

# **Abstract Book**

**Summary of Lectures  
Delivered at 76<sup>th</sup> Orientation Programme  
February 3 - February 24, 2020**

**UGC-Human Resource Development Centre  
Jadavpur University**

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## *Director's Note*

The UGC-Human Resource Development Centre, Jadavpur University, is organizing the 76<sup>th</sup> Orientation Programme, the first among the four such programmes sanctioned by the UGC in the session 2019-20.

Like the previous Orientation Programmes, we have organized a study tour at Satyajit Ray Film and Television Institute (SRFTI) Kolkata, for the participants of 76<sup>th</sup> Orientation Programme. In this study tour the participants would get first-hand experience in direction, sound, cinematography, editing and animation through a guided tour of different units of SRFTI, which they would thereafter document in terms of reports. My sincere thanks go to Debamitra Mitra, Director of SRFTI Kolkata and Ashok Viswanathan, Dean, SRFTI Kolkata, for arranging such an important study tour for the participants of the 76<sup>th</sup> Orientation Programme.

While selecting topics of the lecture sessions, three criteria have been kept in mind: topics of current affairs of national as well as international importance (such as Disaster management); topics of general interest for moral, psychological and professional development (such as lectures on stress management, research methodology, CAS/service matters, general financial rules); and topics of cross-discipline and multi-discipline in nature (such as lectures on, philosophy and history of science, Vasha Andolon, Digital Archive etc.). On top of all these, there has been one session on performing arts with live demonstration.

This Abstract Book collates summary of most of these lectures delivered by experts and eminent researchers in the relevant fields both from within and outside West Bengal. The summary lectures are arranged thematically according to the above-mentioned perspectives. I hope that the participants of the 76<sup>th</sup> Orientation Programme would find this Abstract Book useful for ready references of what they have learnt through this programme.

On January 20, 2018, we have achieved a milestone by launching our own website ([www.hrdcju.in](http://www.hrdcju.in)) and from the session of 2018-19 the application procedure has become on line both of which have been the first of their kind among all the HRDCs in West Bengal. I sincerely thank the University administration for all the help that has been provided to us in this regard. The e-copies of this Abstract Book as well as the earlier ones can be downloaded from link to Archive in this website. Apart from providing all necessary information regarding different programmes organized by us along with time lines and application forms, the website contains a feedback link which can be used by the participants and other stakeholders for providing us their valued suggestions. Such suggestions would help us improve our performance and discharge our moral responsibilities more efficiently and effectively according to the needs of the stakeholders.

At the end, I wish all the participants a memorable and enjoyable four weeks of interactive learning.

February, 2020

**Rajat Acharyya**



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<b>Schedule for 76<sup>th</sup> Orientation Program (February 3 - February 24, 2020)</b>				
<b>Date</b>	<b>10:30 AM – 12:00 Noon</b>	<b>12:00 Noon – 1:30 PM</b>	<b>2:15 PM – 3:45 PM</b>	<b>3:45 PM – 5:15 PM</b>
Feb 03 <b>Monday</b>	<b>Inauguration Session:</b> 10:45 AM: Welcome Address by <b>Dr. Chiranjib Bhattacharjee</b> , Pro. VC, JU 11:00 AM - 11:15 AM: Inaugural Address by <b>Dr. Pradip Kumar Ghosh</b> , Pro. VC, JU, 11:15 AM - 11:30 AM: Tea Break 11:30 AM - 1:00 PM: Inaugural Lecture by <b>Jayanta Sthanapati</b> , Former Deputy Director General, NCSM <b>Enhancing Public Understanding of Science: The role of National Museums</b> 1:00 PM - 1:15 PM: Introduction to the OP Dr. Nandan Bhattacharya, Asstt. Director & Mr. Prabir Chatterjee, Section Officer, UGC-HRDC Guest of Honour, <b>Dr. Sadhan Kumar Ghosh</b> Former Dean, FET, JU		<b>Bichitra Kumar Guha</b> Dean, Faculty Affairs, IEST <b>Evolution of Scientific Ideas from Aristotle to Newton</b>	
Feb 04 <b>Tuesday</b>	<b>Amlan Dasgupta</b> Department of English, JU <b>TBA</b>	<b>Lab &amp; Library Work</b>	<b>Shubrangshu Aditya</b> Counselling Services & Studies in Self-Development, Jadavpur University <b>Neurophysiology and Management of Stress</b>	
Feb 05 <b>Wednesday</b>	<b>Kaushik Roy</b> Department of History, JU <b>Military History</b>		<b>Supriyo Ghosal</b> Secretary, WB Right to PSC, GoWB <b>Emotional Intelligence</b>	
Feb 06 <b>Thursday</b>	<b>Amitava Datta</b> Department of Power Engg. JU <b>Efficient Operation of LPG Cook-stoves in Domestic Households</b>		<b>Suddhasatwa Chakraborty</b> Department of Electrical Engineering, JU <b>Let there be Light</b>	<b>Lab &amp; Library Work</b>
Feb 07 <b>Friday</b>	<b>Partha Karmakar</b> Deputy Secretary, Academic. WBBSE <b>CAS/Service Matters</b>		<b>Lab &amp; Library Work</b>	
Feb 08 <b>Saturday</b>	<b>Gour Krishna Pattanayak</b> FO, JU <b>Basic Financial Rules and Service Related Rules Applicable for the College and University Teachers</b>		<b>Pranabesh Sanyal</b> School of Oceanographic Studies, JU <b>Biodiversity, Project Tiger</b>	

**Lunch Break: 1:30 PM – 2:15 PM**

<b>Schedule for 76<sup>th</sup> Orientation Program (February 3 - February 24, 2020)</b>				
<b>Date</b>	<b>10:30 AM – 12:00 Noon</b>	<b>12:00 Noon – 1:30 PM</b>	<b>2:15 PM – 3:45 PM</b>	<b>3:45 PM – 5:15 PM</b>
Feb 10 <b>Monday</b>	<b>Sugata Hazra</b> School of Oceanography, JU <i>Disaster Management and Sustainable Development</i>		<b>Sarmistha Raychoudhuri</b> Department of Biophysics Molecular Biology & Bioinformatics, CU <i>Genetic Engineering of Plants: Science and Safety</i>	
Feb 11 <b>Tuesday</b>	<b>Barendu Mandal</b> Department of Bengali, JU <i>Vasha Andolon</i>	<i>Lab &amp; Library Work</i>	<b>Dr. Sankar Nath</b> Oncologist <i>Cancer</i>	
Feb 12 <b>Wednesday</b>	<b>Pradip K. Ghosh</b> Pro VC, JU <i>Some Aspects of Philosophy of Science</i>	TBA	<i>Lab &amp; Library Work</i>	
Feb 13 <b>Thursday</b>	<b>Survey based Group Project &amp; Discussion &amp; Evaluation &amp; Evaluation of Group Project &amp; Discussion</b>		<b>Survey based Group Project &amp; Discussion &amp; Evaluation &amp; Evaluation of Group Project &amp; Discussion</b>	
Feb 14 <b>Friday</b>	<b>Study Tour at SRFTI</b>		<b>Study Tour at SRFTI</b>	
Feb 15 <b>Saturday</b>	<b>Sabuj Chowdhury</b> Department of Lib. & Inf. Sc, CU <i>TBA</i>		<i>Lab &amp; Library Work &amp; Submission of report on Study Tour</i>	

