUDIES AND GOVERNANCE,
CENTRAL UNIVERSITY OF PUNJAB,
BATHINDA, PUNJAB INDIA.]

1. INTRODUCTION

The starting points of the linkage between human rights and climate change is that climate change will undermine or already undermining the realization of a range of internationally protected human rights such as right to life, health, right to food, water, shelter, property, livelihood and culture with migration and resettlement. Moreover, the inter-linkages between climate change and human rights are deep and complex. The most dramatic effects of climate change are expected to occur in the world's poorest countries, where human rights protections are too weak for a variety of reasons.¹ Low-lying, socio-economically disadvantaged small island developing states are among those most vulnerable to the harm posed by climate change which resulted in the rise of sea level and extreme weather conditions threatening the habitability of their territory and the enjoyment of fundamental human rights.² With the rise of the concern regarding climate change at international level, the justice issue raised due to the nature of climate change, drew a direct line between the wealth and lifestyle of some and the suffering of others. It raised the question on the continued economic expansion in poor countries along the lines rich countries had followed in the past was no longer sustainable.³ The destruction or disappearance of a state without an immediate successor and its implications for statehood, sovereignty, self-determination and the protection of basic human rights- represents an unprecedented challenge to the international community and contemporary human rights framework.⁴

International human rights law is potentially well placed to address that challenge and highlight some of the human and equity dimension of climate change. The Human rights approach to climate change places the human rights principles in the center of international climate change policy making in order to save the present and future generation.⁵ Focusing on the rights of those who are already vulnerable and marginalized due to poverty and discrimination, a human rights approach to climate change can be useful tool to complement international efforts aimed at tackling the adverse effect of climate change.

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2. LINKAGE BETWEEN HUMAN RIGHTS & CLIMATE CHANGE

2.1 Conceptual Questions Regarding the Linkages

The debate relating to the linkage of human rights and climate change can be sketched to the well-established body of literature relating to environmental protection and human rights⁶ and growing recognition in the resolution and the reports of international bodies as well the soft and hard law relating to human rights and environment. Safe and healthy environment is the pre-condition for the enjoyment of fundamental human rights. Both regime relating to environmental protection and human rights are concerned with the development of human well-being. To live in a healthy and quality environment is the fundamental and basic human rights. While human rights are necessary to the overall development of human personality, the quality environment is equally necessary to safeguard to conditions conducive to such a personality development. The present scenario of unsustainable development has the potential to oust millions of people in one stock without taking into account their economic, social and cultural aspect of life.⁷ Focusing on the human rights approach to environmental protection provides theoretical basis for making linkage between climate change and human rights. The recognition of the right to a clean and healthy environment in numerous international and regional human rights treaties is another basis of the linkages between climate change and human rights. More recently it can be identified in efforts specifically aimed at highlighting the human dimension of climate change.

There are two features of climate change make it distinctive from other crisis relating to environment to which the international community has yet confronted. First, due to the raise of global temperature there are numerous

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7. D. Shelton, "Developing Substantive Environmental Rights" 1(1) *Journal of Human Rights and the Environment* (2010); Y.K. Sabharwal, "Human Rights and the Environment" (2005) Retrieved from http://supremecourtindia.nic.in/speeches/speeches_2005/humanrights.doc (last visited on March 23, 2014); P. Pathak "Human Rights Approach to Environmental Protection" 7 (01) *OIDA International Journal of Sustainable Development* (2014) 17-18.

impacts including the increase of the severity of droughts, desertification, land degradation, tropical cyclones and the intensity of floods, the incident of malaria and heat related mortality and decrease the availability of potable water, crop yield and food security.⁸ Second, the distribution of climate change is uneven. Some regions are more vulnerable than other regions including the Arctic, because of the impacts of high rates of projected warming on natural systems and human communities; Africa because of low adaptive capacity and projected climate change impacts; small islands where there is high exposure of population and infrastructure to projected climate change impacts; and Asian and African mega deltas, due to huge population and high exposure of sea level rise, storm surges and river flooding. These two distinctive features of the climate change provide the necessary context within which human rights impacts should be explored.⁹

There are some conceptual as well as analytical questions persist while linking human rights and climate change. How to link these two issues in a coherent manner is a challenge before international community. How to place the pervasive phenomenon of climate change with its aggregated causes and diffuse effects within the normative framework of human rights regime is a challenge. How the physical manifestation of climate change can be connected to the human rights of peoples and the responsibilities of state.¹⁰ Other conceptual question is that for the purpose of human rights one must identify a right holder and a duty bearer so as to permit an actionable claim in the court of law which must be supplemented by some legal provision according to one of the traditional source of public international law or domestic law. Other issues include the concept of violation in relation to human rights in more oriented toward past harm than future harm as in the case with respect to climate change.¹¹

While conceptualizing the connection between climate change and human rights one of the aspect is to focus on the number of rights that will be impacted adversely by climate change including the right to life, food, health, housing and self-determination. According to World Bank, the impact of the climate change are already being felt with more droughts, floods and other natural disasters drawing resources away from development. If the warming of the climate continues at current rates, it will pose

8. World Bank, *World Development Report 2010: Development and Climate Change*. Washington, DC, Chapter 2, 11, available at: <http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/WDR10-Full-Text.pdf> (last visited on February 25, 2014).
9. *Ibid.*
10. Siobhan McInerney Lankford "Climate Change and Human Rights: An Introduction to Legal Issues" Volume 33, *Harvard Environmental Law Review* (2009) 431-437, 433.
11. *Supra* n 8 at Chapter 2, 11-12.

severe challenges to development. World Bank reveals that by the end of century, it could lead to warming of 5 degree centigrade or more compared with preindustrial times and to a vastly different world to from today, with more extreme weather events.¹² IPCC fourth Assessment Report reveals that the warming of the climate system is unequivocal and accelerating. The global average temperature has increased by 0.74 degree centigrade in the last century which is the fastest warming trend in the history of the earth.¹³ There are serious consequences of such change in the climate system including the severity of drought, land degradation, deforestation, intensity of floods and tropical cyclones, decrease crop yield and food security etc. These impacts are undermining millions of peoples' rights to life, security, food, water, health, shelter and culture.

The Human Rights Council (HRC) in its resolutions¹⁴ on the basis of the study conducted by United Nations High Commissioner for Human Rights (OHCHR)¹⁵ emphasized how climate change will negatively impact the enjoyment of specific human rights in many countries particularly in small island and low-lying state of their very existence and areas at risk for increased deforestation and drought. The Human Development Report notes that climate change is hampering efforts to fulfill the Millennium Development Goals (MDG) promise and that failure to address the climate change problem will consign the poorest 40% population of the world to a future of diminished opportunity.¹⁶ Stern review pointed out that the cost of climate change in India and Southeast Asia could be as high as 9 to 13% loss in GDP by 2100 as compared to what could have been achieved in a world without climate change.¹⁷

The report of OHCHR describes the implication of climate change for a wide range of human rights but at the same time also states that "while climate change has obvious implications for the enjoyment of human rights, it is less obvious whether, and to what extent, such efforts can be qualified as

12. *Ibid.*

13. S Solomon, et. al. (eds.), *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007.

14. U.N. Human Rights Council Res. 7/23, U.N. Doc. A/HRC/7/78 (July 14, 2008); U.N. Human Rights Council Res. 10/4, U.N. Doc. A/HRC/10/L.11 (March 31, 2009).

15. United Nations Office of the High Commissioner for Human Rights (OHCHR), *Report on the Relationship Between Climate Change and Human Rights*, U.N. Doc. A/HRC/10/61 (Jan. 15, 2009).

16. Human Development Report 2007/2008, United Nations Development Programme available at http://hdr.un dp.org/ sites/default/files/hdr_20072008_summary_english.pdf (last visited on March 12, 2014).

17. Nicholas Stern, *Stern Review on the Economics of Climate Change* (2006) available at: http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreviewreport_complete.pdf (last visited on March 05, 2014).

a human rights violations in a strict legal sense."¹⁸ In the context of climate change there may be serious challenges in disentangling the complex casual relationships between emissions from a particular country and a particular harm caused by climate change in another country, and in segregating the harm due to climate change from other possible causes.¹⁹ Despite such contrast issues underpinning the connection between human rights and climate change, there may be complementarily identifiable in principle which can be identified in both the UNFCCC & the ICESCR such as duty of cooperation, do not harm or equity. The rising nexus between human rights and climate change is meaningful because demonstrating climate change's numerous negative impacts on human rights particularly for already vulnerable population is a way of measuring the harm. It is also meaningful because it connects this harm to obligations which the state has already undertaken. Thus it exposes the potential for using developing supranational human rights legal system to impose a duty on states to prevent further climate change and protect individuals from its negative impacts.²⁰

2.2 Human Rights Approach to Climate Change

There is a substantial body of evidence which specifies that climate change interferes with internationally protected human rights. Such link has been acknowledged by numerous international bodies under the United Nations.. The UN Deputy Commissioner for human rights while addressing at the conference of parties to the United Nations Framework Convention on Climate Change (UNFCCC) observed that "there are many predictions that global warming could result in hundreds of millions of people suffering from hunger, malnutrition, water shortages, floods, droughts, heat stress, diseases triggered by extreme weather events, loss of livelihoods and permanent displacement. These human consequences are already visible and real in many corners of the world. The human rights approach compels us to look at the people whose lives are most adversely affected and to urge governments to integrate their human rights obligations into policies and programs to deal with the climate change as well as to the international community to assist in this process."²¹ In the Conference on Climate Change and Migration: Addressing Vulnerabilities and Harnessing Opportunities,

18. *Supra* n 15 at para 70.

19. *Supra* n 8 at Chapter 2, 12.

20. Megan S. Chapman, "Climate Change and the Regional Human Rights Systems" *Sustainable Development Law & Policy* (2010) 37-38.

21. Kyung-wah Kang Deputy High Commissioner for Human Rights, *Address at Conference of the Parties to the UNFCCC and its Kyoto Protocol*, 3-14 December 2007, Bali, Indonesia, available at: <http://www.ohchr.org /EN/NewsEvents /Pages/DisnlavNews.aspx?NewsID=200&LangID=E> (last visited on March 12, 2014).

2008, it was reiterated that “research points out that global warming and extreme weather conditions may have calamitous consequences for the human rights of millions of people. They can be among the leading causes or contributing factors that trigger hunger, malnutrition, lack of access to water and adequate housing, exposure to disease, loss of livelihoods and permanent displacement. Ultimately, climate change may affect the very right to life of countless individuals.”²²

Another effort in this regard was the resolution of Human Rights Council (HRC) 7/23 of 2008 on human rights and climate change which called for a study to be undertaken by OHCHR. This study devoted specifically to the question of human rights and climate change will certainly help to advance the conceptual understanding and legal underpinning of this area.²³ Further the HRC in 2009 adopted a resolution 10/4 in which it, inter alia, notes that “climate change-related impacts have a range of implications, both direct and indirect, for the effective enjoyment of human rights and the effects of climate change “will be felt most acutely by those segments of the population who are already in a vulnerable condition.” Further it recognizes that “effective international cooperation to enable the full, effective and sustained implementation of the UNFCCC is important in order to support national efforts for the realization of human rights implicated by climate change-related impacts”, and affirms that “human rights obligations and commitments have the potential to inform and strengthen international and national policy-making in the area of climate change.”²⁴ The council in this resolution also announced its decision to hold a panel discussion on the inter-linkage between climate change and human rights and welcomed the exchange of information between the OHCHR and UNFCCC secretariat.²⁵

In September 2011, the Human Rights Council adopted its third resolution on “human rights and climate change,” resolution 18/22. The resolution

22. Deputy High Commissioner for Human Rights, OHCHR *Address at Conference on Climate Change and Migration: Addressing Vulnerabilities and Harnessing Opportunities* 19 February 2008 Geneva, available at: <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=9162&LangID=E> (last visited on March 12, 2014).
23. U.N. Human Rights Council Res. 7/23, in U.N. Human Rights Council, *Report of the Human Rights Council on Its Seventh Session* U.N. Doc. A/HRC/7/78 (July 14, 2008) 65-66, 1.
24. U.N. Human Rights Council Res. 10/4, in U.N. Human Rights Council, *Draft Report of the Human Rights Council on its Tenth Session*, U.N. Doc. A/HRC/10/L.11 (March 31, 2009) 13.
25. In resolution 10/4, the Human Rights Council decided to hold a panel discussion on the relationship between climate change and human rights at its eleventh session in order to contribute to the realization of the goals set out in the Bali Action Plan. The panel discussion was held on June 15, 2009 at the Palais des Nations, Geneva.

affirmed that human rights obligations, standards, and principles have the potential to inform and strengthen international and national policy making in the area of climate change, promoting policy coherence, legitimacy, and sustainable outcomes.²⁶ Pursuant to resolution 18/22 OHCHR organized a seminar²⁷ to address the adverse impacts of climate change on the full enjoyment of human rights, with a view to following up on the call for respecting human rights in all climate change-related actions and policies and forging stronger cooperation between the human rights and climate change communities.²⁸ The Committee on the Elimination of Discrimination against Women (CEDAW) also adopted a statement on gender and climate change in 2009.²⁹ At the regional level some regional bodies recognized such linkage in its resolution. The general assembly of Organization of American state in 2008 adopted a resolution on human rights and climate change.³⁰ Similar resolution was passed by the African Commission on Human Rights & Peoples’ Rights in 2009.³¹

However, such clear evidence of the recognition about the linkage between human rights and climate change is growing at international level and a more systematic application of the human rights approach to climate change is possible which can be based on existing legal obligation but this recognition has remained rather ad hoc and apparently uncoordinated.³² International human rights bodies may interpret and apply states’ obligations to specific situation involving the harm done by climate change and state obligation to act.

