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by Dr. Prosenjit Mukherjee
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We are grateful to all our colleagues for their kind cooperation in publishing this book. We hope all the students and teachers would be deeply enlightened from this variety of pleasant, interesting and thoughtful topics in various fields – Science, Humanities and Commerce.

Special and sincere thanks are rendered to Dr. Suparna Banerjee, Associate Professor, Bangabasi Evening College, Kolkata, for her constant effort, patience, sacrifice, motivation, encouragement and continued guidance which have led this book to come to reality.

We would sincerely like to pay thanks to Dr. Sanjib Chattopadhyay, Principal, Bangabasi Evening College and Dr. Prosenjit Mukherjee, Bursar for providing financial support for this volume.

The papers published in this volume are entirely self and personal opinion of each author. We, of course, are solely responsible for any errors that have crept in inadvertently. The College Authority and Editors are not responsible for any contents of this volume.

Editorial

It has been five decades since Sri Prasanta Kumar Bose, eminent scholar and educator, son of Acharya Girish Chandra Bose, founded Bangabasi Evening College. Under his guidance, Bangabasi Evening College forged its own path, providing not only the general body of young students with a supportive educational institution but also providing mature and working students an opportunity to further their educational aspirations and career prospects. As an evening college then, Bangabasi Evening College fills a highly required demand/contribution to academics which is invaluable. It is only fitting that the Golden Jubilee of Professor Bose's vision and the college he founded should be marked by an academic endeavour. We are privileged therefore to bring out this collection of essays aimed at students and teachers/scholars which focus on contemporary critical issues in diverse disciplines of Science, Humanities and Commerce. Our society is passing through several critical phases. The issues are mixed with different dimensions and directions. This book focuses on contemporary critical issues linked with diversified disciplines such as science, humanities and commerce. In fifty years, the world - and Indian Map has changed dramatically. The Cold War has thawed and global warming has come in its stead. Extreme environmental events, social unrest and violence has increased, food and water shortages are predicted and nearly all countries are feeling the effects of a worldwide recession.

The interdisciplinary nature of the collection has led to a wide variety of essays embracing both subject specialization as well as accessibility, particularly, in diverse disciplines of Science, Humanities and Commerce.

We hope that the readers will find interest while going through the different aspects of this broad and up-to-date presentation of the present multifarious subject and the essays will open up the scope of further research work in concerned areas.

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We would like to express our sincere gratitude to Dr. Sanjib Chattopadhyay, Principal, Bangabasi Evening College and Dr. Prosenjit Mukherjee, Bursar for providing financial support for this volume.

Patron



Principal, Dr. Sanjib Chattopadhyaya,
Bangabasi Evening College

Biodata

Dr. Sanjib Chattopadhyay was born at Burdwan, West Bengal, India on 30 October 1967. He studied Zoology Honours in Ramkrishna Mission Vivekananda Centenary College, Rahara, and obtained B.Sc. degree from University of Calcutta in 1988. He completed his M.Sc degree in 1991 and his Ph.D degree in 1997 in Zoology from Visva-Bharati University, Santiniketan under the guidance of Professor A.K. Aditya. At that time, he was taught by Professor Nirmal Chandra Sukul, who is a legendary figure in the field of Homeopathic Research. Chattopadhyay He joined as a Lecturer in Zoology at BKC College, Kolkata. He was promoted to the post of Associate Professor in 2009 and worked there up to 2nd July, 2015. During that time he expressed his keen interest in the field of Alternate Medicine and achieved MD degree in Biochemic system of Medicine. Chattopadhyay has got some well known publications in homeopathic research. In 3 July, 2015 he joined as a Principal of Bangabasi Evening College, Kolkata, India.