**Lunch Break: 1:30 PM – 2:15 PM**



<b>Schedule for 76<sup>th</sup> Orientation Program (February 3 - February 24, 2020)</b>				
<b>Date</b>	<b>10:30 AM – 12:00 Noon</b>	<b>12:00 Noon – 1:30 PM</b>	<b>2:15 PM – 3:45 PM</b>	<b>3:45 PM – 5:15 PM</b>
Feb 17 <b>Monday</b>	<b>Somnath Ganguli</b> Department of Physiology, CU <i>Ergonomics</i>		<i>Lab &amp; Library Work</i> & <i>Submission of report of Seminar Reports</i>	
Feb 18 <b>Tuesday</b>	<i>Lab &amp; Library Work</i>	<i>Lab &amp; Library Work</i>	<i>Seminar</i>	<i>Seminar</i>
Feb 19 <b>Wednesday</b>	<i>Seminar</i>	<i>Seminar</i>	<i>Seminar</i>	<i>Seminar</i>
Feb 20 <b>Thursday</b>	<i>Seminar</i>	<i>Seminar</i>	Microteaching	
Feb 20 <b>Friday</b>	<i>Holiday</i>		<i>Holiday</i>	
Feb 22 <b>Saturday</b>	Microteaching		<b>Performing Arts</b>	
Feb 24 <b>Monday</b>	<b>Valedictory Session</b> 11:00 am – 12:30 pm: Valedictory Lecture by <b>Prof. Sibaji Raha</b> Former Director, Bose Institute		Feedback and Interactive Session <b>(Certificate Distribution and Disbursement of Payment)</b>	

**Lunch Break: 1:30 PM – 2:15 PM**

**UGC – Human Resource Development Centre  
Jadavpur University  
Kolkata – 700 106**

**76<sup>th</sup> Orientation Program  
(February 3 - February 24, 2020)**

**Survey based Group Project & Discussion & Evaluation**

1. Time slot of Group Discussion: **13.02.2020** at **10:30 AM - 1:30 PM & 2:15 PM - 5:15 PM**
2. Presentation shall be made for **30 Minutes** followed by interaction for **10 Minutes**.
3. Presentation shall be made according to the following order.
4. Write up (**12 TNR; Single spacing**) on the topic must be submitted on **12.02.2020 (5:15 PM)**

**Distribution of Group Discussion topic for participants**

Name	Subject	No.	Topic
Animesh Bose	Botany	6	<b>Knowledge Economy: Role of Higher Education Institutes in India</b>
Bhanumati Sarkar	Botany		
Chumki Chowdhury	Botany		
Dipasree Roychowdhury	Botany		
Mithu Biswas	Botany		
Pijush Kanti Das	Botany		
Prajjal Datta	Botany	5	<b>Women in The Millennium</b>
Rashmi Mukherjee	Botany		
Rupa Chakraborty	Botany		
Suranjana Sarkar	Botany		
Tripti Bouri	Botany		
Narayan Roy	Civil Engg.	7	<b>Prevention of Sexual Harassment in Work Place</b>
Nehal Ahmad	Civil Engg.		
Samir Malakar	Comp. Sc.		
Tamal Chakraborty	Computer Sc		
Rajib Sarkar	Computer Science		
Anup Kumar Mallick	ECE		
Arijit Dutta	Mechanical Engg		
Ansar Khan	Geography	4	<b>Natural Calamities and Mental Health of Victimes</b>
Bapi Kisku	Geography		
Gopal ChandraHembram	Geography		
Subhrajyoti Das	Geology		

Aditi Sarkar	Physics	6	<b>Research in Basic Sciences: Is India Lagging Behind</b>
Kaustuv Das	Physics		
Piyali Sengupta	Physics		
Rajim Ali Mondal	Physics		
Nasreen Khan	Mathematics		
Sujay Biswas	Mathematics		
Eashita Das	Microbiology	6	<b>Bioethics</b>
Priyadarshini Mallick	Microbiology		
Sayed Modinur Rahaman	Microbiology		
Angira Das	Nutrition		
Santosh Kumar	FET		
Abhijit Das	Food Engn.		
Amitava Khan	Physiology	4	<b>Psychoanalysis: Conflict Between Self and Society</b>
Soma Majumder	Physiology		
Samiran Mondal	Vety. Pathology		
Mitali Das	Zoology		



**ABSTRACT  
OF LECTURES  
DELIVERED**



# **Inaugural Lecture**





## **Enhancing Public Understanding of Science: Role of Science Museums**

**Dr Jayanta Sthanapati**

Former Deputy Director General, NCSM

**Date & Time: 3<sup>rd</sup> February, 2020; 12:00 Noon - 1:30 PM**

According to the International Council of Museums, a museum is a non-profit making, permanent institution in the service of society and its developments, and open to the public, which acquires, conserves, researches, communicates, and exhibits, for purpose of study, education and enjoyment, material evidence of people and their environment. The same statement is true for science museums. While there are over 55,000 museums in the world, the number of science museums is about 6000. Starting with the Indian Museum (1814) in Kolkata, our country now has over 600 museums and 125 of them are science museums.

We have used 'Science Museums' as a generic term to represent Natural History Museums, Science & Technology Museums, Science Centres, and Science Cities that are located all over the world. We shall examine how the exhibits and presentations in some of the famous science museums in India and abroad increase visitors' knowledge and understanding of science and technology, offer them memorable learning experiences, and motivate youngsters in career choice.





# **CAS/ Service matters/**



## **Basic Financial Rules and Service Related Rules Applicable for the College and University Teachers**

**Gour Krishna Pattanayak**  
Finance Officer, Jadavpur University

**Date & Time: 8<sup>th</sup> February, 2020; 10:30 AM - 1:30 PM**

General Financial rules normally includes sanction process, budgeting, spending norms, purchase rules, service benefits, pay and promotion issues and taxation matters, to name a few. The present lecture primarily focuses on these aspects.

Budgeting is essentially estimates for the future period based on past experiences, and flow of funds and expectations thereof. The principle of budgeting is essentially setting some benchmarks for future plan of growth and development. For academic institutes, the main source of funds is funding by the State and Central Governments and other agencies. In addition, there are incomes/revenues generated through fees, testing and consultancy, sale of publications, alternative use of properties and assets, and disposal of junk and other materials.

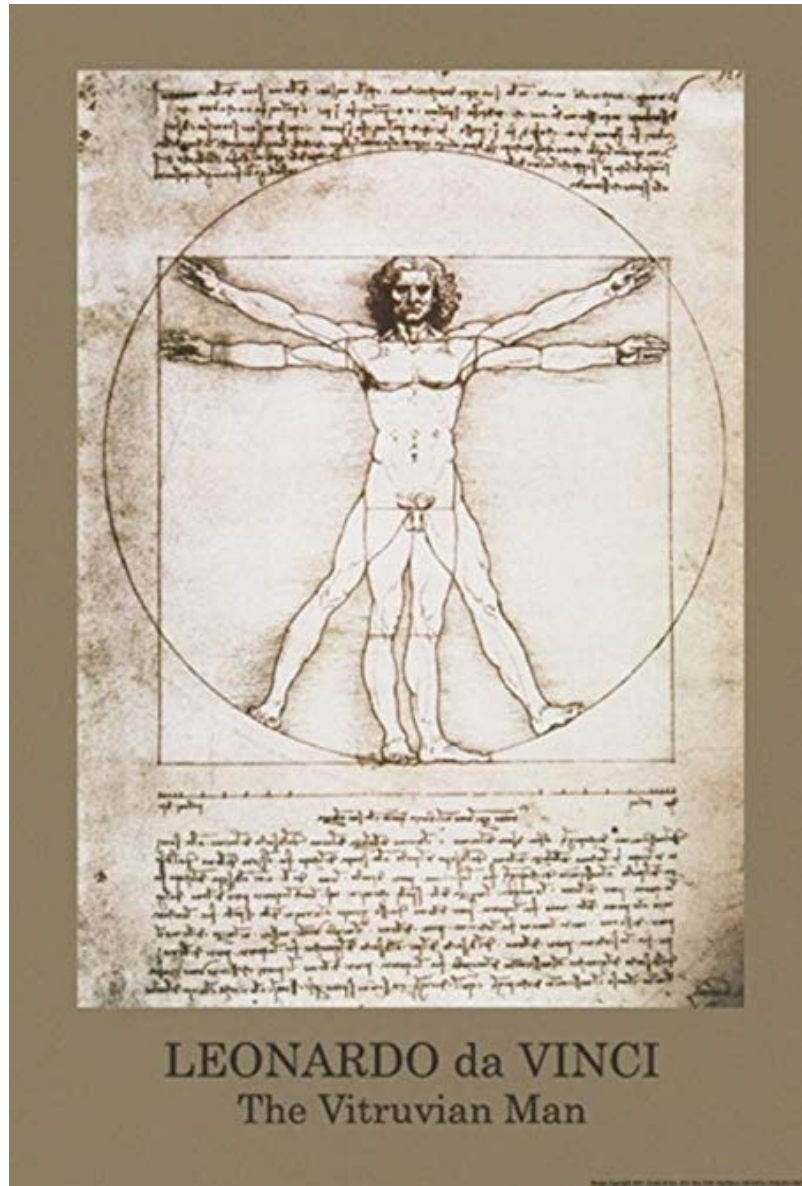
Purchase and expenditure thereof are primarily intended for academic and research activities and primarily within budgetary allocations and/or sanctions. The purchase of materials, equipment and furniture are now governed by GO No.: 5400-F(Y) dated 25.6.2012 of Government of West Bengal.