26. U.N. Human Rights Council Res. 18/22, in U.N. Human Rights Council, *Report of the Human Rights Council on its Eleventh Session*, U.N. Doc. A/HRC/RES/18/22 (October 17, 2011).
27. The seminar’s objectives were to further awareness and enhance understanding of the relationship between climate change and human rights, suggest actions and identify best practices that address the adverse effects of climate change on human rights; and enhance cooperation between human rights and climate change-awareness advocates. The seminar was held from 23-24 February 2012, at Palais des Nations and a summary report will be presented at the June 2012 session of the Council and made available to the 18th session of the Conference of Parties to the UNFCCC (COP18).
28. *Supra* n 15.
29. UN CEDAW, Statement of the CEDAW Committee on Gender and Climate Change, adopted at the 44th Session, held in New York, USA (20 July to 7 August 2009).
30. General Assembly of the Organization of American States, *Human Rights and Climate Change in the Americas*, OAS Doc. AG/RES. 2429 (XXXVIII-O/08), adopted at the Fourth Plenary Session, held on 3 June 2008.
31. African Commission on Human and Peoples’ Rights, *Climate Change and the Need to Study Its Impacts In Africa*, adopted at the 46th Ordinary Session on 25 November 2009.
32. M. Wewerinke, “Exploring the Legal Basis of a Human Rights Approach to Climate Change,” *Journal of Human Rights* (2011) 141-160.

3. CLIMATE CHANGE THREATENS FUNDAMENTAL HUMAN RIGHTS

Climate change has particularly serious implications for the realization of individual and collective rights of inhabitants of low-lying small Island developing state. These states are vulnerable to the effects of sea level rise and other climate change impacts. Their primary source of income depends of environmental context like fishing, agriculture and tourism and highly dependent on foreign aid and imports. Countries which are most vulnerable to climate change are Bangladesh, Cambodia, Democratic Republic of Congo, Haiti, Sierra Leone, Malawi, Mozambique, Madagascar, Malawi, Philippines, and Zimbabwe. The Maldives consists of around 1,200 islands, 80 percent of which are less than one meter above sea level. Its economy largely depends on tourism and fishing, both of which are highly vulnerable to climate change, account for a substantial proportion of GDP and government revenue.³³ Most of low lying small Island developing states are therefore both geographically and socio-economically vulnerable to a range of climate change related impacts including rising food and fuel prices; adverse weather events; and sea level rises - which is predicted to range from 0.18-0.59 meters by 2100, and up to 7 meters thereafter.³⁴ These may result in a number of short- and long-term harms, including increased rates of mortality and disease; damage to basic infrastructure; destruction of arable land through erosion; contamination of freshwater supplies; loss of traditional livelihoods and sources of income; temporary or permanent displacement; and, eventually, loss of political sovereignty in the event that a state's territory becomes uninhabitable.³⁵ These climate change-related impacts have adverse consequences for a range of internationally recognized human rights such as right to life, food, health, housing and portable water with other human rights are at risk due to the impact of climate change. The analysis of these rights and the climate impact on such rights is pertinent to discuss.

3.1 The Right to Life

The right to life is inseparably linked to other human rights which is protected by numerous international and regional human rights treaties.³⁶

33. World Bank, *Maldives: Sustaining Growth and Improving the Investment Climate* (2006) 60.
34. Intergovernmental Panel on Climate Change (IPCC), IPCC Fourth Assessment Report (AR4): Climate Change 2007 - Synthesis Report (2007).
35. *Supra* n 2.
36. Article 6 of International Covenant on Civil And Political Rights, 1966; Article 4 of American Convention on Human Rights, 1969; Article 2 of European Convention on Human Rights, 1950; Article 4 of African Charter on Human and Peoples' Rights, 1981.

The Human Rights Committee (HRC) in its general comment on the scope and content of the right to life under Article 6 of International Covenant on Civil and Political Rights (ICCPR) emphasized that the right to life cannot be interpreted in a restrictive manner and the protection of the right to life requires positive measures. The HRC also stated that a failure by state institutions to take action to prevent, mitigate or remedy life-threatening harms from climate change constitute a violation of the right to life.³⁷ At the regional level, the Human Rights bodies have considered cases involving the right to life in relation to environmental harm, although the relevance to this jurisprudence to climate change is open to debate.³⁸

A number of observed and projected effects of climate change will pose direct and indirect threats to human lives as reflected by OHCHR 2009 report on climate change and human rights.³⁹ Some communities, such as those living in the Arctic and in coastal regions, are particularly at risk, and are already starting to experience the adverse effects of climate change on their right to life.⁴⁰ The Maldives' 2008 submission to the OHCHR as part of its preparation of its study on climate change and human rights described how climate change threatens its right to life. Global warming causes sea levels to rise, both because water expands as it warms and because water from melting glaciers flows into the ocean.⁴¹ Although rising sea levels threaten all coastal regions, small islands are particularly vulnerable. Islands also face increasing frequency and severity of flooding from sea surges, as warming oceans lead to more extreme weather. Warmer waters and eroding beaches undermine fishing and tourism, two critical economic bases for most small island states.⁴²

3.2 The Right to Adequate Food

The right to adequate food as an element of the right to an adequate standard of living recognized in International Covenant on Economic Social

37. The Human Rights Committee (HRC) re-affirmed in its General Comment No. 31(2004), that States parties' duties are of both a positive and negative kind available at: <http://www.unhcr.ch/tbs/doc.nsf/0/58f5d464e861359c1256ff600533f5f> (last visited on March 08, 2014).

38. *Supra* n 8 at Chapter 2, 13.

39. *Supra* n 15 at paras 22-23.

40. Petition to the Inter American Commission on Human Rights seeking relief from violations resulting from global warming caused by acts and omissions of the United States available at: <http://www.inuitcircumpolar.com/files/uploads/icc-files/FINALPetitionICC.pdf> (last visited on March 10, 2014).

41. *Supra* n 13 at 323-324.

42. John H. Knox, "Linking Human Rights And Climate Change at The United Nations" 22 *Harvard Environmental Law Review* (2009) 477-498, 480.

and Cultural Rights (ICESCR).⁴³ The Committee on Economic Social and Cultural Rights (CESCR) has maintained that the right to food⁴⁴ is fundamental to the inherent dignity of the human person and indispensable for the fulfillment of other human rights enshrined in the International Bill of Rights. To realize this right appropriate economic, environmental and social policies are required.⁴⁵ The threats caused by climate change to the right to food have been apparent. United Nations Framework Convention on Climate Change (UNFCCC) highlights the importance of ensuring availability of food. It entails the stabilization of GHG in the atmosphere to be achieved within a time frame sufficient to “ensure that food production is not threatened.”⁴⁶ Climate impacts, and possibly climate response measures may impend both availability and accessibility to food. Increases in extreme weather events, including droughts and floods, will also negatively affect crop production,⁴⁷ thereby placing both availability and accessibility at risk. Agriculture is important for food security in two ways: First, it produces the food people eat; and it provides the primary source of livelihood for a large portion of the population of the world particularly in developing countries. If agricultural production in the low-income developing countries of Asia and Africa is adversely affected by climate change, the livelihoods of large numbers of the rural poor will be put at risk and their vulnerability to food insecurity increased.⁴⁸

43. International Covenant on Economic Social Cultural Rights, 1966 Article 11. Article 11 provides that (1) The States parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions. The States parties will take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co-operation based on free consent. (2) The States parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes.

44. Article 25 Universal Declaration of Human Rights, 1948; Article 11 of International Covenant on Economic Social Cultural Rights, 1966; Article 12(2) of the Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) 1979; Articles 24(2)(c) & 27 of the Convention on the Rights of Child, 1989. In addition, the right to food has been incorporated or read into many national Constitutions including those of Bangladesh, Brazil, Colombia, India, Iran, Pakistan, Sri Lanka and South Africa. For example in India it is recognized explicitly by Supreme Court of India in *People's Union for Civil Liberties v. Union of India*, (1997) 1 SCC 301.

45. CESCR General Comment No. 12, The Right to Adequate Food, E/C.12/1999/5 (1999) available at: <http://www.unhcr.ch/tbs/doc.nsf/0/3d02758c707031d58025677f003b73b9> (last visited on March 08, 2014).

46. UNFCCC Article 2.

47. IPCC Climate Change Report 2007, *Supra* n at 13.

48. Climate Change and Food Security: A Framework Document, Food and Agriculture Organization of the United Nations Rome, 2008 available at: http://www.fao.org/for-estry/15538_0706314450816_0_2_2_64734_1907_4_361

3.3 The Right to Health

The ICESCR recognizes the right to the “highest attainable standard of physical and mental health,”⁴⁹ and the CESCR considers this right crucial for the enjoyment of other human rights.⁵⁰ The right to health is widely protected in other international and regional treaties⁵¹ and under national constitutions.⁵² As interpreted by the CESCR and other international bodies, the substantive content of this right includes timely and appropriate health care, access to safe and potable water, adequate sanitation, nutrition and housing etc.⁵³ All these are considered the basic determinants of health which, in the assessment of the World Health Organization (WHO), climate change will place at risk.⁵⁴ Climate change is likely to have significant health impacts, including malnutrition; the number of people suffering from death, disease and injury from heat waves, floods, storms, fires and droughts; and cardio-respiratory morbidity and mortality associated with ground-level ozone. The IPCC also foresees that the adverse health impacts will be greatest in low-income countries. It would appear that climate impacts will only increase the onerous burdens developing countries already experience in addressing health issue.

49. Article 12 of the ICESCR provides: (1) The States parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. (2) The steps to be taken by the States parties to the present Covenant to achieve the full realization of this right shall include those necessary for: (a) The provision for the reduction of the stillbirth-rate and of infant mortality and for the healthy development of the child; (b) The improvement of all aspects of environmental and industrial hygiene; (c) The prevention, treatment and control of epidemic, endemic, occupational and other diseases; (d) The creation of conditions which would assure to all medical service and medical attention in the event of sickness.

50. CESCR General Comment No. 14, The Right to Adequate Food, E/C.12/1999/5(1999) available at: <http://www.unhcr.ch/tbs/doc.nsf/0/3d02758c707031d58025677f003b73b9>; and CESCR General Comment No. 14, The right to the highest attainable standard of health, E/C.12/2000/4 (2000), available at: [http://www.unhcr.ch/tbs/doc.nsf/\(symbol\)/E.C.12.2000.4.En](http://www.unhcr.ch/tbs/doc.nsf/(symbol)/E.C.12.2000.4.En) (last visited on March 10, 2014).

51. Article 25 of UDHR, Article 12 of ICESCR, Article 5(e)(iv) of ICERD, Articles 11(1)(f) & 12 of CEDAW, Article 24 of CRC, Article 11 of European Social Charter, Article 16 of African Charter on Human and Peoples' Rights, Article XI of The American Declaration on Human Rights.

52. *Consumer Education and Research Centre v. Union of India*, (1995) 3 SCC 42; AIR 1995 SC 922; *Paschim Banga Khet Mazdoor Samity v. State of W.B.*, (1996) 4 SCC 37; AIR 1996 SC 2426.

53. Paul Hunt, *Report of the Special Rapporteur on the Right of Everyone to the Highest Attainable Standard of Physical and Mental Health*, U.N. Doc. E/CN.4/2003/58 (2003), paras 10-36, available at: <http://www.un.org/womenwatch/ods/E-CN.4-2003-58-E.pdf> (last visited on March 05, 2014).