Publications : Total number of papers in peer reviewed research journals: 16

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Preface

The Bengal Renaissance can be said to have started with Raja Ram Mohan Roy (1772-1833) and ended with Rabindranath Tagore (1861-1941). However, there have been many stalwarts after that embodying particular aspects of the unique intellectual and creative output. Nineteenth-century Bengal was a unique blend of religious and social reformers, scholars, literary giants, journalists, patriotic orators, and scientists, all merging to form the image of a renaissance, and marked the transition from the 'medieval' to the 'modern'. Bengali intelligentsias like Acharyya Girish Chandra Bose, Bhupal Chandra Bose, Aghornath Chatterjee, Upendralal De, Ishan Chandra Ghosh, Tejesh Chandra Bidyananda, etc were the brilliant descendants of middle phase of Bengal Renaissance originated from Vidyasagar during the British ruled period, who could realize the utility of higher education to be spread over the Bengali youths, about which the ruler community were much conservative. During the Renaissance of Bengal, several educational institutions (Schools and Colleges) were established by the intelligentsia of Bengal with the support of the Government. Bangabasi College was one of them. The other Colleges include Hindu College (Presidency College), Scottish Church College, St Xavier's College, Vidyasagar College, City College, SurendraNath College etc. Bangabasi Evening College did not have any separate existence at the initial state. The main Bangabasi College, housed on the same campus, was founded by Acharya Girish Chandra Bose, as mentioned above, in 1887. Bangabasi Evening College from its establishment, guided by Sri Prasanta Kumar Bose, the illustrious son of Acharyya Girish Chandra Bose, was affiliated to the University of Calcutta, which was the pioneer of higher studies since the British monarchy. In 1944 Sri Prasanta Kumar Bose, the Founder Principal, introduced the Arts and Science faculties in the Evening section.

Bangabasi Evening College has bestowed 60 years of service to the nation. The Research Journal entitled "Synthesis" gathers writings of different employees of the college on natural sciences as well as social sciences. Now, we have intended to publish the second volume of the book Synthesis II. A good teacher should be a good student also. In other words, whenever he ceases to be a learner, he no longer remains a good tutor. With its glorious tradition in teaching and learning, the college continues disseminating higher and progressive education, holding high ideals of the motto of superior study.

Bangabasi Evening College was originally an integral part of Bangabasi College, which came into being on 11th April 1965 as a full-fledged evening college, the largest of all evening colleges in Calcutta based on faculties of Arts, Science, and Commerce, with student numbers, 3000- 3500 every year, 70

teaching and 36 non-teaching staff. The College Starts at 4.30 pm and runs up to 9.00 pm. It is located at the heart of the megacity of Kolkata, in the vicinity of Sealdah Station, giving easy access to students coming from rural, semi-urban, and urban areas. It is also very near to Central Metro Railway station and half an hour's distance from Howrah Station by bus. It is surrounded by 4 major roads of Kolkata, namely, Acharyya Prafulla Chandra Road, Raja Rammohan Sarani, Mahatma Gandhi Road and Bipin Bihari Ganguly Street of east-west and north -south respectively. Prof. Prasanta Kumar Bose, the illustrious son of Acharya Girish Chandra Bose was the founder Principal of Bangabasi Evening College. Now it offers 4year Honours degree in Bengali, English, Hindi, Sanskrit, History, Political Science, Philosophy, Economics, Chemistry, Mathematics, Anthropology, Physiology, Botany and Accountancy.

Other subjects include Geography, Physics, and Zoology and MSc Department of Pure Mathematics regular course under the University of Calcutta. Two B. Voc courses sponsored by UGC, affiliated to CU, i.e., (1) Banking, financial services, and insurance and (2) Hospitality and tourism. The college provides scholarships like Kanyashree, Swami Vivekananda Merit-cum Means Scholarship, Oasis, Aikyashree, and National Scholarship for meritorious students are available. It also helps poor students with its funds. The Student Credit Card of West Bengal Government is also available to students for higher studies. The institution provides computer training programs and online competitive examination training programs. The college is now preparing for 3rd cycle NAAC. It participates every year in NIRF. It has a main building and an annex building shared by the two other colleges of the Bangabasi Group. There is a playground also entitled "Bangabasi Play Ground", shared by the other two colleges. There are many established Alumni from this college. Professor Amia Bhaumik is now the Vice Chancellor of Linkoln University, Malaysia. Three streams - Humanities, Science, and Commerce (Hons and General) are taught at the graduate level by highly qualified and experienced teachers. Postgraduate studies in Mathematics has brought higher education's spotlight to a recognizable height. Two BVoc courses sponsored by UGC opened in 2018 i.e., (1) Banking, financial services, and insurance (2) Hospitality and tourism There are many opportunities for students to work with our faculty to improve their quality of learning. Our permanent and guest faculty members are amply efficient and affectionate in solving the student's problems. Many teachers are engaged in active research funded by UGC and DST research projects in specialized areas. PhD works are also performed here in the Botany and Physics Department. Some UGC and DST seminars, National and International have recently been organized in Anthropology, Economics, Chemistry, Political Science, English, Sanskrit, History, Botany and Mathematics departments.