Accounting, reporting and auditing are the other crucial elements of general financial rules. In this context, introduction of GST has added another dimension to accounting of purchases. The present lecture shall briefly touch upon the scope, applicability, rationality and impact of GST.

The lecture also elaborate upon Service Rules, particularly pay fixation and promotion, promotion under CAS, retirement benefits and the new Pension Scheme introduced by the GoI with effect from 01.01.2004. Salient features of this pension scheme are as follows:

- This is a contributory Pension scheme, introduced w.e.f. 2004; 10% of Basic Pay as subscription and matching equal contribution by the employer will be provided monthly.
- A Pension fund will be maintained by a Fund Manager, where monthly the subscription and contribution need to be send by a employer.
- The employer shall have no liability for Pension of the employees under the scheme.
- The Fund manager shall release Pension monthly, based on the income on the accumulated funds with them.

- Such Pension would not have any DA or Pay-revision benefits.
- The employer has no financial liability for pension after the retirement.
- The fund manager receiving the funds will pay monthly pensions.
- There is a permanent Retirement Account number [PRAN], which is transferable.
- The scheme is controlled by PFRDA.



# History and Philosophy of Science





## **Philosophical View of Science: A Brief Understanding**

**Pradip Kumar Ghosh**

Pro-Vice-Chancellor, Jadavpur University

**Date & Time: 12<sup>th</sup> February, 2020; 10:30 AM – 12:00 Noon**

In general idea we know that Physics, Chemistry and Biology constitute science with Mathematics. In literature science viewed as: “Systematized knowledge covering general truths or the operation of general laws, esp. as obtained and tested through scientific method.” One of the key problems in Philosophy of science is to understand how techniques such as experimentation, observation and theory construction have enabled scientists to unravel so many of nature’s secret. The study of the most general and abstract features of the world and the categories with which we think. In philosophy the concepts with which we approach the world themselves become the topic of enquiry.

Though History of science usually not embedded in the curriculum and while science is taught rather in a historical way, it is argued that close attention to the history of science is indispensable for doing good philosophy of science.

It may be recalled that rapid scientific development occurred in Europe between the years 1500 and 1750. There were scientific investigations in ancient and medieval times- The dominant world was Aristotelianism. According to him all earthly bodies composed of just four elements: earth, fire, air & water.

Ptolemy’s earth centric model of universe was uprooted by Copernican model of Sun centric universe. In fact the whole system of mechanics, explanation of fall of apple and planetary motion was finally solved through Newton’s law of gravity. In leading to the conclusion we saw how the collection of data based on of observation by Tycho Brahe and predicting the formula of planetary motion by Kepler helped the discovery of most natural force exist in Universe- “The force of Gravity”.

The scientific views established on Newton’s deterministic science upto late part of nineteenth century saw development science through number of discoveries and theoretical explanation. Concept of Atom by Dalton advanced many ways the physical science which we generally termed as Physics and Chemistry while “Theory of Evolution” by Darwin gives a better understanding of living being.

The entire scenario of science changed dramatically after discovery of Electron by Sir J.J. Thomson and quick theoretical advance in developing atomic structure and introduction of Quantum Mechanics on one hand and introduction of theory of relativity by Albert Einstein on another hand. Their emergence caused considerable conceptual upheaval not only in physics but in other branches of science. Finally yet incomplete revolution in biology took place in 1953 by Watson & Crick through the discovery of the structure of DNA. It leads to development of molecular biology, Understanding of Heredity & process of building organisms.

Scientific theories established through imagination, observation & experimentation. Both observation & experimentation on a system cannot be done infinite times. Then,

how we can say that it still become effective in next experiment or observation. Here lies the question why?

Twentieth century Philosopher Karl Popper's Theory of Falsification, Lakatos' observation and Hempel's covering model are discussed to know how science and philosophy are embedded. How deductive inference and inductive inference plays role in understanding the philosophical aspect of science and its theory is looked through Hume:

- Use of induction cannot be rationally justified.
- Whenever we make inductive inferences the presupposition is "Uniformity of nature".

Causality, conflict between Realist and Anti Realist are also discussed.

Finally we discuss how Thomas Khun arrived at paradigm concept. According to him a paradigm, therefore, determines not only a set of beliefs about the world. It also defines what counts as good science, and even determines what counts as a scientific fact. It is a conceptual framework that determines how the world looks to those who have accepted it. It defines not only the scientific outlook for practitioners of a particular science, but also the scientific "form of life."

In the conclusion it may be referred that in this lecture we have discussed about Induction, Explanation, Realism and Scientific change which are within the purview of General Philosophy of Science. There are scopes of issue based philosophical questions specific particular sciences. Conflict in physical science, Biological Science and human mind are dealt with examples.

Finally a short review of criticism on overdose of "Scientism" and idealistic difference between Science and Religion is made.

## **Evolution of Scientific Ideas from Aristotle to Newton**

**Bichitra Kumar Guha**

Indian Institute of Engineering Science and Technology, Shibpur, Howrah

**Date & Time: 3<sup>rd</sup> February, 2020; 2:15 PM - 5:15 PM**

Search for truth about the Universe surrounding us started from ancient times. A number of philosophers in ancient Greece contributed in development of ideas about the earth and the heavens; notable among them was Aristotle who proposed different laws to work for the earth and the heavens and tried to establish logically the workings of terrestrial and celestial mechanics. His ideas may also be compared with those of ancient Indian philosophers. Later on, as the Catholic Church gained power, Aristotle's ideas were declared to be infallible and any contradiction was supposed to be anti Bible. From the time of the Renaissance, systematic scientific ideas started developing through Copernicus, Bruno and Galileo. After a long drawn struggle, finally through Newton, the modern science took shape. The ideas of these great thinkers have been discussed in details following chronologically the development of scientific ideas.