54. WHO, *Protecting Health from Climate Change* (2008) 6, available at: http://www.who.int/health_topics/climate_change/protect_health.pdf (last visited on March 06, 2014).

3.4 The Right to Water

The right to water,⁵⁵ is an essential condition for human existence. It is not just a self-standing right,⁵⁶ but is documented as inextricably associated with other human rights such as the right to an adequate standard of living, the right to the highest attainable standard of health, and the rights to adequate housing and adequate food.⁵⁷ Climate change is projected to seriously affect the availability of water. The Stern Review records that even a 1 degree Celsius rise in temperature will threaten water supplies for 50 million people, and a 5 degrees Celsius rise in temperature will result in the disappearance of numerous Himalayan glaciers threatening water shortages for a quarter of China's population, and hundreds of millions of Indians.⁵⁸ OHCHR report cited that "Loss of glaciers and reductions in snow cover are projected to increase and to negatively affect water availability for more than one-sixth of the world's population supplied by melt water from mountain ranges. Climate change will thus exacerbate existing stresses on water resources and compound the problem of access to safe drinking water, currently denied to an estimated 1.1 billion people globally and a major cause of morbidity and disease."⁵⁹

3.5 Other Possible Human Rights

Climate change may influence the progressive realization of a range of other human rights as well. Climate impacts such as extreme weather events, increased flood and drought risk, changing weather and crop patterns will likely hamper the realization of the rights to private and family life,⁶⁰

55. CESCR, General Comment No. 15: The Right to Water, E/C.12/2002/11 (2003) available at: <http://www.unhcr.ch/tbs/doc.nsf/0/a5458d1d1bbd713fc1256cc400389e94> (last visited on March 06, 2014).

56. Article 14(2)(h) of CEDAW, Article 24(2)(c) of CRC, Articles 20, 26, 29 & 46 of Fourth Geneva Convention (Treatment of Prisoners of War), Articles 85, 89 & 127 of Third Geneva Convention (Treatment of Civilian Persons in Time of War); Report of the Special Rapporteur of the Sub-Commission on the Right to Drinking Water Supply and Sanitation, 2002 (U.N. Doc E/CN.4/ Sub.2/2002/10); Preamble, UN Water Conference, Mar. 14-25, 1977; Paragraph 18.47 of Agenda 21, 1992; UN International Conference on Population and Development, Sept. 5-13, 1994; and Resolution 2002/6 of the United Nations Sub-Commission on the Promotion and Protection of Human Rights on the promotion of the realization of the right to drinking water (E/CN.4/2002/200).

57. *Supra* n 55.

58. *Supra* n 17.

59. *Supra* n 15 at para 29.

60. Article 12 of UDHR Article 17 of ICCPR, Article 16 of CRC, Article 8 of European Convention and Article V of American Declaration

property,⁶¹ means of subsistence,⁶² freedom of residence⁶³ and movement. For indigenous groups like the Inuit, climate impacts will fundamentally alter their way of life, affecting a further set of protected rights and interests,⁶⁴ in particular the right to the benefits of their culture,⁶⁵ and the right to freely dispose of natural resources.⁶⁶ There are serious concerns among certain groups that policies and measures to reduce emissions from deforestation, a significant contributor to climate change, may have direct relevance to indigenous peoples' rights particularly in relation to traditional rights to forest produce.⁶⁷ For these communities whose very existence is threatened, such as those living in small island states, climate change threatens their right to self-determination, protected by both the ICCPR and the ICESCR.⁶⁸ The effects of climate change will be felt most acutely by those segments of the population who are already in vulnerable situations due to factors such as poverty, gender, age, minority status, and disability. Another particularly vulnerable group is children. The OHCHR reports that: "the health burden of climate change will primarily be borne by children in the developing world."⁶⁹ Extreme weather events and reduced quantity and quality of water already are leading causes of malnutrition and child death and illness.

4. CONCLUSION

The world is already witnessed for the climate change related impacts have a range of implications for the effective enjoyment of a series of individual and collective rights. The impact of climate change particularly those which threaten the existence of low lying small island developing states with inundation and thus extinction have adverse implication for the realization of the right to self-determination. Significant loss of territory undermines the enjoyment of human rights. Most importantly loss of territory jeopardize

61. Article 17 of UDHR, Article XXIII of American Declaration of the Rights and Duties of Man, 1948; Article 21 of American Convention on Human Rights, 1969.

62. Article 1(2) of ICCPR.

63. Article 13 of UDHR.

64. Convention Concerning Indigenous and Tribal Peoples, 1989, (ILO Convention 169); United Nations Declaration on the Rights of Indigenous Peoples, G.A. Res. 61/295, (A/RES/61/295, 2007); Article 27 of ICCPR.

65. Article 27 of UDHR; Article 15 of ICESCR and Article XIII of American Declaration.

66. Article 1 of ICCPR.

67. A plan for negotiating positive incentives for reducing emissions for deforestation and forest degradation in developing countries was one of the key features of the Bali Road Map negotiated at the Thirteenth Conference of the Parties (COP13) to the UNFCCC in December 2007.

68. Article 13 of UDHR, Articles 1 & 12(1) of ICCPR, Article 1 of ICESCR, Article 22(1) of American Convention, and Article VIII of American Declaration.

69. *Supra* n 15 at para 48.

a people's recognition as a state under international law. Without territory and potentially statehood- the individual and collective rights of people of the state are no longer adequately protected by their state and are thus increasingly vulnerable to potential violations. Thus it is essential to ensure the meaningful participation and empowerment of those individuals and communities most affected by climate change inundation, particularly those already socio-economically and political marginalized within the global community.

Human rights framework having binding obligations and commitments which have the potential to inform and strengthen international and national policymaking in the area of climate change as recognized by Human Rights Council in its resolution 10/4 of 2009. Human rights approach to climate change is helpful as it identifies rights-holders and their entitlements and corresponding duty-bearers and their obligations, and works for strengthen the capacities of rights-holders to make their claims and of duty- bearer to meet their obligations. Integration of human rights approach to climate change will help to consider in what ways and to what extent, the changes in climate will impede economic and social development at relevant level including consideration of poverty reduction, strengthening human rights and improving human health and well-being. The international environmental regime particularly the climate change regime must be taken into account the importance of strengthening the social dimension, integrating a gender perspective and the human rights approach in UNFCCC negotiations.

CHAPTER 15

CLIMATE CHANGE, MIGRATION AND ENVIRONMENTAL JUSTICE

[ANAM SOOMRO]
[INDEPENDENT RESEARCHER, ADVOCATE,
SINDH BAR COUNCIL, PAKISTAN.]

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15

IMPORTANCE OF MORAL, RELIGIOUS AND SPIRITUAL EDUCATION IN PRESENT EDUCATIONAL SCENARIO

Dr. Ranjit Kaur & Dr. Shamshir Singh***

Introduction

During the last few decades, the realization of value oriented education has assumed strong significance on the national as well as international level. The negative forces like selfishness, hatred, terrorism, intolerance, regionalism, violence etc are raising their ugly heads in the today's society. The problem of atrocities on women, domestic violence, increase in number of divorces, use of drugs among the present generation seems to be escalating worldwide and posing great danger to the peaceful existence of the modern society on the global level. Therefore value oriented education is badly needed in our modern society. Education is the vehicle of knowledge and self preservation. Education is essential for the harmonious development of the child's personality but value oriented education is a tool which not only provides a profession but also a purpose in life. It is therefore high time that educationists should realize the importance of value based education. The students should realize that character building is equally important as career building. Value oriented education must be provided to the students so that they not only emerge as leaders in their field but also become good citizens and make their nation proud. Education is essentially a process of inculcating values among youngsters to lead a kind of life that is satisfying to the individual in accordance with the cherished values and ideals of the society. The diverse and rich cultural

* Assistant Professor, Chaudhary Devi Lal University, Sirsa.

** Assistant Professor, Shah Satnam Ji College of Edu. Sirsa.

REFORMS IN INDIAN SYSTEM OF EDUCATION

with Special Reference to Youth and Teachers for
Social and National Development

About the book

The book in hand aims at providing platform to creative and energetic youth, scholars, delegates, policymakers, administrators so that they can present their views about the major reforms required in the Education System of India. It throws light on the varied aspects of education which require reforms like reconciliation of aims & objectives of education, Examination & Evaluation system, Moral, Religious & Spiritual Education, need of Technology in present scenario. The present education system emphasizes on enrollment of the students but the quality is deteriorating day by day. Therefore, challenges for quality education with special reference to stake holders: Government, Administrators, Managements and Teacher Educators have also been stressed. The book also presents the importance of social intelligence, personality and teaching interest of pre-service teachers in educational reforms.

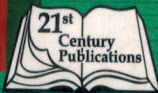
The book is expected to serve as an ideal book on Reforms in Indian Education System, which gives insight to the readers to think and analyze one's self and sensitizes them towards the welfare of humanity and nation. All the readers will find this book worth-reading.

About the Editor



Dr. S. B. Sharma, M. Sc., M. Ed., Ph.D., is Principal of the National College of Education, Affiliated to Ch. Devi lal University, Sirsa, Haryana. Besides participating in many seminars and contributing many research papers, presently, he is Secretary of Regional Executive Committee, Council for Teacher Education, Haryana State Chapter and working for the upliftment of standard of education through different developmental programmes. His areas of interest are Educational Psychology, Spirituality, Science & Technology and Parapsychology. He is also working for social cause with the rural students for their educational development. He has written more than hundred poems on social, religious and educational issues.

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India-China trade Relations: A Study of Post-Reform Period

Parmjeet Kaur¹

Dr. Sandeep Kaur Bhatia²

Abstract

India's trade ties with China have developed extensively from last two decades following its opening up of economy with major economic reforms in 1991. In the present study, extensive efforts have been made to collect India-China trade exports and imports data of commodity and services from many sources namely-UNCOMTRADE database, ITC, UNCTAD and WTO database. The analysis of the services structure has been articulated of exports and imports from India-China and its altering dynamics over the last decades. India's exports of goods to China enlarged from US\$ 0.05 billion in 1991 to US\$ 13.43 billion in 2014 and its import from US\$ 0.02 billion in 1991 to US\$ 58.23 billion in 2014. China's exports of goods to India enlarged from US\$ 0.14 billion in 1991 to US\$ 54.22 billion in 2014 and China's imports from India increased from US\$ 0.12 billion to US\$ 16.36 billion in 2014. RCA of India with China has mainly in commodities namely crude fertilizer, organic chemicals, textile yarn, non-metallic minerals and electronic machinery, apparatus and appliance. Similarly, China's RCA in commodities namely organic chemicals, medical pharmaceuticals, iron and steel, machinery specialized for particular industry, general industrial machinery and equipment and electrical machinery, apparatus and appliance. The study suggested that government should take initiative and suitable strategy for improving the level of trade between India and China.

KEYWORDS: Trade, Composition, Services,

JEL Classification: F1, F15, F19

¹ Research Scholar at Central University of Punjab, India. Email: chanania.parm08@gmail.com.

² Assistant Prof. of Centre for Economic Studies at Central University of Punjab, India. Email: koursandeep00@gmail.com.