# History



## **Dragon against the Peacock: A Strategic Analysis**

**Kaushik Roy,**

Guru Nanak Chair Professor, Department of History, Jadavpur University

**Date & Time: 05<sup>th</sup> February, 2020; 10:30 AM - 1:30 PM**

The People's Republic of China from its inception till this date has not accepted the McMahon Line (India-China border). Beijing slowly but continuously is chipping away at the territories along the Indian side of the border. In fact, the hardliners in China claim that Arunachal Pradesh, Bhutan, Sikkim, parts of Uttarkhand and Himachal Pradesh are all parts of China. After 1962, India has always backed down before a military confrontation with China. This is because of the gross disparity of military strength between China and India. And with the passage of time, this disparity is widening.





# Literature



# ভাষা আন্দোলন ও ভারতীয় উপমহাদেশের ভাষা-রাজনীতি

Barendu Mandal

Department of Bengali, Jadavpur University

Date & Time: 05<sup>th</sup> February, 2020; 10:30 AM - 12:00 Noon

১৯৫২-র একুশে ফেব্রুয়ারির রাষ্ট্রভাষা আন্দোলন বাঙালির আত্মসত্তা নির্মাণের ক্ষেত্রে ঐতিহাসিক ভূমিকা পালন করেছিল। একুশ যদি না হত, একাত্তর হত না। একুশের চেতনা থেকে জন্ম নিয়েছিল মুক্তিযুদ্ধের চেতনা। একুশে ফেব্রুয়ারির আন্দোলন ছিল— আরবি-ফারসি-উর্দুর আধিপত্যের বিরুদ্ধে বাংলা ভাষার (একতম ভাষা) লড়াই।

ভাষা প্রশ্নে অসমের সংকট ভিন্নতর। বরাক উপত্যকার ভাষা আন্দোলনের (১৯ মে ১৯৬১) ইতিহাস একুশের মতো বহু চর্চিত নয়। ভৌগোলিক অবস্থানের নিরিখে অসম প্রথম থেকেই বহুভাষিক। অসমিয়া ছাড়াও সেখানে বাঙালি, খাসি, জয়ন্তিয়া, বড়ো, রাভা, ডিমাসা, মেচ, মিকির, মিসিং, কার্বি, নাগা, মণিপুরী, সাঁওতাল, বিহারী, ভোজপুরী – প্রভৃতি জনগোষ্ঠী ও ভাষাগোষ্ঠীর মানুষ অসমে কয়েকশ বছর ধরে বসবাস করে আসছেন। তবু অসম সরকার ১৯৬০ সালে ‘সরকারি ভাষা আইন’ প্রণয়ন করে বাঙালি সহ অন্য ভাষাভাষীদের অসম থেকে তাড়াতে থাকে। ফলে বরাক উপত্যকার ভাষা আন্দোলন ছিল একতম ভাষা (অসমিয়া)-র আধিপত্যের বিরুদ্ধে বার-তেরোটি ভাষার অস্তিত্ব রক্ষার লড়াই।

১৯৯৬ সালে মণিপুরী ভাষায় শিক্ষার দাবিতে শহিদ হয়েছিলেন সুদেষ্ণা সিন্ধা। হিন্দি ভাষার আধিপত্যবাদের বিরুদ্ধে লড়াই করে শহিদ হয়েছেন তামিলনাড়ুর চিন্মাস্বামী (১৯৬৪), পীলমেডু দগুপাণি, সত্যমঙ্গলম মুথু, সারান্গাপাণি প্রমুখ। মানভূম ভাষার অধিকার আদায়ের দাবিতে আন্দোলন করে শহিদ হয়েছেন ভবানী মাহাতো।

তবু প্রচারের সব আলো শুষ্ক নিয়েছে একুশ। বহু ভাষা, বহু ধর্মের এই ভারতবর্ষের ভাষা আধিপত্য ও ভাষা রাজনীতিকে বুঝতে গেলে কেবল একুশের আলোচনায় সীমাবদ্ধ থাকলে চলবে না, চাই ভারতীয় উপমহাদেশের ভাষা-রাজনীতির সম্যক পর্যালোচনা ও বিশ্লেষণ। আমরা প্রতিটি ভাষার সমান অধিকারের পক্ষে। প্রতিটি ভাষা যেদিন সমান অধিকার পাবে সেদিনই আমরা রাষ্ট্রভাষা আন্দোলনের প্রকৃত সার্থকতা খুঁজে পাব।



# **Counseling and Stress Management**



# Neurophysiology and Management of Stress

Subhrangsu Aditya

Counselling Services & Studies in Self-Development, Jadavpur University

**Date & Time: 04<sup>th</sup> February, 2020; 2:15 PM - 5:15 PM**

Stress is an unpleasant internal condition which occurs when perceived demands of a situation exceed one's perceived resources beyond the threshold of coping and resilience.

According to Richard Lazarus et al (1984) the experience of psychological stress occurs as a result of '*transaction*' (interplay) between two entities – 1) on one hand, presence of *stressors* (factors causing stress) in the immediate environment or life situation of a person and 2) on the other hand, *cognitive appraisal* of the situation by the person resulting in *stress response*.

Cognitive appraisal is a mechanism through which an individual can assess a particular life event. Based on this assessment, one has to decide whether one should pursue, give up or get rid of the challenges involved in it. For example, while pursuing a career, a PhD, Post- Doctoral fellowship or an independent research project, if the challenges tend to become too stressful one has to make an assessment and decide how much time, effort, money and emotion should be invested into it.

According to Lazarus, cognitive appraisal is of two kinds – primary and secondary, though both seem to occur simultaneously at different levels. Through primary appraisal one decides whether the situation involves challenge, threat, harm or loss. The object under threat in this case can be money, power, status, reputation, career, relationship, life, physical and psychological wellbeing.

Through secondary appraisal one can assess potential resources available for dealing with an imminent stressful life event – such as: coping strategy, support system, skills of problem solving, organizing, memorizing, planning, time management, financial management, emotion regulation, empathy, communication, public relation and networking etc.

If the available resources appear to be adequate for dealing with the demands of the situation, one remains relaxed. If the resources appear to be a bit inadequate, even then one feels positively aroused, but not stressed. In fact this might actually motivate the person to perform better and put in further passionate effort into the said pursuit. This ability to stretch oneself keeping with the demands of the situation is called resilience. The degree of resilience one can allow varies from person to person. However, there is a limit or threshold for everyone, beyond which it leads to stress.

At this point, the balance of our autonomic nervous system gets inclined toward sympathetic over activity which leads to acute stress responses. This is mediated via

sympathetic adrenomedullary (SAM) system. As a result, heart rate, blood pressure increases, there occur sweating, trembling, rapid shallow breathing, palpitation etc. Other internal physiological processes like digestion, sleep, bladder-bowel function, immunity etc. get disturbed. If it continues for days, weeks or months at a stretch, chronic stress responses usher in mediated by hypothalamo-pituitary-adrenocortical (HPA) axis. This increases the risk of different chronic diseases like diabetes mellitus, peptic ulcer, rheumatoid arthritis, hormonal problems, obesity, autoimmune disorders etc. Moreover, certain brain areas get adversely affected by sustained high level of stress hormone (cortisol) in the blood. For example volume and connectivity of amygdala gets increased resulting in excessive anxiety, irritability, guilt, shame, jealousy, frustration, anger outbursts etc. Depression can follow secondarily as brain attempts to take defence against the ever increasing burden of emotional arousal. On the other hand, another important brain area called hippocampus gets diminished in volume with diminished number of neural connections (less synapses and dendritic spines). This leads to a deficiency in the ability to learn and memorize. Such paradoxically opposite impact of chronic stress on amygdala and hippocampus have been reported by the research of Sumantra Chattarji (2012). At the same time, the prefrontal cortex of brain tends to perform poorly under such ‘amygdala hijack’ situation (Daniel Goleman, 2005). As a result rational thinking, problem solving, planning, time management, practical judgment, creativity, social skills – all tend to suffer.