Chapter

The China factor in Indo–Japan strategic relations

By *NISHTHA KAUSHIKI, HILAL RAMZAN*

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In the ongoing century the strategic viability of the Indian Ocean has been on constant rise. It has become a major flashpoint for conflict among the major powers. One of the reasons for the mounting significance of the Indian Ocean is rising economies of Asia and their growing surge for raw materials, including the vital energy resources from the Middle East, to boost their respective economies. Apart from this, the collapse of communism which marked the end of Cold War and the post-9/11 Iraq and Afghanistan crises on the one hand have undermined the significance of Atlantic Ocean and on the other hand boosted the geopolitical significance of the Indian Ocean. 1

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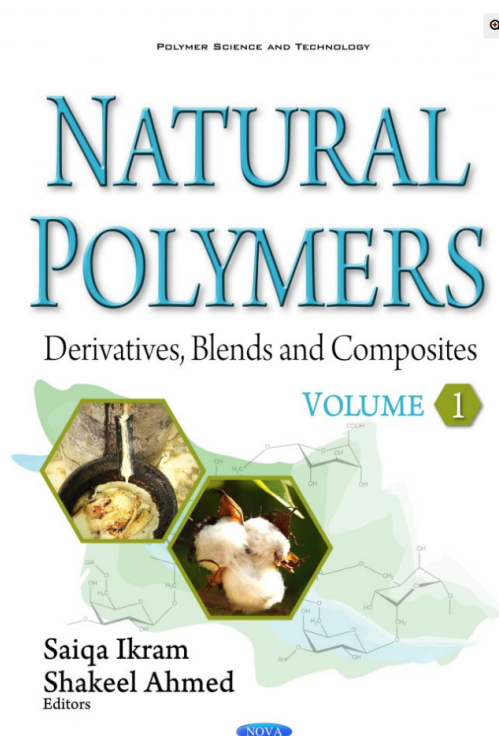
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Natural Polymers: Derivatives, Blends and Composites. Volume I

\$275.00

Saiqa Ikram and Shakeel Ahmed, PhD (Editors)
Jamia Millia Islamia (A Central University), New Delhi, India

Series: [Polymer Science and Technology](#)
BISAC: TEC055000

This book is a compiled contribution from experts in the field of natural polymers, and it is organized into two volumes. The purpose of this book is to provide an entire catalogue of natural polymers, beginning with their introduction, mass production, qualitative and quantitative characterization and leading to their advanced applications in every aspect of life (i.e. from food packaging to biomedical studies such as cancer treatments). Overall, it compiles all abundant natural polymers originating from both plant and animal resources such as cellulose, carrageenan, xanthum gum, chitin, chitosan, etc. The derivatives of these natural polymers in the form of hydrogels, blends and composites are also compiled with their recent societal benefits and applications. (Imprint: Nova)

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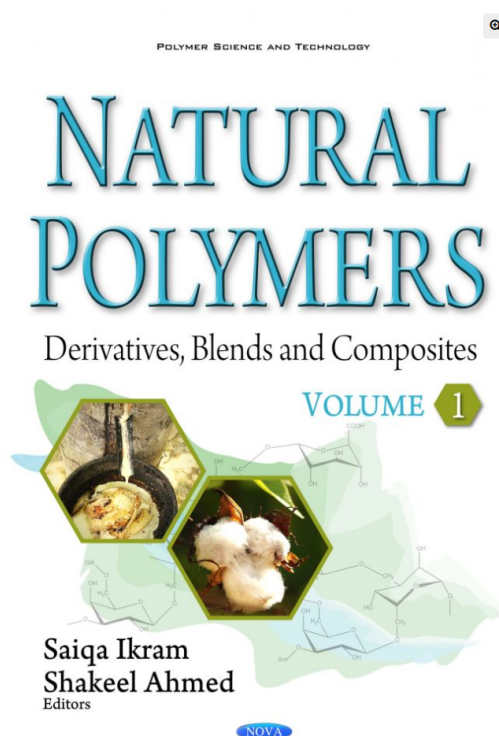
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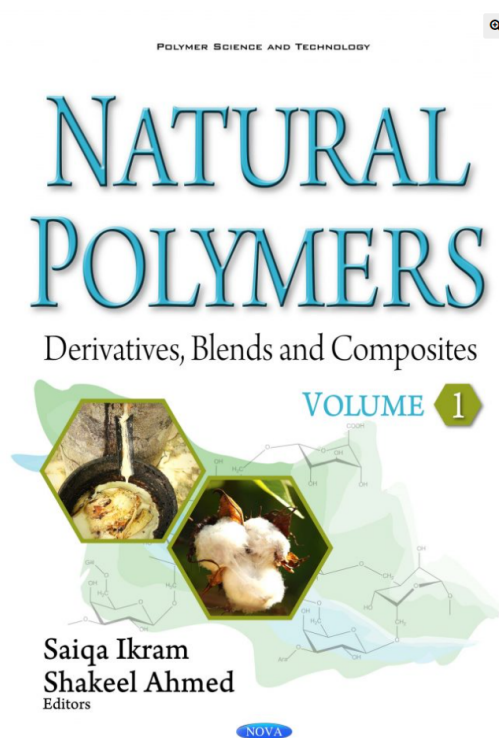
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Abstract

Biotechnology and bioengineering are disciplines of science, which use biological sciences and advanced technologies to generate new products and processes for the benefit of society. The potential of biotechnology and bioengineering is immense because it touches the entire spectrum of life, including agriculture, food processing, medicine, and many other areas. Advances in biotechnology and bioengineering have restricted many resources. Although, genetically modified organisms have many benefits, they are always considered to impose a threat to the environment and human health in one way or the other. The deliberate modification and transfer of genetic




[Organised Retailing and Agri-Business](#) pp 229-240 | [Cite as](#)

Inclusive Fresh Food Retail Chains in India: A Case Study from Punjab

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Naresh Singla , Sukhpal Singh, Paramjeet Kaur Dhindsa

Chapter

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Abstract

Linking primary producers with global and national markets through fresh food retail chains has been identified as one of the emerging agricultural marketing practices in India to improve the livelihoods of small producers. The fresh food retail chains are developing from farm to fork to buy fruits and vegetables directly from farmers. However, the retail chains everywhere are, generally, found to be working with only large farmers and excluding small farmers from the value chains for various reasons. In this context, this chapter discusses the inclusiveness and effectiveness of fresh food retail chains in linking farmers with the help of a case study of a retail chain (Reliance Fresh) based on a primary study with growers of two major crops—cauliflower and cabbage in Punjab. The study reveals that the fresh food retail chain primarily works with relatively small intensive vegetable growers who procure only a part of their produce. The farmers were left to sell the rest of their produce at local markets. The retail chain farmers realized higher profits compared to non-retail chain (traditional market supplying) farmers mainly because of higher yield and high



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Morphological, Optical and Thermal Properties Embedded (PVC/PE)_{1-x} (Where x = 0.0, 0.1, 0. and 0.5) Blend Nanocomposites

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Anjna Thakur, Priya Thakur, Kamlesh Yadav

Conference paper

First Online: 21 October 2016

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Abstract

Present study deals with the dispersion of TiO₂ nanoparticles in PVC/PE blend nanocomposites have been characterized using FESEM, FTIR, UV-Visib TGA, and EDX to study the morphology, optical and thermal properties of pre FESEM confirms the dispersion of nanoparticles in polymer blend and format nanocomposites. Decrease in optical band gap has been observed by addition of TiO₂ content in polymer blend. Variation in melting point is studied by TGA. Thermal stability is enhanced with TiO₂ content in polymer blend

Keywords

aturally, religiously and financially. Without freedom in travelling or movement from one place to another places how we can update our knowledge, experience, perception, feeling and compassion. As a freedom of movement, everybody should have free journey, safer and easier journey, fordable and knowledgeable Journey that should bring happiness and yful.

Freedom of Religions

Actually there is no religious freedom. It is used to very traditional and blindly. The practice of religion is being very out of religious norms and values. As human being there is only one religion that is Manava Dharma "Human Religion" which has been guided by the Sanatan Dharma. Sanatana Dharma is the major dharma but people absolutely forgot this. This religion is now becoming one traditional commune system like Hindus, Buddhist, Christian, and Muslim. They are distributing the identity card and making the world more violent and un-peace. They are fighting each other, killing each others. This is not absolutely freedom, not absolutely human rights. We are missing and misusing the norms and values of real Manava Dharma, not the virtue, not a righteousness and falling in un-virtue or sinful acts in all over the world.

Freedom of Culture and Tradition

Lots of boundaries and barriers of culture and tradition are seen around us. There is no freedom in our cultures and no rights at all. These cultures have bounded and restricted the people. Culture is man-made thing. When People use something long time, this becomes habit and finally is used as culture. When culture is specialized or made used to for particular group of people, becomes tradition. This is not freedom, not the human right until the adaptation of natural rules and regulations in life. This adaptation is the supper culture, supper rules, supper phenomena accordingly the biological clock.

Conclusion

Human right is global announcement of rights of life which makes life more assurance and updating. Only one organization which works really oriented and devoted to human being focusing more about human reality and facts. Just repetition of principles and slogans of human rights never make sense and work. Practically with realization and feeling, everybody should go in fields of working areas and then it will be real applied. If we go beyond the natural phenomena, we never reach in real approach and innovation in life.

PROCEEDINGS

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SURROGACY: REPRODUCTIVE RIGHT OR BUSINESS

Dr. Hans Raj Arora
Dr. Puneet Pathak

Assistant Professor, Centre for Law
Central University of Punjab, Bathinda (Punjab)

ABSTRACT

The issue of surrogacy in our country has led, now, to a big debate on the lives of the women and all other stakeholders involved therein because the future of surrogacy in India remains uncertain with a range of different policy changes on this subject.

INTRODUCTION

Infertility is a biological disability that inhibits either, or both, of the life-partners to contribute to the process of conception. It is the inability of the couple to conceive in spite of regular unprotected sex. If a couple remains unable to conceive even after 12 months¹ of regular sexual intercourse, the treatment for infertility is recommendable to such a couple. Infertility has inflicted about 10- 15 percent of the world population, including many such couples from India, too.² Approximately 13 to 19 million Indians are likely to be infertile, at any given point of time, out of which about 8 percent are in need of a serious medical intervention³ including, even, those 10% of all infertile couples who are over 50 years in their ages each.⁴

Woman, the First Target

Infertility is, undoubtedly, an ailment that causes, naturally, an intense mental agony and trauma to the vulnerable couples concerned. More than 50 percent of the infertility cases are caused due to female reproductive conditions such as the ovulation disorders, blockage in the fallopian tubes, mental stress, age factor, medication or due to some other uterine problems etc. About 25- 30 percent of such cases, on the other hand, might arise due to male reproductive conditions like ejaculation dysfunction, semen problems, mental stress, age factor and medication etc. Apart from these, there may also be certain other internal or external reasons which might result in infertility of any healthy-looking but vulnerable couple.

Around 50 million couples, world-wide, have been trying to conceive, at least, for the past 5 years without any success, and almost none of those, in the developing countries, can hope to get treatment for their infertility.⁵ The male infertility is observable in about 40- 50 percent of the total cases of infertility, but the pity is that the woman partner is taken, usually, to be the first target who has to undergo all the invasive medical procedures⁶ as to prove whether, or not, she is the barren wife.

Altruistic Surrogacy

Since biblical times, there have probably been many surrogacy pregnancies but it is not until late 1970s that any such thing is recorded as a document. Sarah, an infertile woman begged, once, of her hand- maiden, Hagar, to carry a child for her and her husband, Abraham. Surrogacy is, briefly, a process of carrying and delivering a child for another person⁷ through renting of the womb for a specified period of time, so needed, naturally, since conception/ implantation till 24 hours, after the actual delivery of such a surrogate child or till an extended time- period, per specific medical advice, if any.

In this process, actually, the egg, or the oocyte, of an infertile woman is substituted into a fertile woman's womb for the fetus to develop its full length incubation/ maturation, therein. Such an arrangement of developing a fetus, to a matured full- birth child is known, technically, as the surrogacy, the term derived from the Latin word 'surrogatus' or 'surrogare', the simple meaning of which is 'to substitute' or else is 'appointing one to act for another'. Any fertile married woman can safely rent her womb, to any infertile couple, for implanting the fertilized eggs of the later, therein, through the technique of In- Vitro Fertilization (IVF). If, at all, the eggs of an infertile woman cannot be fertilized, so naturally, then, the eggs of the rented womb can be used, instead, for the fertilization thereof with the sperms from the male counter- part of the said infertile couple.

Gestational Relations

The fertile woman who rents her womb, voluntarily, or for money- compensation in the form of rent, for carrying, and delivering, a surrogate child for another, is known, technically, as the 'surrogate' or the 'surrogate mother' of the surrogate child, so born. The child so delivered has no biological relation with such a surrogate mother, though it has a gestational relation with her. The other couple, for whom all this is done, is known as the 'commissioning parents', or the 'commissioning couple' that gets all the rights of owning such a surrogate child as its own biological child.

Surrogacy is one among the few medical solutions to childlessness whereby a woman is paid to have a baby to whom she has no genetic link, otherwise. Such a surrogate mother performs merely a social role of bearing a child on behalf of the Commissioning Couple who is unable, otherwise, to produce its own children in the usual way.⁸ So, it will be in the fitness of the things that the genuine expenditures, relating to such a delivery, are borne by the commissioning parents themselves, apart from paying some reward to the surrogate, for the noble cause of kindness to the needy commissioning couple.

Warnock (1984) describes surrogacy as a process/ practice whereby one woman carries a child, for another, with the intention that the child, so born, would, thenceforth, be handed over, to that other woman, after the birth itself. A surrogate mother, as such, is a woman who is, or will try to become, impregnated with an embryo in her womb, with the very clear intention of surrendering the child, so born, to the intending couple or to the Commissioning Couple concerned, after its birth, immediately, within the minimally shortest possible time- gap. The parenting rights, over such a

surrogate child, stand transferred, sooner, to the commissioning couple, in accordance with the essential clauses in the relevant surrogacy agreement itself.

Experimental Test- Tube Babies

The first successful birth of a surrogate baby took place in the United Kingdom on 25th July 1978. That child was named, then, as Louise Joy Brown. This pioneer success was brought about through the joint efforts of Dr. Robert G. Edwards and Dr. Patrick Steptoe, who had, already, been working on this project, ever since 1966. The infertile couple, Mr. John Brown and Mrs. Lesley Brown, was trying hard to conceive, for 9 long years earlier, but in vain. Frustrated as they were, they agreed to experiment with the IVF procedure resulting, finally, in a wonderful success, of course, of giving purpose to their living together, as a complete family, themselves. The second such kind of the Test- Tube baby, in the world, was Kanupriya @ Durga, born just 67 days after Louise Brown, on 3rd October 1978, in Kolkata. This was India's first IVF Baby which was, really, a wonderful success brought about through the joint efforts of a trio of scientists consisting of Dr. Subhas Mukhrjee and two of his other colleagues.⁹

Assisted Reproductive Technique (ART) is permissible to be undertaken only by any married woman who can volunteer to become a surrogate mother. Such a surrogacy does not amount to adultery if undertaken with the informed consents of respective husbands each. But it will be a solid ground for any husband to seek divorce from his wife whosoever offers herself for a surrogacy without his requisite consents. It is noted, however, these days, that most of the husbands themselves pressurize their wives each to take up this lucrative task of surrogacy.¹⁰

When it comes to success in surrogacy, India is not far behind. The success rate is around 50-60% when a fresh embryo is used. If the embryo has been fertilized before implantation, success rate is about 40%. The success rate depends on the health of the embryo, the age of the genetic mother and that of the biological father. A well- defined and efficiently implemented law will deliver not just babies but fair practice, as well, all around.

The Chairperson of the National Commission for Women (NCW), Lalitha Kumaramangalam, however, had recommended to our Health Ministry, very recently, that each woman, single or married, unmarried or divorced, or else who is judicially separated from her husband, may be permitted to become a surrogate mother since it is the prerogative, vesting in every woman, to take an active part in the reproduction activity, if and, as she wishes so to do.¹¹

Baby- Making Business

While Louise Joy Brown was not born out of any external surrogate- mother arrangement yet it became a historic event to pave way towards the gestational surrogacy in the future. The first documented surrogate pregnancy was recorded in 1976. From that moment onwards until 1988, approximately 600 babies were born via surrogacy and that number rose significantly, further, to over 5000 such births, between 1988 till 1992. Every

year, more than 3.7 millions of babies are born world-wide with the help of such fertility treatments.¹² The number of babies born from surrogacy process, in the United States, has, also, been continuing to rise throughout the last two decades with thousands of babies, so born, every year.

Human reproduction remains, no longer, a biological or natural activity alone. It has, rather, become a faster commercial commodity-production, as a flourishing family business, when several of the agreements are signed between parties concerned and the relevant laws are also fledgling which can, easily, be circumvented, too.¹³ The babies are produced, commercially, without sexual activities, by the couples of the same sex, as well. Baby-Making has become, now, a full-time occupation, for several of the women, to be undertaken with an ulterior motive of earnings for feeding their own hungry and poor families each. Such a type of baby-farming is quite popular, these days, in some of the countries like Mexico, Thailand, Nepal and India etc.

After the first surrogate delivery in India, in June 1994, India has steadily emerged as an international destination of commercial baby-making because, perhaps, of relatively less-expensive medical facilities, know-how in reproductive technology, and of the availability of women, largely from poor socio-economic strata who are willing to take up this task. Several legal vacuums also let this practice grow as in Georgia, Russia, Thailand and Ukraine etc.

Surrogacy has, now, become such a bigger business in several cities like Hyderabad, and in its neighborhood, where so many fertility-centers have mushroomed over the past 5 years catering, at least, from 50 to 100 surrogate births in a month. There are more than 3000 fertility-clinics in India that offer such services.¹⁴ According to an expert report, nearly 400 surrogate mothers are available, to be contacted, at a short notice, anytime... at the charging rates of Rs. 75,000 to 1,00,000 per such birth, besides the cost of medicine and maternity expenses. Although the same single lady is not, usually, allowed more than three surrogate births yet instances do exist of one singular lady giving birth to five surrogate children, and that, too, in quick succession.

Exploitative / Coercive Industry

In many of the metropolitan cities today, several maid-servants who are unable to earn Rs. 3000/- a month, otherwise, prefer to undertake the risky task of surrogacy. Reportedly, 68% of the domestic helps in Delhi, and 78% thereof in Mumbai, are being used as surrogates whereby they have become able to earn more than Rs. 3000 a month each... but clearly, this evidences the real exploitative nature of this horrible maid-business of 'rent-a-womb industry' in India. During the labour period, the surrogate mother has to live away from her own family members which is, really, a painful occasion, in itself. A woman going for the Assisted Reproductive Technique (ART) had to face unpredictable and repetitive physical and/ or psychological trauma, as well.

Surrogacy is, essentially, a contract between the commissioning parents and the surrogate mother(s) as the essential parties thereto. Some

surrogate mothers are impregnated, fraudulently, without their knowledge of such a surrogate pregnancy and the unhealthy or unwanted pregnancy, if any, is aborted, similarly, without consents of the surrogate mother, by the use of pills etc., in the guise of merely a spontaneous abortion itself. This is deceptive enough, otherwise, in affecting the health of the concerned surrogate mother, adversely. Moreover, the copy of the surrogacy agreement is not, usually, given to the surrogate mother concerned who is, really, the essential party to such an agreement itself. Consequently, the women stakeholders are, knowingly, kept unaware of various favourable clauses contained therein which is likely, but, to yield undue margins only to the fertility-clinics and/ or the middlemen involved.

Vitiating Reproductive Choice

Motherhood is not a job of baby-farming that can be outsourced. Today, surrogacy is out-sourced with the aid of religious contacts of the family-owned Clinics and/ or Nursing Homes (NHs), being run by certain so-called social workers¹⁵ or by the Third-Party Agencies (TPAs) in the metro cities like Mumbai, or else by the parallel ART Industry of - 'Sale or Hire Ones Own Body'—which is being touted, rather, as a form of social development. With its large pool of agencies, and of the nimble surrogacy laws, as also of its world-class medical infrastructure, and of highly-trained doctors, India has emerged, now, as a hub for the wealthy wannabe parents. The money offered by foreign couples attracts a steady stream of women from the poor socio-economic strata to offer themselves as surrogates.

Generally, the fertility-physicians/clinics create multiple embryos in the laboratories, sometimes up to seven in numbers, as to transfer the best two or three thereof to the uterus of the surrogate mother (s) in the hope to enhance the success rate of pregnancies. This may, so often, lead to few births of twins or triplets, as well. This is much more dehumanizing and twibling a trend where more than one surrogate mothers are used, usually, for the same single commissioning couple as to raise the success rate of surrogate baby-making.¹⁶ The efforts of other volunteer surrogates are left to be so wasted, for no socio-economic gains thereof, whatsoever. Strange enough, such services are being advertised, shamelessly and conspicuously, without an eye to frown thereupon! The Indian Council of Medical Research (ICMR) had, however, issued guidelines, already in 2005, for the accreditation, supervision and regulation of surrogacy clinics, but those remain on papers, as the paper-tigers alone.

Ban on Baby-Farming

The commercial surrogacy is taken to be an easier work to make quick money for setting up a business or to repay a loan or else to enjoy easy-going life at the cost of the health of the woman in the family. Many a times, the wife is threatened of the abandonment by her husband if she did not agree to a surrogacy arrangement.¹⁷ Such types of gross violations of the rights of women who agree to become surrogate mother amount to a considerable degree of miscarriage of natural justice taking place in our society.¹⁸ In several countries on the globe, like in Germany, Norway, Italy, Sweden and Singapore, surrogacy is completely banned while only the

and the United Kingdom.¹⁹

The Law Commission of India, too, had recommended to ban on such mass baby-making in India.²⁰ In the eyes of our Hon'ble Apex Court, the commercial surrogacy is like a business of surrogacy tourism, or is a trade in human embryos, for the foreigner couples to bring the frozen human embryos and to rent a surrogacy womb in India. This amounts to nothing different than the commoditization of life itself. ... should not be allowed at all.²¹

In response to the above-mentioned mandate of our apex court, the Government of India is all set, now, to ban the surrogate visits of the foreign couples confirming, thereby, its resolution that 'India not be allowed to be the surrogate capital of world'.²² The earlier notification of 2013, allowing a free import of human embryos to India, is going, sooner, to be withdrawn so that the ongoing psychological, emotional and economic exploitation of the poorer surrogate mothers is stopped, forthwith. This is felt, of course, that a sudden and arbitrary such ban would, definitely, hurt all the stakeholders in this multi-billion rupees industry, particularly, all those innocent children who are at the core of the issue.²³ It is note-worthy, as well, that banning surrogacy is quite easier a task but framing a relevant and proper law is a bit difficult exercise since it involves careful thoughts, good technical inputs and, above all, the necessary political will, as well. Such a womb-battle is also curtailed, currently, by the Kathmandu Government but only in a phased manner.²⁴

Ms. Lalitha Kumaramanglam, the Chairperson of the National Commission for Women has advocated, rather, that surrogacy law must allow every single woman to serve as the surrogate mother may she be married, un-married, divorced or else be separated from her husband if any of them wishes, at any time, to avail of her right to choose of her reproductive autonomy.²⁵ Really, the issue of surrogacy in our country has led, now, to a big debate on the lives of the women and all other stakeholders involved therein because the future of surrogacy in India remains uncertain with a range of different policy changes on this subject.

Concluding Remarks

The Government of India had, of course, tightened the visa regulations, since March 2014, as to discourage the foreigner couples visiting India, on a tourist visa, with the sole purpose only of commissioning a surrogacy therein.²⁶ The Assisted Reproductive Technologies (Regulation) Bill 2010 needs to be passed forthwith without any delay and the following may be suggested to be incorporated therein:

1. The Assisted Reproductive Technique (ART) must only be available, as a facility, only to the Indian infertile couples and it must be open to the foreigners only sparingly;
2. The surrogate mother must have a living child of her own who should, at least, be three years old in age;
3. Any woman can opt to be a surrogate mother only once in her life-time.

the child's custody irrespective of any deformity or abnormality it might be born with;

5. All expenses, including insurance, for the duration of pregnancy as well as for the delivery, in relation to the surrogacy, should be borne by the couple commissioning the surrogacy;
6. Surrogate mothers' contracts should be given due regards to ascertain their terms and conditions;
7. No Surrogacy without prior permission of Court shall be allowed in any Clinic whether private or Governmental;
8. Role of the unnecessary middle-men should be eliminated, at all. The particulars of the surrogate mothers should be placed on some public record;

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19. Gita Aravamudan, Regulate, don't eliminate in the Hindu, 5 November 2015, p. 11.
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DOMESTIC VIOLENCE: VIOLATION OF HUMAN RIGHTS OF WOMEN

Archana
LBS Arya Mahila College
Barnala (Punjab)

ABSTRACT

Violence against women and girls continues to be a global epidemic that kills, tortures, and maims - physically, psychologically, sexually and economically. It is one of the most pervasive of human rights violations, denying women and girl's equality, security, dignity, self-worth, and their right to enjoy fundamental freedoms. Violence against women is present in every country, cutting across boundaries of culture, class, education, income, ethnicity and age.

Though, the law is an important tool but it is one of the many strategies available to women. While fighting for justice through the legal system, there should also be attempts to put in place education policies, health strategies and community level programmes that promote equality between men and women and teach non-violent methods of resolving conflict.

INTRODUCTION

'Violence against women is a manifestation of historically unequal power relations between men and women, which have led to domination over and discrimination against women by men and to the prevention of the full advancement of women...'

Violence against women and girls continues to be a global epidemic that kills, tortures, and maims - physically, psychologically, sexually and economically. It is one of the most pervasive of human rights violations, denying women and girl's equality, security, dignity, self-worth, and their right to enjoy fundamental freedoms. Violence against women is present in every country, cutting across boundaries of culture, class, education, income, ethnicity and age. Even though most societies proscribe violence against women, the reality is that violations against women's human rights are often sanctioned under the garb of cultural practices and norms, or through misinterpretation of religious tenets. Moreover, when the violation takes place within 'he home, as is very often the case, the abuse is effectively condoned by the tacit silence and the passivity displayed by the state and the law-enforcing machinery.