As an intervention strategy, cognitive approach recommends cognitive restructuring of the appraisal system. A positive and more adaptive *re-appraisal* of the stressful life situation as well as available coping options and resources can significantly reduce the intensity of stress response and resulting impact on physical and psychological wellbeing. The behavioural approach intends to bring back the autonomic balance toward parasympathetic end and thereby inducing a state of relaxation. The life style modification approach focuses on reducing stress prone lifestyle events. Instead, some enriching and meaningful engagements in life can help one recover from the ill effects of stress both physically and mentally. A positive, purposeful and esteem enhancing fantasy about self, life and future is also helpful in maintaining the islands of wellbeing amidst the ocean of stress. Psychological counselling can provide a space for exploring such meaningful options and make more adaptive self determined rational choices in life so as to progress toward growth and wellbeing.

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## **Interpersonal Skills-Transactional Analysis**

**Supriya Ghoshal**

Secretary, West Bengal Right to Public Service Commission,  
Government of West Bengal

**Date & Time: 05<sup>th</sup> February, 2020; 2:15 PM - 3:45 PM**

Interpersonal skills are the set of interactive skills which help us to interact successfully in our social and working life. These sets of skills may also be called as ‘Human’ or ‘Life Skills’ and are exhibited by us when we interact with people around us.

Transactional analysis is a very important tool in analysing our behavioural pattern which shows how effectively we interact with each other and is also one of the most accessible theories of modern psychology. It has wide application in clinical, therapeutic, organisational and personal development, encompassing communication, management, personality, relationship and behaviour.

The theory was founded by Dr. Eric Berne in 1950’s. He said that verbal communication is at the centre of human social relationships and psychoanalysis. He also said that when two people interact, one of them will speak to the other. This he called the transaction stimulus. And the reaction from other person called the response.

Berne stated that each person interacts from three ego states: Parent, Adult and Child. Parent is the taught concept and conditioned and developed by copying our real parents or parent like figures. It is the repository of values and prejudices. We can change it but this is easier said than done.

The Child ego state is the 'felt' concept and the emotional body of data within each of us. When anger or despair dominates reason then the Child is in control. Like our parent we can change our Child ego state as well.

Our 'Adult' is our ability to think and hence it is the thought concept. It determines action of us based on received data and it is oriented towards current reality. If we are to change our 'Parent' or 'Child' we must do so through our 'Adult'.

## **Emotional Intelligence**

**Supriya Ghoshal**

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**Date & Time: 05<sup>th</sup> February, 2020; 3:45 PM - 5:15 PM**

Emotional intelligence is the ability to monitor one's own and others' feelings and emotion, to discriminate among them, to use this information to guide one's thinking and action.

Emotional intelligence is scientifically anchored by four cognitive components:

- 1) The capacity to perceive emotion.
- 2) To integrate emotion in thought.
- 3) To understand emotion &
- 4) To manage emotion effectively.

When these cognitive components are effectively exhibited in interaction with others, a person has emotional competence, which includes:--

1. Self-awareness; 2. Impulse-control; 3. Persistence; 4. Confidence; 5. Self-motivation; 6. Empathy; 7. Social- deftness; 8. Trustworthiness; 9. Adaptability;
10. Ability to work cooperatively.

Daniel Goleman and others have categorised the component of EI into two areas of concern, each with an awareness and application dimension. Thus, EI has four dimensions:

- 1) Self-awareness
- 2) Self-management
- 3) Social awareness &
- 4) Relationship management

Applying EI at work requires:

- Being aware of our feeling and acting congruently.
- Sharing our feeling with straight forward and composed manner.
- Treating other with compassion, sensitivity and kindness.
- Being open to emotion and ideas of others.
- Building and mending relationships.



# **Science and Engineering**



# **Introduction to Design Ergonomics**

**Somnath Gangopadhyay**

Occupational Ergonomics Laboratory  
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**Date & Time: 17<sup>th</sup> February, 2020: 10:30 AM - 1:30 PM**

Ergonomics can be defined as “Science, Technology & Art of Man at Work”. The subject is related with the definite aim on the enhancement of human performance. In other word, application of ergonomics is “the improvement of individual and group productivity”.

The subject seeks to change the things to better match capabilities, limitations & needs of people.

Ergonomics is the application of the human biological sciences in conjunction with the engineering sciences to the worker and his working environment, to obtain maximum satisfaction of the worker which at the same time enhances productivity

On the basis of its application it can be divided in three categories: Physical, Organizational and Cognitive ergonomics.

Cognitive ergonomics is the subfield of cognitive science. It concerns with the human task oriented activities and deals with processing and decoding of information and finally plays a definite role in understanding. It has a direct contribution in the design of product. Through this way, ergo design term has recently been coined.

By application of cognitive science, ergonomics and anthropometry, product is now becoming more easy to use with maximum comfort. Simplification in gadgets and proper application of anthropometry in it makes the tools more user-friendly.

## **Efficient use of LPG Cook-stoves in Domestic Households**

**Amitava Datta**

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**Date & Time: 6<sup>th</sup> February, 2020: 10:30 AM - 1:30 PM**

Liquid Petroleum Gas (LPG) is the most widely used fuel in Indian urban households for the purpose of cooking. It is favoured widely because of its safe, less polluting and easy to use option. Presently, Govt. of India has taken up an initiative to extend the LPG supply in rural households and to families who live below the poverty line, using the Pradhan Mantri Ujjwala Yojana. LPG is primarily a blend of propane and butane gases and is obtained either from the gas fields or more commonly during crude oil refining. Due to the limited reserve of fossil fuel in general and crude oil in particular it should be a concern to utilize this fuel in an efficient manner for the sake of sustainability. Moreover, efficient use of LPG helps the consumer to spend less over fuel in their monthly bill. Therefore, it should be the duty of every household to utilize LPG gas the most efficiently.

In a LPG cook-stove, the fuel gas burns in air producing a flame at the burner. The heat released in combustion is then transferred to the load, which is placed upon the burner. The overall efficiency of the cook-stove can be expressed as the product of the combustion efficiency and the heat transfer efficiency.

LPG burns in the stove as a partially premixed flame with the burner configuration similar to the commonly used Bunsen burner. The ingress of primary air and the premixing of it with the fuel inside the burner affect the combustion efficiency. A good amount of primary air helps to complete the burning in the premixed flame front. However, as the primary mixture gets richer, the burning at the premixed flame becomes incomplete thus generating incomplete products of combustion. The incompletely burnt species complete their oxidation in a non-premixed flame with the air from the surrounding atmosphere. Non-premixed flames can be more sooty resulting radiative loss from the flame. Soot also has adverse effects when deposited on burners and utensils.

Heat transfer efficiency can be improved as the heat loss in the hot gas is reduced. This depends on the height of the load from the burner top, relative dimension of the load to the burner, flow rate of LPG etc. A clear knowledge of the impact of all factors can help in optimizing the performance of the cook-stove.

Safety in usage is another important aspect on which the consumers should have a clear idea. The use of good quality hose, proper regulator and clean burner ensure safety in operation. The cylinder pressure should be properly maintained during filling and any leakage of gas should be immediately brought into the notice of the authority.



## **Let's Light: A Journey towards Enlightenment**

**Suddhasatwa Chakraborty**

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**Date & Time: 06<sup>th</sup> February, 2020,; 2: 15 PM - 3:45 PM**

The definition of light as particle as well as wave has been established a long ago in physics. But there is a fine line exists between light & lighting which is not well defined still today. Lighting is apparently not to deals with physics only but the application of light to illuminate a space. There is a myth that light source takes the most vital role in lighting design, but real story says something more. The lighting designs encapsulate the selection of luminaries, light source, the placement of the luminaries moreover the energy efficient design. The classical tools of lighting design are becoming outdated today, because of two revolutionary steps in field of lighting design. The lighting design is now no longer restricted with the energy efficient solutions rather a new dimension has been included, which is called future of lighting, the “Human Centric Lighting”, which is really a revolutionary change in lighting. The “Internet of Things (IoT)” is also a remarkable footstep towards future lighting, where, internet can be used to control the level, color, intensity of light in any space in concurrence the general harmony between human centric lighting requirements and energy efficiency.

## **Genetic Engineering of Plants: Science and Safety**

**Sarmistha Raychaudhuri**

Department of Biophysics Molecular Biology & Bioinformatics, University of Calcutta,  
Kolkata

**Date & Time: 10<sup>th</sup> February, 2020; 2:15 PM - 5:15 PM**

Biotechnology is the technique used by modern biologist to modify the genetic makeup of an organism. This will pay tremendous dividend in future if under-taken with safety measures. Both biological as well physical methods of transforming crop plants could be used to improve the quality of nutrients, use of the plant as bioreactor and all these need proper safety protocols. Electroporation, microinjection, bombardment with microprojectiles are used regularly by the scientists. The soil borne bacterium ‘Agrobacterium tumefaciens’ is also used to transform plants. The present lecture will discuss the methodology and adopted safety measures usually followed to carry out genetic engineering.



# **Environment**



## Bio-Diversity

**Pranabesh Sanyal**

Addl. Principal Chief Conservator of Forests, Research, Working Plan & Monitoring, West Bengal

**Date & Time: 8<sup>th</sup> February, 2020; 2:15 PM - 3:45 PM**

**Definition** : The variability among living organisms from all sources including inter alia terrestrial, marine and other aquatic eco-system and ecological complexes of which they are a part ; this includes bio-diversity within species, between species and of eco-systems.

**There are 3 components of biological diversity**

- (1) **Genetic diversity** : The Allelic variation within a species such as different rice varieties, different varieties of Babul, different varieties of cows, sheep etc.
- (2) **Species diversity** : This is the commonest method of measuring biological diversity which indicates total no. of species and their dominance. This also includes variation of different Taxa at various levels. Total no. of terrestrial species are much more than aquatic species. But total no. of terrestrial phyla is 50 whereas total no. of aquatic phyla is 52.
- (3) **Eco-system diversity** : The forest eco-systems are mostly highly diverse and within the forest eco-system Rain forests are more diverse than low rain fall areas or mangrove.

### BIODIVERSITY

So far **1.7 million species** have been identified on globe as below:

- Plant and Algae	:	4%
- Protozoa, Fungal, Bacteria, Virus	:	16.8%
- Vertebrates	:	0.4%
- Insects	:	64.3%
- Invertebrates	:	14.4%

**Position of India:**

India has a total of 89,451 animal species i.e 7.31% of world's fauna and 10.78% of world's flora.

According to red list of IUCN,

	Critically endangered	endangered	Vulnerable
Plant	44 species	113 species	87 species
Animal	18 species	54 species	143 species

Number of different animals and plants.

	Mammal	Bird	Reptile	Butterfly	Angiosperm
<b>INDIA</b>	350 (8th)	1200 (7th)	53 (6th)	1500 (3rd)	45,000 (3rd)
<b>Global Highest</b>	515 (Indonesia)	1721 (Columbia)	717 (Mexico)	2100 (Indonesia)	55,000 (Brazil)
<b>WEST BENGAL</b>	188	612	115	941	14,000

Endemism : 33% of plants, 32% of the reptiles, 62% of amphibians

### MARINE & COASTAL DIVERSITY

Marine species constitute only 20% of the total number of species

but has **greater diversity of higher Taxa** as below :

All life form	:	70 Phyla.
Exclusive marine live form	:	20 Phyla.
Common marine and terrestrial life form	:	22 Phyla.
Exclusive terrestrial life form	:	18 Phyla.
Terrestrial and freshwater life form	:	10 Phyla.

### **BIO-DIVERSITY INDEX**

1. **Shannon & Weaner Index (1963) :**

$$H = - \sum (N_i/N) \ln (N_i/N)$$

Where,

$N_i$  = No. of individuals of the species.

$N$  = Total No. of individuals of all the species.

To compare between two systems each having 2 species

(i) Ratio = 95 : 5

(ii) Ratio = 50 : 50

Which one is more diverse?

2. **Simpson (1949)**

**Species Diversity Index (D)**

$$D = 1/\lambda$$

Where,  $\lambda = \sum (n_i(n_i-1)/N(N-1))$

$\lambda$  is a measure of dominance

Large  $\lambda$  implies aggregation of few species.

Small  $\lambda$  implies more uniform distribution.

3. **C.B. Williams's (1964) index of Generic Diversity**

The formula show higher diversity for greater number of genera. If 'G' is number of genera and 'S' is the number of species in the sample ecosystem,

$G/S = ((1-x)/x) * \ln(1-x)$ . Coefficient of Generic Diversity is  $100 * G/S$ .

**Generic diversity GD = (S\*(1-x))/x**

In SW Bengal the effect of Joint Forest Management is monitored by the simple measurements of Biodiversity indices.

From species vs area curve it was determined that the plot sizes should be as follows:

Trees : 10 m x 10 m

Shrub : 5 m x 5 m

Herb : 1 m x 1 m

Dist. Burdwan

Mouza : Jalikandar

FPC : Jalikandar

Date : 15.02.93.

Category; Tree

Plot size: 10m x 10m

Species	Local name	No.	p	P ^ 2	Ln (p)	P*Ln (p)
<i>Shorea robusta</i>	Sal	23	88%	0.783	0.123	0.108
<i>Semecarpus anacardium</i>	Bhela	1	4%	0.001	3.258	0.125
<i>Pterocarpus marsupium</i>	Peasal	1	4%	0.001	3.258	0.125
<i>Madhuca latifolia</i>	Mahul	1	4%	0.001	3.258	0.125

**26      100      0.787      9.897      0.484**

<b>Relative frequency of species</b>	<b>p</b>	
Total number of species	S	= 4

Simpson Index for dominance	$\sum(P^2)$	= 0.787
	$1 - \sum(P^2)$	= 2.13
<b>Simpson Index for diversity</b>		
Shanon Index for diversity	$\sum(p \cdot \ln(p))$	= 0.484
Normalised Shanon Index	$\sum(p \cdot \ln(p)) / \ln(S)$	= 0.349

**Comparative chart of Mangal Diversity of Global top three mangrove eco-systems**

<b>Tomlinson's Types</b>	<b><i>Indian Sundarban</i></b>	<b>Andaman and Nicobar Islands</b>	<b>Mahanadi Estuary</b>
<b>Major Elements</b>	18 No. of species	21 No. of species	19 No. of species
<b>Minor Element</b>	13 No. of species	16 No. of species	14 No. of species
<b>Back Mangals</b>	64 No. of species	30 No. of species	34 No. of species
<b>Total</b>	95 No. of species	67 No. of species	67 No. of species

**Comparative Generic Diversity**

<b>Tomlinson's Class</b>		<b>Sundarban</b>		<b>A&amp;N Islands</b>		<b>Mahanadi Estuary</b>	
<b>Major Element</b>							
S/G		2	18/9	2.33	21/9	2.38	19/8
X		0.429		0.4289		0.429	
Generic Diversity		23.96		27.96		25.29	
<b>Minor Element</b>							
S/G		1.18	13/11	1.23	16/13	1.4	14/11
X		0.529		0.523		0.518	
Generic Diversity		11.57		14.59		13.03	
<b>Back Mangals</b>							
S/G		1.31	64/48	1.17	30/25	1.375	34/27
X		0.5128		0.527		0.52	
Generic Diversity		60.80		26.93		31.38	
<b>Total Mangals</b>							
S/G		1.39	95/68	1.27	67/47	1.571	67/46
X		0.505		0.502		0.498	
<b>Generic Diversity</b>		<b>93.11</b>		<b>66.47</b>		<b>67.54</b>	



## Forest Conservation

**Pranabesh Sanyal**

Addl. Principal Chief Conservator of Forests, Research, Working Plan & Monitoring, West Bengal

**Date & Time: 8<sup>th</sup> February, 2020; 3:45 PM - 5:15 PM**

The global Carbon dioxide reserve of atmosphere is consumed by 2 large consumers, the forest in the terrestrial area and corals in the marine area. These 2 large Carbon sinks are indeed protecting the mankind from extinction due to global warming. The total quantity of Carbon sequestered in the terrestrial eco-system in the planet is 2000 ± 500 Giga Ton Carbon out of which Northern peats sequester 450 GTC.