The global dimensions of this violence are alarming, as highlighted by studies on its incidence and prevalence. No society can claim to be free of such violence; the only variation is in the patterns and trends that exist in countries and regions. Specific groups of women are more vulnerable, including minority groups, indigenous and migrant women, refugee women and those in situations of armed conflict, women in institutions and

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ਵਿਸ਼ਵੀਕਰਨ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ: ਦਸ਼ਾ ਤੇ ਦਿਸ਼ਾ

ਡਾ. ਰਮਨਪ੍ਰੀਤ ਕੌਰ*
ਸਪਨਪ੍ਰੀਤ ਕੌਰ**

Abstract: ਭਾਸ਼ਾ ਕਿਸੇ ਵੀ ਸਮਾਜ-ਸਭਿਆਚਾਰ ਦਾ ਅਨਿੱਖੜਵਾਂ ਅੰਗ ਹੁੰਦੀ ਹੈ। ਇਹ ਅੱਗੋਂ ਉਸ ਸਭਿਆਚਾਰ ਦੇ ਪ੍ਰਚਾਰ ਅਤੇ ਪਾਸਾਰ ਦਾ ਮਾਧਿਅਮ ਵੀ ਬਣਦੀ ਹੈ। ਇਸ ਲਈ ਜਦੋਂ ਕਿਸੇ ਸਮਾਜ ਜਾਂ ਉਸਦੇ ਸਭਿਆਚਾਰ ਦਾ ਜ਼ਿਕਰ ਕੀਤਾ ਜਾਂਦਾ ਹੈ, ਤਾਂ ਉਸ ਭਾਸ਼ਾ ਦੇ ਮਹੱਤਵ ਨੂੰ ਘਟਾ ਕੇ ਨਹੀਂ ਵੇਖਿਆ ਜਾ ਸਕਦਾ। ਵਿਸ਼ਵੀਕਰਨ ਇੱਕ ਅਜਿਹਾ ਵਰਤਾਰਾ ਹੈ, ਜੋ ਸਾਰੇ ਵਿਸ਼ਵ ਦੀ ਆਰਥਿਕ, ਰਾਜਨੀਤਿਕ, ਸਭਿਆਚਾਰਕ, ਭਾਸ਼ਾਈ, ਵਿਗਿਆਨਕ, ਸੰਚਾਰ-ਸਾਧਨੀ, ਤਕਨੀਕੀ ਤੇ ਵਾਤਾਵਰਨੀ ਅੰਤਰ-ਸੰਬੰਧਿਤਾ ਨੂੰ ਵਧਾਉਂਦਾ ਹੈ ਅਤੇ ਮੌਜੂਦਾ ਹੱਦਾਂ ਤੇ ਹੱਦਬੰਦੀਆਂ ਨੂੰ ਅਪ੍ਰਸੰਗਿਕ ਕਰ ਦਿੰਦਾ ਹੈ। ਇਸ ਦਾ ਸਭ ਤੋਂ ਵੱਡਾ ਹਮਲਾ ਖੇਤਰੀ ਤੇ ਸਥਾਨਕ ਭਾਸ਼ਾਵਾਂ ਉੱਤੇ ਹੋਇਆ ਹੈ ਅਤੇ ਸਿੱਟੇ ਵਜੋਂ ਬਹੁਤ ਸਾਰੀਆਂ ਖੇਤਰੀ ਭਾਸ਼ਾਵਾਂ ਆਪਣੀ ਸਭਿਆਚਾਰਕ ਪਹਿਚਾਣ ਗੁਆ ਕੇ ਹਾਸ਼ੀਆ-ਗ੍ਰਸਤ ਹੋ ਚੁੱਕੀਆਂ ਹਨ। ਇਸ ਨੇ ਵਿਕਾਸਸ਼ੀਲ ਅਤੇ ਅਵਿਕਸਤ ਦੇਸ਼ਾਂ ਨੂੰ ਕਈ ਪੱਖਾਂ ਤੋਂ ਪ੍ਰਭਾਵਿਤ ਕੀਤਾ ਹੈ। ਵਿਸ਼ਵੀਕਰਨ ਦੇ ਇਸ ਦੌਰ ਵਿਚ ਭਾਸ਼ਾ ਜੋ ਮਨੁੱਖ ਦੀ ਵਜੂਦਾਤਮਿਕ ਪਹਿਚਾਣ ਦਾ ਸਭ ਤੋਂ ਵੱਡਾ ਲੱਛਣ ਹੈ, ਇਸ ਦੀ ਭੂਮਿਕਾ ਸੰਚਾਰ ਦੇ ਸਾਧਨ ਤੋਂ ਮਾਲ (Commodity) ਵਿਚ ਬਦਲ ਗਈ ਹੈ। ਇਸ ਦੇ ਪ੍ਰਭਾਵ ਅਧੀਨ ਅਜੋਕੀ ਸਿੱਖਿਆ ਦਾ ਕੇਂਦਰ-ਬਿੰਦੂ ਬਿਲਕੁਲ ਬਦਲ ਚੁੱਕਾ ਹੈ। ਫਲਸਰੂਪ ਸਥਾਨਕ ਜਾਂ ਖੇਤਰੀ ਭਾਸ਼ਾਵਾਂ ਦੀ ਉਹ ਥਾਂ ਨਹੀਂ ਰਹੀ ਜੋ ਪਹਿਲਾਂ ਹੁੰਦੀ ਸੀ। ਸਿੱਖਿਆ ਦੇ ਨਿੱਜੀਕਰਨ ਦੀ ਪ੍ਰਵਿਰਤੀ ਕਾਰਨ ਵਰਤਮਾਨ ਸਮੇਂ ਭਾਸ਼ਾ ਕੇਵਲ ਤੇ ਕੇਵਲ ਮੰਡੀ ਦੀ ਵਸਤ ਬਣ ਗਈ ਹੈ ਅਤੇ ਸਾਡਾ ਆਪਣੀ ਮਾਂ-ਬੋਲੀ ਨਾਲ ਭਾਵੁਕ ਸਾਂਝ ਵਾਲਾ ਰਿਸ਼ਤਾ ਸਹਿਜੇ-ਸਹਿਜੇ ਮਨਫੀ ਹੁੰਦਾ ਜਾ ਰਿਹਾ ਹੈ। ਹੱਥਲੇ ਖੋਜ-ਪੱਤਰ ਵਿਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਉਤੇ ਪਏ ਵਿਸ਼ਵੀਕਰਨ ਦੇ ਪ੍ਰਭਾਵਾਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਅਧਿਆਪਨ ਦੇ ਹਵਾਲੇ ਨਾਲ ਉਲੀਕਣ ਅਤੇ ਉਜਾਗਰ ਕਰਨ ਦਾ ਯਤਨ ਕੀਤਾ ਗਿਆ ਹੈ।

* ਅਸਿਸਟੈਂਟ ਪ੍ਰੋਫੈਸਰ, ਕਲਾਸੀਕਲ ਅਤੇ ਆਧੁਨਿਕ ਭਾਸ਼ਾਵਾਂ ਕੇਂਦਰ, ਪੰਜਾਬ ਕੇਂਦਰੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ, 9855656963

** ਰਿਸਰਚ ਸਕਾਲਰ, ਕਲਾਸੀਕਲ ਅਤੇ ਆਧੁਨਿਕ ਭਾਸ਼ਾਵਾਂ ਕੇਂਦਰ, ਪੰਜਾਬ ਕੇਂਦਰੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ

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WATER CRISIS AND ITS IMPACT ON PUNJAB AGRICULTURE

PAVNEET
Research Scholar

NARESH SINGLA
Assistant Professor, Centre for Economic Studies
Central University of Punjab, Bathinda

ABSTRACT

The growth of Punjab agriculture is showing signs of slowdown as in past its growth has taken place at the cost of its natural resources. In some districts of the state such as Sangrur, the problem of water depletion is highest, while in the south-western regions such as Muktsar, water logging is serious problem resulting in socio-economic loss to the farmers and shift in the cropping pattern. In the central Punjab, water table has gone down by more than 20 meter in the past one decade and the trend is continuing and on the other side, in south-western region, it is continuously showing a rise of 20-22 cm per year motivating the farmers to shift from cotton to rice cultivation. The fast increase in area under rice and wheat appears to be unsustainable due to declining water table in one region and low productivity in other region. The cost of pumping out the water for the present cropping pattern is increasing in central Punjab and crop productivity of most crops is adversely affected in south-western Punjab region due to water-logging and productivity per acre. The wheat-cotton crop rotation in this region has changed to wheat-paddy. The small farmers are most sufferers in both conditions as in declining water table region, they cannot afford to install tubewells at a depth of hundreds of meter to irrigate their crops and less productivity or no income from agriculture in waterlogged region. The study suggested in water logged region, agro-forestry trees such as poplar should be promoted as they withdraw water from the surface of the soil besides setting up tension-meters to monitor water requirements. In ground water depletion areas, the study suggested the encouragement of basmati paddy which is a short duration crop and water requirement is also less compared to the paddy. Besides, diversification policy towards less water consuming crops should be properly implemented in water depletion region

INTRODUCTION

Punjab, a small northern state contributes significantly to the agricultural economy of India, as more than 83 per cent of the land in state is under

agriculture. It is also known as 'food bowl' of the country (Jeevandas et al., 2008). Growth of Punjab agriculture is closely related with Green Revolution, as it transformed India from food deficit nation to a food surplus one. But from last decade agrarian economy of the state is showing signs of a serious slowdown as cropping intensity and irrigation potential have already been fully exploited and the growth in productivity has also reached a saturation point. Its gross irrigated area to gross cropped area has increased from 85.4 per cent in 1980-81 to 98.4 per cent in 2012-13 (Statistical Abstract of Punjab, 2014). The cropping intensity was 191 per cent in 2012-13 (Economic Survey, 2013-14). But this increment takes place at the cost of its own natural resources like land and water. The greed for maximizing economic returns has put water resources under huge pressure and exploitation of which resulted in water depletion day by day and it has created an alarming situation in central Punjab and in south-western region, it has given birth to problem of water logging. Injudicious surface water irrigation policies, excessive groundwater pumpage due to free electricity along with irrational irrigation and agricultural practices have led a critical situation for groundwater resources in central Punjab region. The total water requirement for Punjab, with present cropping pattern and practices and industrial use is estimated at 4.33 million hectare meter. The total availability of water is estimated at 3.13 million hectare meter out of which 1.45 million hectare meter is from canals and 1.68 million hectare meter is from rainfall and seepage. The deficit of almost 1.20 million hectare meter is met by groundwater withdrawal. This has led to a decline in the water table in central Punjab (Singh, 2009). On the other side, southwestern districts of the state comprising almost one-fourth of the cultivated area of the state, popularly known as cotton belt has deep and brackish underground water is facing a severe problem of water logging and resultant soil salinity in the districts- Muktsar, Fazilka, Bhatinda and Faridkot, irrigated by the Sirhind canal (with the Sirhind and Rajasthan feeders running North-South through this region). The network of canal water supply in the area improved but could not provide to the requirements of increasing cultivated area, cropping intensity and area under water intensive crops. Thus the use of underground poor quality water through tubewells has been increasingly overexploited. With about 11-12 meter water depth in 1981, it is continuously showing a rise of 20-22 cm per year motivating the farmers to shift from cotton to rice cultivation. This has been largely responsible for the fast declining productivity of cotton due to the fact that use of underground water has increased growth of salts on the soil surface deteriorating its health, higher inflow of canal water in some area has caused rise in water table and even water-logging in some pockets of this zone and the high humidity resulting from paddy cultivation and water-logging of soil has encouraged the built up of insect-pests, threatening the cultivation of cotton in this belt (Singh, 2013). The state can in fact be characterized by two distinct topographical and hydro-geological settings: high yielding fresh groundwater regions in northern and central districts and the saline groundwater regions in south western districts. The state, therefore,

requires a twin pronged policy to manage its groundwater resources i.e. to stop the declining trend in groundwater in northern and central districts and fight water logging in south-west districts. Groundwater irrigation has been a major component in agricultural development as it is most efficient, reliable and productive source and intensive use of groundwater rapidly expanded with the adoption of tubewell and diesel engine technology. Approximately 14.05 lakh tubewells are working in the state that irrigates about 72 per cent of the total irrigated area (Statistical Abstract of Punjab, 2014).