This apart, annual Carbon sequestration which is done by the terrestrial eco-system amounts to 2 GTC per year and forests play a major role in the same. An estimate has recently been made about the total burning of global bio-mass which is found to be 3.94 GTC per year, out of which deforestation alone contributes 1.6 GTC per year in the atmosphere.

The total global area of forests is 33% of the terrestrial area which is about 51 million km<sup>2</sup>. In India, the total standing bio-mass of forests has been calculated to be 2.4 billion tons Carbon. But the forest has also a special property to store additional Carbon in the soil and thus considering both vegetation and soil, the forests sequester 5.4 Billion tons Carbon. Globally the potential yield of natural forests is much higher in Amazon Basin (11 M<sup>3</sup>/ha/y) as against India (6 M<sup>3</sup>/ha/y). Of course, world average potential yield of natural forests is 2.1 M<sup>3</sup>/ha/y.

Why forests are to be conserved?

From the aforesaid data, it is evident that forests are counteracting the global climate change to a great extent. This apart, forests have the following role.

- ☐ Amelioration of local and global climate.
- ☐ Increase in rainfall.
- ☐ Decrease in temperature.
- ☐ Decrease in surface run off for both soil and water.
- ☐ Recharging ground water.
- ☐ Makes the stream flow perennial.
- ☐ Abode of Bio-diversity.
- ☐ Place for recreation and eco-tourism.
- ☐ As a pollution sink.
- ☐ As a barrier to noise pollution and noise buffer.
- ☐ Stores of timber, fuel-wood fodder and non-timber forest produce.

### Forest Conservation in India

In India, there is age-old tradition of conserving the forest, right from the time of Shakuntala. The first concept of Abhay Aranya was enunciated in the writing of Chankya Kautilya's "Artha Shastra". In recent years, the first Forest Act came in 1878 as Indian Forest Act which was revised in the year 1928. The first Forest Conservation Act came in the year 1980 and was revised in 1988 which envisages 33% forest area in the planes and 60% forest areas in the hills.

As on today, no felling of forests is allowed from the natural forests and the total timber and fuel-wood need of India stands as below:

(Copy)

### Management of forests

The forests are sustainably managed. The area of forests, which is felled, is also subsequently replanted in order to maintain the equilibrium. During such management, in the post-independence period, it was observed that there was a lot of diversion of forestland for non-forestry purpose and the total area slowly dwindled. The total recorded forest area in India is 75 million ha. was found to get reduced to 63 million ha. in the year 1983 in the satellite imageries. Today, the situation has improved a bit and in the year 2001, the area has increased to 67.14 million ha. and tree cover outside forest is another 10.48 million ha. which is nearly 20.55% of the geographical area.

In West Bengal, the total recorded forest area is 1.209 million ha. i.e. 30.60% of geographical area and tree cover outside recorded forest area is 0.44 million ha.

### Social Forestry

During early 80s, it was felt that the existing extent of national forest is unable to cater to the need of timber fuel and firewood. Thus, the concept of social forestry to raise forests outside forest area in the form of farm forestry in wasteland, street plantations along canal banks, roadside, railway line etc. came into being. This apart, this concept gave rise to the tree cover which today we find outside the forest areas to the extent of 10.48 million ha in the country.

### Participatory Forest Management

In the year 1989, Participatory Forest Management came into operation and the local people were involved in forestry management, right from planning stage to implementation stage and then to exploitation and monitoring stage. Today nearly 6,000 Kms<sup>2</sup> of forest area in West Bengal is managed by the Joint Forest Management concept. In fact, this concept came from the Arabari village of Midnapore district of West Bengal and today in India 1,42,500 Kms<sup>2</sup> area is managed under Joint Forest Management. There are nearly 4,100 Forest Protection Committees in West Bengal and 63,000 in India are managing the forests under Joint Forest Management.

# **Disaster Management and Sustainable Development**

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**Date & Time: 20<sup>th</sup> February, 2019; 2:15 PM - 5:15 PM**

The goal of disaster management is to reduce the vulnerability of local communities through disaster preparedness and capacity building . Earlier (2000-2015) Hyogo Framework and later Sendai framework (2015-30) set the specific goals and targets for disaster risk reduction. It is observed that Deltas and coastal zones are major impact areas, particularly for multiple disasters exacerbated by Climate Change. By 2025, coastal population will account for 75% of total world population. At the same time , one third of the coastal regions run at a high risk of degradation due to various natural and anthropogenic forcing. Asia is the most threatened region with 69% of their coastal ecosystem at risk of both fast and slow onset disasters. However, there is an inverse relationship between the level of development and loss of human lives in a disaster. Inclusive and sustainable development emerges as an essential requisite for long term disaster risk reduction.

Natural hazards are extreme events of otherwise steady state natural processes. Their magnitude and frequency (recurrence interval) are inversely related .In turn they can affect the environment beneficially or adversely. Understanding of natural processes and environmental change are therefore necessary for any society capable of integrating nature, in it's regular and extreme forms, in the process of development planning. Human activities, on the other hand, are capable of affecting both magnitude and extent of natural hazards and disasters.

A Disaster happens while hazards converge with biophysical and social vulnerabilities. Disaster Risk relationship is given by - Risk of Disaster= hazard\*vulnerability/capacity to cope. Vulnerability is the degree to which a system is susceptible to, and unable to cope with, the adverse effects of hazards. If we can assess the vulnerability of society and environment and risks to various hazards, we can undertake effective disaster management through risk reduction.

Pre disaster activities for risk reduction include vulnerability and risk assessment , risk mitigation, risk transfer, prediction and preparedness planning. It needs to be followed up by post disaster emergency response, reconstruction and rehabilitation keeping the environmental sustainability a priority. Reviewing a set of case studies the paper attempts to find out the scope of synergy of efforts of disaster management and sustainable development. It is observed that attempts to attain the 17 major goals of sustainable development may considerably reduce the risk of disaster to any community or country. India , nearly 10 years after the en action of National Disaster management Act 2005, has adopted a National Disaster Management Plan in 2016.

The plan incorporated the approach enunciated in the Sendai frame work (2015-30) with the four basic objectives

1. Understanding disaster risk
2. Strengthening disaster risk governance to manage disaster risk
3. Investing in disaster risk reduction for resilience
4. Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

The NDMP has also outlined specific financial responsibilities for disaster management which envisages a National Disaster Response & Mitigation Fund, a State Disaster Response& Mitigation Fund in each State and, within the States, a District Disaster Mitigation & Response Fund in each district.