This paper makes the use of secondary sources such as Statistical Abstract of Punjab, Report of Dynamic Groundwater Resources of Punjab State-2012 and Water Logging in Punjab-2013 to provide background to emerging problem concerned with water resources on cropping pattern, average yield of major crops, availability of groundwater and its draft, water logged area etc. Dhawan, (1993) shared the perception that the cultivation of paddy in Punjab and Haryana needs some reduction, the extreme forebodings of either total groundwater exhaustion or of the state becoming a desert if paddy growing is not restricted immediately. Even the technology to extract groundwater, being capital intensive, gives greater accessibility to groundwater to large farmers who gain enormously from growing the remunerative but water-intensive rice crop (Sarkar, 2012). So this water depletion is affecting more severely to small and marginal farmers as they are unable to invest in costly water extraction machines as a result either they have to buy water, lease out or sell land. The introduction of canal irrigation system mainly in Southwest Punjab and poor drainage system gave birth to the serious problem of water logging which results socio-economic loss to the farmers and the cropping pattern shifts from wheat-cotton crop rotation to wheat-paddy crop rotation (Singh, 2013).

2. Groundwater Scenario

Groundwater is a critical resource in India, accounting for over 65 per cent of irrigation water and 85 per cent of drinking water supplies (Wyrwoll, 2012). In India, over- exploited blocks are 14 per cent, 3 per cent are critical, 9 per cent are semi- critical and 73 per cent are in safe category. Percentages of over-exploited and critical blocks are significantly higher in Delhi, Gujarat, Haryana, Himachal Pradesh, Karnataka, Punjab, Rajasthan and Tamil Nadu. Among states, Punjab is having highest percentage of over- exploited blocks i.e. 80 per cent, followed by Delhi with 74 per cent (Ground Water Year Book, 2011-12). Punjab state has the highest percentage of groundwater development and even over-exploited blocks are also more than other states. The situation of central Punjab is worst in groundwater depletion. The water table in the central Punjab has gone down by more than 20 meter in the past one decade and the trend is continuing. Out of 138 blocks in Punjab, 110 blocks (80 per cent) are over- exploited, 3 blocks (2 per cent) are critical, 2 blocks (1 per cent) are semi- critical and 23 blocks (17 per cent) are in safe category in 2009.

Table 1: Year- wise Groundwater Assessment of Blocks in Punjab

| Year | Over-exploited | Critical | Semi-critical | Safe |
|------|----------------|----------|---------------|------|
| 1984 | 53 | 7 | 22 | 36 |
| 1986 | 55 | 9 | 18 | 36 |
| 1989 | 62 | 7 | 20 | 29 |
| 1992 | 63 | 7 | 15 | 33 |
| 1999 | 73 | 11 | 16 | 38 |
| 2004 | 103 | 5 | 4 | 25 |
| 2009 | 110 | 3 | 2 | 23 |

Source: Dynamic Groundwater Resources of Punjab State, 2012

Table 1 shows that over the period of time number of dark/ over-exploited blocks has increased from 53 in 1984 to 110 in 2009. The number of white/ safe blocks has decreased from 36 in 1984 to 23 in 2009. The categorization of blocks has shown tremendous change from semi-critical to over-exploit due to extensive use of tubewells and rise in area under paddy crop, along with increase in domestic/ industrial water use due to urbanization. The problem of groundwater depletion has emerged mainly in the central region districts which include Amritsar, Barnala, Kapurthala, Fatehgarh Sahib, Jalandhar, Ludhiana, Patiala, Sangrur, Tarn Taran, where the stage of groundwater development² is more than 150 per cent shown in Table 2. Among all these districts Sangrur has highest gross groundwater draft i.e. 367244 hectare meter and minimum in Mohali district as 28005 hectare meter in 2008-09. The stage of groundwater development in Sangrur is 264 per cent. The net annual groundwater availability of Punjab is 20.35 billion cubic meter (bcm) and total gross groundwater draft is 34.66 bcm, out of that 33.97 bcm is for irrigation only. On the other side, Muktsar district has highest waterlogged area 46.32 sq. km in Punjab. The problem is wide spread over all blocks of Muktsar. The water table has been rising steadily over the last three decades reaching within 1 meter or less from the surface over large areas.

Table 2: District- wise Assessment of Groundwater Resources in Punjab, 2008-09 (Ha. Mt.)

| District | Net Annual Groundwater Availability | Existing Gross Groundwater Draft for Irrigation | Existing Gross Groundwater Draft for all uses | Stage of Groundwater Development (%) | Waterlogged Area (sq. km) |
|------------|-------------------------------------|---|---|--------------------------------------|---------------------------|
| Amritsar | 123026 | 215724 | 220547 | 179 | 2.53 |
| Barnala | | 60641 | 118371 | 119594 | 197 |
| Bathinda | 97638 | 117778 | 120702 | 124 | 0.00 |
| Faridkot | 61226 | 95253 | 97195 | 159 | 1.97 |
| Fatehgarh | 53505 | 110450 | 112483 | 210 | 0.00 |
| Ferozepur | 196553 | 273766 | 277032 | 141 | 6.59 |
| Gurdaspur | 177929 | 218298 | 224753 | 126 | 40.07 |
| Hoshiarpur | 88158 | 86475 | 91297 | 104 | 9.23 |
| Jalandhar | 118137 | 265594 | 270181 | 229 | 0.11 |
| Kapurthala | 65376 | 150083 | 153954 | 235 | 6.03 |

| | | | | | |
|------------|---------|---------|---------|-----|-------|
| Ludhaina | 203448 | 334616 | 345504 | 170 | 1.47 |
| Mansa | 67246 | 143790 | 143804 | 214 | 0.72 |
| Moga | 119411 | 240557 | 242319 | 203 | 0.00 |
| Muktsar | 76810 | 51286 | 53746 | 70 | 46.32 |
| Nawanshahr | 64014 | 70277 | 71765 | 112 | 0.02 |
| Patiala | 149083 | 286960 | 291165 | 195 | 0.08 |
| Ropar | 41518 | 43487 | 45818 | 110 | 2.07 |
| Mohali | 27514 | 23438 | 28005 | 102 | 0.55 |
| Sangrur | 139322 | 364296 | 367244 | 264 | 0.04 |
| Tam Taran | 104368 | 186441 | 189011 | 181 | 0.34 |
| Total | 2034922 | 3396941 | 3466117 | 170 | |

Source: Dynamic Groundwater Resources of Punjab State, 2012 and Water Logging in Punjab, 2013.

The Government of Punjab has indicated that about 2 lakh hectares of fertile agricultural land is water logged and there are certain patches where not even a single crop has been grown for more than a decade. Even more than 200,000 farmers have lost their primary income source from agriculture as their lands have become unproductive (Water Logging in Punjab, 2013). The major causes of water logging in Muktsar, Faridkot and Ferozepur districts of Punjab is the continuous seepage from Rajasthan and Sirhind Feeder canals. The groundwater situation in Punjab is summarized in Table 3.

Table 3: Groundwater Situation in Punjab

| | |
|---|-----------------------|
| Annual groundwater availability | 20.35 BCM |
| Groundwater extraction | 34.66 BCM |
| Decline in level of groundwater | 4.5 to 13.5 meter |
| Area identified for recharging ground water | 16450 km ² |
| In the basin by CGWB | |
| Water logged area | 200,000 ha |
| Salinity affected area | 1000000 ha |

Source: Final Report September 2011, Appendix 2 Lower Sutlej Sub Basin.

3. Water and Crop Productivity

Rice has benefited the most from its effective Minimum Support Price (MSP), electric power supply as there are 12.26 lakh electric tubewells working out of 14.05 lakh in 2014 and free electricity supply. Subsidized and sometimes even totally free electricity to the farm sector in Punjab has done more harm than good. As may be seen from table 4, rice occupied merely 4.80 per cent of the total cropped area in 1960-61 but registered a steep rise up to 36.23 per cent in 2013-14. It did not confine only to traditional paddy belt but spread over to all the districts wherever adequate irrigation facilities were made available. Similarly, the area under wheat increased from only 29.59 per cent in 1960-61 to 44.62 per cent of total cropped area in 2013-14 but the stage has now reached beyond which increase appears to rather impossible. On the other hand, area

under maize, bajra, jawar, groundnut, gram, barley and lentil has fallen rapidly. However, cotton, sugarcane, pulses, rapeseed and mustard, potato and other vegetables have shown wide fluctuations from year to year. The water table rises nearly to surface in large number of villages in south-western districts during the rainy season cause serious damage to standing crops. Water logging and soil salinity are thus an unavoidable problem attached with irrigation and adversely affecting the production and productivity in irrigation command areas of south-west of Punjab resulting in huge economic loss. The area under cotton crop has been declined in Muktsar district from 125.5 thousand hectare in 2001-02 to 82 thousand hectare in

Table 4: Shift in Cropping Pattern of Punjab (000 ha)

| Crop | 1960-61 | 1980-81 | 2000-01 | 2010-11 | 2013-14 |
|---------------------------|-------------|-------------|-------------|-------------|-------------|
| Rice | 227(4.8) | 1183(17.49) | 2612(32.92) | 2826(35.85) | 2851(36.23) |
| Maize | 327(6.91) | 382(5.65) | 164(2.07) | 133(1.69) | 130(1.65) |
| Bajra&Jawar | 140(2.96) | 70(1.03) | 6(0.07) | 3(0.04) | 1(0.01) |
| Groundnut | 67(1.41) | 83(1.23) | 4(0.05) | 2(0.02) | 1(0.01) |
| Cotton | 446(9.42) | 648(9.58) | 474(5.97) | 483(6.13) | 446(5.67) |
| Sugarcane | 133(2.81) | 71(1.05) | 121(1.52) | 70(0.89) | 89(1.13) |
| Pulses | 32(0.68) | 61(0.90) | 42(0.53) | 20(0.25) | 12(0.15) |
| Sesamum | 8(0.17) | 17(0.25) | 19(0.24) | 7(0.09) | 4(0.05) |
| Wheat | 1400(29.59) | 2812(41.58) | 3408(42.95) | 3510(44.53) | 3512(44.62) |
| Barley | 66(1.39) | 65(0.96) | 32(0.40) | 12(0.15) | 12(0.15) |
| Gram | 838(17.71) | 258(3.81) | 8(0.10) | 3(0.04) | 2(0.02) |
| Rapeseed & mustard | 106(2.24) | 146(2.16) | 55(0.69) | 32(0.40) | 32(0.41) |
| Lentil | 30(0.63) | 20(0.29) | 5(0.06) | - | - |
| Potato | 9(0.19) | 40(0.59) | 70(0.88) | 64(0.81) | 87(1.10) |
| Other vegetables | 23(0.49) | 24(0.35) | 46(0.58) | 38.5(0.49) | 42.5(0.54) |
| Fruits | 42(0.89) | 29(0.42) | 34(0.43) | 69.8(0.88) | 76.6(0.97) |
| Fodders & others | 838(17.71) | 854(12.63) | 835(10.52) | 608.3(7.72) | 571.9(7.27) |
| Total cropped area | 4732 | 6763 | 7935 | 7882 | 7870 |

Source: Statistical Abstract of Punjab, (Various Issues).

Figures in parentheses are area under the crop as per cent of Total cropped area

2013-14. The area under cotton crop has been substituted by paddy due to water logging. The cotton crop is very sensitive to water logging and 77 per cent yield reduction has been taken place, the corresponding figures for paddy, wheat and sugarcane are 42 per cent, 38 per cent and 61 per cent (Singh, 2013). Even Table 5 shows that yield level for both major crops in Waterlogged (Muktsar) district is low as compare to Sangrur district i.e. fresh water region. But in Sangrur district to maintain their productivity at high level, farmers have to put 10 meters pipe in submersible motors after every 2 or 3 years for continuous accessibility of groundwater facility as water table is going down

every year. Due to these reasons the cost of production is rising in both districts. For small and marginal farmers agriculture is becoming unviable as they are not in position to do investments in new technology. In Sangrur, small farmers those are unable to install submersible motors at their lands are giving their lands on half rent to large farmer and themselves work as agricultural labourer. On the side in Muktsar, the lands in some villages like Tappa Khera, Therhi, Husner, Ratta Khera etc had become unproductive due to problem of water logging and salinity. These farmers are also quitting the agriculture and becoming drivers and agricultural labourers.

Table 5: Area and Yield of Major Crops in Shri Muktsar Sahib and Sangrur district

| District | 2001-02 | | 2010-11 | | 2013-14 | |
|----------|---------|-------|---------|-------|---------|-------|
| | Wheat | Paddy | Wheat | Paddy | Wheat | Paddy |
| Muktsar | 189 | 93 | 192 | 111 | 209 | 115 |
| | 4596 | 3476 | 4985 | 3894 | 5062 | 3974 |
| Sangrur | 393 | 354 | 287 | 272 | 285 | 273 |
| | 4889 | 3759 | 5128 | 4357 | 5498 | 4724 |
| Punjab | 3408 | 2506 | 3510 | 2506 | 3512 | 2851 |
| | 4563 | 3506 | 4693 | 3828 | 5017 | 3952 |

Source: Statistical Abstract of Punjab, Various Issues.