However, the paper argues that In the apart from provisioning for ‘fast onset’ disasters, adequate emphasis needs to be provided to prepare a community for “slow onset” disasters particularly those exacerbated by Climate Change . In the state level, we need to publicize our disaster management plans, need to make it more participative and gender sensitive. Anticipating migration due to Climate Change, we may take up appropriate retreat and rehabilitation plans for the vulnerable deltas and coastal communities.



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# Medical Science



## **Food and Cancer**

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**Date & Time: 11<sup>th</sup> February, 2020; 2:15 PM - 5:15 PM**

Cancer is such a group of diseases, which people fear most. They associate cancer with death. But the fact is different, no doubt. In fact we can control or arrest or sometimes cure Cancers today with the help of all modern medicines and technology.

Simultaneously we must think the old proverb “Prevention is better than cure” which is applicable to cancer also.

Now we know that 70-75% of cancers are preventable according to WHO. The following cancers can be prevented –

- 1) Occupational Cancer.
- 2) Radiation induced Cancer.
- 3) Hormones and Cancer.
- 4) Tobacco and cancer.
- 5) Exercise and Cancer.
- 6) Diet (food) and Cancer and so on.

We shall discuss here in short on Food and Cancer.

What is cancer :

Cancer is a disease in which a family of cells will grow progressively with permanent impairment of normal growth control, resulting in spread of the primary group of tumour cells.

Character of cancer cells :

Cancer cells are very much different from the normal cells. They do not remain confined to primary part only. Rather they infiltrate into the adjoining part of the body. Usually some of the cancer cells from the original site may be detached and travel to the distant sites of the body through blood streams, lymphatic channels or other methods. This is called metastasis. This is how the cancer kills the patients quickly.

Carcinogens :

These are such substances that can initiate neoplasia ( both benign and malignant).

## FOOD AND CANCER ( Cancer Prevention through Foods)

- 1) Diet causing cancers.
- 2) Diet preventing cancers : 30 – 40% of cancers can be prevented by diet.

### 1) Diet causing cancer:

#### A) Fat :

Several studies have shown that there is strong association between consumption of dietary fat and formation of cancers in the breast, the prostate, colon, rectum endometrium and ovary.

#### B) Fast food :

Children today very much like to take fast food and begin to take from early ages. Fast foods are rich in fat, high sodium, low fiber, low calcium content and also deficient in essentially nutrient. This is why fast food leads to develop cancer.

#### C) Preservatives and Additive :

Some substances of nitrate are used as preservatives of food stuff specially meal. Nitrate is transformed into nitrite and in stomach it is transformed into Nitrosamine which is a form of potent carcinogen.

Sometimes we see a fungus called *Aspergillus flavus* that grows mainly on peanut plants and dry fruits. This fungus contains a carcinogen known as Aflatoxin which can cause liver cancer.

*Gyromitra esculenta*, a type of mushroom used in cooking, contains N – methyl – N formyl – hydrazine which is a strong carcinogen.

Additive like metanil yellow, Iron oxides, lead bromate are usually mixed in '*Ghoogni*', '*Bonday sweets*', leads to the formation of Cancer stomach, Cancer colon etc.

Tremendous use of pesticides like DDT, Aldrin, Carbon tetrachloride, formaldehyde, Vinyl chlorides is threatening for development of different cancers like Leukemia, Lymphoma, brain cancer, skin cancer etc.

Taking salt cured foods regularly may cause stomach cancer. This is probably the reason why Japanese suffer most in cancer of stomach. This may also give rise to Esophageal cancer.

Radioactive substances contaminated foods are threat to the formation of cancer lung, cancer bone etc.

#### D) Smoked food:

Smoked foods (meat, fish etc) may be delicious but because of the smoking process, cancer-causing substances are deposited on the surface of the food. Regular consumption of smoked food may give rise to cancer stomach and others.

#### E) Drinks:



a) Alcohol: Excessive alcohol consumption is a risk factor for cancers of the oral cavity, pharynx, larynx, esophagus, pancreas and liver.

Women who consume alcohol have a greater risk of developing cancer breast than the non-drinkers.

b) Coffee: Excessive coffee drinking may be related to cancer of lower Urinary tract including Urinary bladder.

c) Water: Excessive chlorination in drinking water may be associated with Gastrointestinal cancer and urinary bladder cancer. Regular taking of such water, contaminated with arsenic, asbestos particles and other organic compounds, may lead to formation of cancer lung, cancer Gall bladder and skin cancer.

d) Too hot or too cold drinks – if taken regularly may lead to cancer esophagus.

2) Diet preventing cancer:

There are lot of foods that are considered as anti-cancer agents at various degree. The types of food, you eat are really important. You are to keep these cancer preventing foods in your daily dish. These are as follows:

A) Vitamin C:

Citrus fruits, tomatoes, berries, green vegetable, potatoes, guava, cucumbers. Daily need 30 – 50 mg.

B) Vitamin A:

Tomato, milk, eggs, liver, kidney, leafy green vegetable, yellow vegetable, carrot, ripe mango, 'lal notey sak', radices, Daily need: 5000 IU

C) Vitamin E:

Leafy vegetable, vegetable oils, whole grain cereals, mother's milk.  
Daily need : 15 mg

D) Minerals :

Selenium : Liver. Sea fish, Rice, Wheat  
Calcium : Protects from Colon cancer.  
Other minerals : Magnesium, Iron, Copper, Zinc etc.

E) Other foods :

Cabbage, Cauliflower, Sweet potato, Bean, Grape, Banana, Turmeric, Garlic, Legume, Pumpkin, etc.

F) Dietary Fiber :

Dietary fiber is very much protective against cancer. Daily need is 25 – 30 gm. But Americans typically consume 3 to 5 gm per day only.

High dietary fiber protects against colon cancer, rectal cancer, breast cancer. Bantu tribe of South Africa take lot of fibers from their daily foods ---- 200 to 250 gm approximately per day. Incidentally colon cancer, rectal cancer, breast cancer, cancer prostate are very rare amongst the Bantu people. Fruits, Vegetables, Wheat etc. are all rich in fibers.

G) Vitamin C is a strong anticancer agent. So do take Vitamin C as per daily need. Vegetables high in Vitamin C , like Potato, Broccoli, Cabbage, Spinach etc. should be cooked briefly and where possible, whole and in covered dishes. If you squeeze the juice from the Orange, you will reduce the Vitamin C to a greater extent , because it is reduced by the oxygen in the air. Luckily for us, most of the foods that are rich in Vitamin C e.g. Citrus fruits, Strawberries, Melons etc. do not need cooking.

H) Do's and Don'ts in preparing foods :

1. Don't drown your foods :

You will retain more Vitamin C and other Vitamins when vegetables are cooked without added water. More water you use fewer Vitamins you retain.

2. Do keep foods in one piece :

The more you cut the cells, the more you expose Them to air or water and more nutrients are lost. Whole Sweet potato retains 89% of Vitamin C, but cut in half, it keeps only 31%.

3. Don't allow sliced food to stand :

Cucumber loses at least 25% of Vitamin C when they are sliced, and they lose 30%, when slices are left standing for an hour. After 3 hours almost 50% of Vitamin C are vanished.

4. Do use all parts of the plants :

Broccolis have more Vitamin A in their leaves, stalks and flower buds than stem.

5. Do save cooking liquids

I) REMEMBER 7 CANCER WARNING SIGNALS :

1. A LUMP OR THICKENING IN BREAST.
2. A CHANGE IN A WART OR MOLE .
3. A SORE THAT DOES NOT HEAL.
4. A CHANGE IN BOWEL HABITS.
5. A PERSISTENT COUGH OR HOARSENESS OF VOICE.
6. CONSTANT INDIGESTION OR TROUBLE SWALLOWING.
7. UNUSUAL BLEEDING OR DISCHARGE.

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