4. Conclusion

The declining water table in the central Punjab and waterlogging in south-western region has been an issue of serious concern. On the one side, stage of groundwater development is more than 200 per cent in Fatehgarh Sahib, Jalandhar, Kapurthala, Mansa, Moga and Sangrur indicating that these districts are using groundwater more than its availability that results as increase in the cost of irrigation as the farmers dig deeper to withdraw groundwater with the installation of expensive submersible motors. The present cropping pattern appears to be unsustainable as wheat-paddy are more water consuming crops. As a result, the cost of pumping out the water for the present cropping pattern is increasing. On the other side, Muktsar district has been suffered from waterlogging. In south western region area under cotton crop has decreased and even reached to zero in some villages due to stagnant water logging problem. The wheat-cotton crop rotation in this region has changed to wheat-paddy. The small farmers are most sufferers in both conditions as in declining water table region they cannot afford to install tubewells at a depth of hundreds of meter to irrigate their crops and less productivity or no income from agriculture in waterlogged region. The study suggest that in water logged region, agro-forestry trees such as poplar should be promoted as they withdraw water from the surface of the soil besides setting up tension-meters to monitor water requirements. In ground water depletion areas, the study suggested the encouragement of basmati paddy which is a short duration crop and water

requirement is also less compared to the paddy. Besides, diversification policy towards less water consuming crops should be properly implemented in water depletion region.

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ASA DI VAR : SAROOP TE SANCHAR

by

DR. RAMANPREET KAUR

Assistant Professor in Punjabi

Centre for Classical and Modern Languages

Central University of Punjab, Bathinda

Contact No.: 98556-56963

E-mail: raman.josan@yahoo.co.in

DR. RAJANDEEP KAUR

Assistant Professor

Post Graduate Department of Punjabi

Guru Nanak College, Budhlada

Contact No.: 98557-67477

E-mail: rajan_deep_gndu@yahoo.co.in

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About the Book

During the last few decades, the world has changed drastically, dramatically and dynamically. Scientific and technological developments have brought immense changes in communication systems throughout the world. Ensuring that "Education for All" is provided with adequate, equitable and sustainable resources is the foremost challenge. Teachers can awaken curiosity, stimulate independence, encourage intellectual rigour and create the conditions for success in formal and continuing education. The book on "Education and Empowerment" contains 17 chapters relating to various conceptual and qualitative issues on education. This serial publication provides an overview of the historic developments, approaches, innovations and the services in different branches of education and training in the Indian context. This book will be a valuable addition in any library for B.Ed./M.Ed./M.A. Psychology/M.A. Education/MSW/M.Sc. Child Development students in all Indian Universities.

About the Chief Editor



Prof. Sushil Kumar Goel

For over four decades of his exceptionally meritorious service in various positions of responsibility, culminating as Professor and Head, Department of Education, Regional Institute of Education, Bhopal, Prof. SK Goel has retired from his services on 30th Sept 2009. Prof. Goel has served with honour and distinction in numerous positions from those associated with his primary duty as Professor to those of greater responsibility such as Head, Dean, Offg Principal & Offg Jt Director in RIE, Bhopal & CIVE, Bhopal. His unwavering dedication to duty and professionalism are evident in his service as he had been running on two parallel tracks in the field of "ISR/Editorial work in Military Technology" and "Psychology & Education" for more than 17 years. His dynamism earned him the prestigious Awards, Honours, Gold Medals & Accolades from USA, UK & India. His biography has been published in more than one dozen international biographical volumes of USA, UK and India. His technical expertise proved invaluable in bringing the field of special education to much greater heights. Prof. Goel has rendered a meaningful service winning the trust and loyalty of his peers, subordinates and student community. Prof. Goel's long and illustrious career is marked by humility and service and reflects great credit upon himself and the profession of Education.

About the Editors

Shirish K Goel, BA(Maj.Socio), HDSE, PGDMIT(Distn), PGDNIA(Distn) is author, editor and collaborator in several publications. He is winner of Governor of Orissa Award, President of India Award and several other awards.

Shivall Goel, BCA(Topper), DIT(Distn), DNIA, PGDip (Fashion Designing) is Editor in IBRA, Jaipur. She is winner of Governor of Orissa Award and several other awards.

Kalpana Goel, MA, BEd, HDSE, PGDNIA is Executive Editor in IBRA, Jaipur. She was executive editor of "Eminent Personalities of 20th Century" and collaborator in several books.



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publication brings for making further improvements. The suggestions/ observations/ comments would go a long way to bring out a revised document in a better form.

Professor Sushil Kumar Goel, Chief Editor

Readings in Educational Developments Series 2

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CHAPTER 13

LEARNING CENTERED EDUCATION (LCE)

Biswajit Behera

Introduction

Constructivist argued that the learning agents develop meanings to construct knowledge with the real-life which goes beyond text-book. This learning design promotes "learning centered focus". Learning centered education (LCE) is constructivist pedagogy. It enables small group learning in which ability to make rational decisions, shared responsibility for the common good, moral and spiritual principles in interpersonal and human relations, competencies for self-reliance are promoted. So, LCE considers the holistic personality of the child.

In this paper, the significance is explored in some dimensions. (1) LCE promotes powerful learning relationship (2) learning is situated in the real world (3) it explains the process of collective learning which rises to a learning community (4) it creates challenge for the teachers to design the scenario and to be responsible towards individuality (5) it covers multiple disciplines on real-life situations emphasizing holistic elements of learning. Some research questions are raised for future investigation in relation to these dimensions. Implications towards teacher education programmes are also derived to emphasize LCE as constructivist pedagogy.

The general kind in a classroom teaching is that the teacher tells and the students listen, then the students tell or write information on a test and the teacher evaluates. The knowledge gained by the students becomes declarative and inert. The defect is that knowledge is not applied. This is teacher centered or one sided model of learning.

Others argue that education is student centered. The belief is that learning is the province of learners, who must necessarily build their own understanding. Here, knowledge is acquired by the students in the process of their self inquires and personal investigations. Thus, it is the student who is

responsible for learning. It needs personal exploration. This model is often referred to as **natural process of learning**.

An entirely different point of view is proposed by Vygotskian social constructivism which suggests for **learning centered education**. In this learning centered process, students do task on their own and the teacher guides students in their use of strategies and provides a meaningful & relevant context for using the strategies. Students find scope to work in a *small group*. Learning takes place within some socio-cultural settings in which social actions as well as *social interactions* develop (Vygotsky, 1978). Through discussion or argument, the students try to listen and understand to other perspectives. It leads to share, negotiate to develop *meanings*. So, learning is the individual construction & *social mediation* of knowledge within a small group. Hence, learning centered education is examined with reference to the way social constructivism views the nature of the learner, the role of the teacher, learning process and the selection, scope and sequencing of the subject matter.

A Paradigm Shift in Teaching and Learning

Most of the key principles which include learning by doing, experiential learning, problem-solving, critical reflection in and upon action & collaborative learning are tried & tested methods\ approaches of our educational schemas. What is new and challenging about these principles and their application is how they are put together into operational models in different kinds of educational settings & for different kinds of subject matter. The learning designs draw upon age-old constructivist principles of learning which promotes the idea that knowledge and expertise are developed through engagement, interaction & critical reflection by learners. The learning design promotes a "**learning centered**" focus which is significantly different concept from the widely known "**learner centered focus**". Constructivist advocates that the learning experience is at the heart of learning centered environment. The learner is obviously an important part of this environment. He is an agent in designing the learning experience. A comparative picture on some major aspect of the categories of learning is presented below. The comparison, it may be kept in mind, is not at all exhaustive.

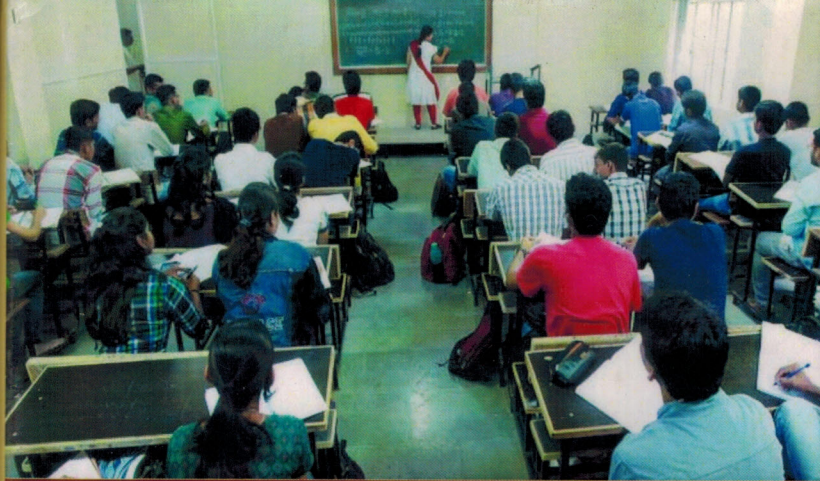
Constructivist Pedagogy: Vital for Meta Cognitive Reflection (MCR)

Dr. Biswajit Behera

Abstract

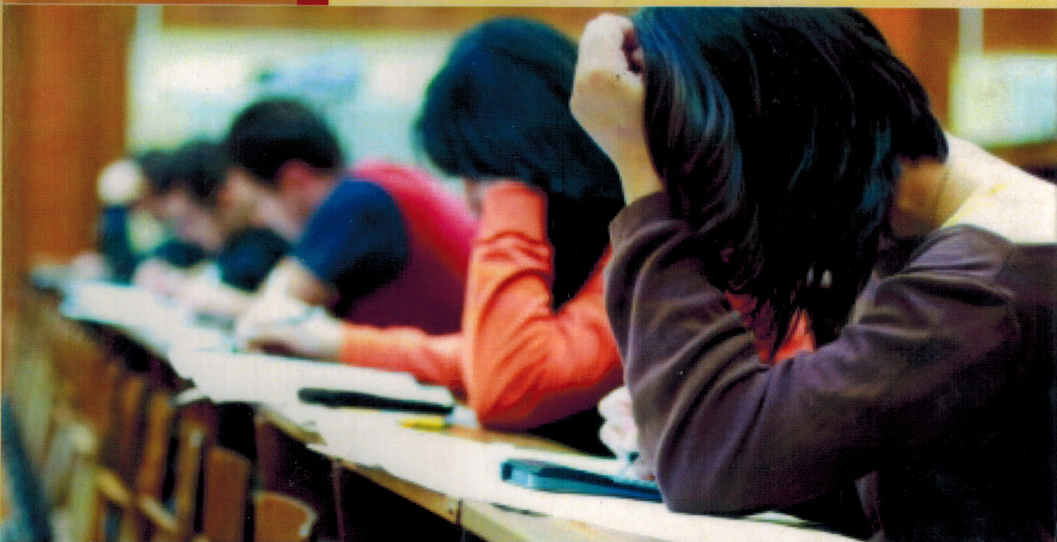
The core of learning is to develop basic forms of understanding which is characterized by forms and processes of verification, validation and justification, knowledge creation and creativity. Both explicit and articulated knowledge as well as tacit and experiential knowledge, creativity and excellence are all integral to the form of knowledge and knowing. It is therefore to organize learning experiences to empower 'learners' and 'transform learning'. Reflection is critical to learning and transfer; it means to be embedded in assessment. A related approach is to require learning to serve a Meta cognitive reflection (MCR). This strategy is the presentation of multiple perspectives to learners by providing multiple representations on the content because there is no single schema. Therefore, Constructivist pedagogy can become the medium for practices of reflection. Strategies like reflective lesson logs, reflective journal, self assessment questions, wait time and group processing which provide opportunities for use of Meta cognitive reflection are suggested.

Key words: Constructivist pedagogy, Reflection, Meta cognitive reflection (MCR)



ESSENTIALS OF TEACHING AND LEARNING

Dr. S.S. Dhillon
Dr. Ranjit Kaur
Dr. Ajit Singh





Dr. S. S. Dhillon

Dr. Shamshir Singh Dhillon is M.Sc.M.Ed.UGC- NET. (Education). PhD. (Education) and is presently at the post of Assistant Professor in Central University of Punjab, Bathinda having 11 years of teaching experience in the field of Education and has contributed more than 30 research papers in field of Education in journals of National and International repute.



Dr. Ranjit Kaur

Dr. Ranjit Kaur is M.Sc. M. Ed. UGC-NET-JRF. (Education). PhD. (Education) and is presently at the post of Assistant Professor in Chaudhary Devi Lal University, Sirsa having 13 years of teaching experience in the field of Education and has also contributed more than 30 research papers in field of Education in journals of National and International repute.

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