Bangabasi Evening College along with Bangabasi Morning College originated as two distinct stems from the main branch of Bangabasi College in 1965; hence all of them including Bangabasi College of Commerce, later coined as Acharyya Girish Chandra Bose College, belong to the Bangabasi Group of colleges has extended the educational canopy for the service of the nation in expanded fields. At the moment the study of interdisciplinary science and humanity has gained special interest among the scholars of different Universities. It would enrich every field of study like an interdependent network. This attempt is admirable for the betterment of knowledge that can direct society to a definite destination. The maxim inscribed in the logo of the Journal sustains the ideals of faculty improvement programs in every walk of natural and social sciences. It is through reverential questioning that who teaches should be taught by others, and that knowledge ultimately helps render service to the cause of humanity. We are glad to say that Bangabasi Evening College is being presented for Re-Accreditation (3rd Cycle) by the National Assessment and Accreditation Council (NAAC). For the past few years, the College has sincerely endeavored towards quality sustenance and quality enhancement in the light of NAAC Peer Team recommendations. Publication of the second volume of Synthesis II is an attempt to sustain the long-lasting credentials of this college in the field of research publication and to reignite the lamp of a multidisciplinary approach to knowledge.

Dr. Sanjib Chattopadhyay
Principal
Bangabasi Evening College

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**Section
Science**

Parenteral Drug Delivery System in the Modern Medicinal System is the Reflection of Hahnemann's Logic

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Abstract

The parenteral route refers to administering liquids, such as nutrition or medications, by bypassing the gastrointestinal system. Although the homeopathic drugs are administered orally, but according to many scientists they are absorbed through the tongue and buccal cavity. Nowadays micelles, liposomes, and niosomes loaded with least amount of drugs are being used for tumor and cancer therapy. Curation by least amount of drugs is also the basic principle of homeopathy, which has been implemented in the parenteral drug delivery system. Succussion method in homeopathy is comparable to sonication, which produces micelle or liposome like secondary covering of alcohol molecules around hydrated drug molecules protecting them from adverse physiological reactions in the route of penetration inside the body.

Key Words

Parenteral drug delivery system, micelles, liposomes, and niosomes, patient-specific treatment

Introduction

Amazed by the sixth sense of Hahnemann about the 'contagious principle' regarding homeopathic management for contagious bacterial diseases, some believe that he can justly be called the 'father of Bacteriology', though the role of bacteria on the human disease was not revealed then. From the above discussion, we can understand that homeopathic remedies, being very minute in amount, cannot bind, and trigger the synthesis of antibodies directly, but can stimulate the minute enzymes or receptors directly or indirectly, which in the form of a cascade reaction can influence the same by means of transcription

factors. Overwhelmed by his modern thought of medicine we cannot cease ourselves in calling him as the 'real father of modern Molecular Medicine'. A true homeopathic doctor like him, though he does not necessarily possess a sound expertise on the discipline of modern medicine, becomes motivated by the same insight. His idea of treatment was much superior to his contemporary workers; even the wisdom of 'Molecular Medicine' along with its recent progress is running far behind homeopathy. The latest ideals of modern medicinal science are: (1) to 'ensure cure by applying least amount of medicine' to avoid side effects, (2) 'drug targeting to the affected tissue' for the safety of unaffected organs, and (3) 'individualization of treatment' due to genetic variability among the patients. Hence, there is no doubt that homeopathy is the forerunner of the modern science of medicine because they are used in the minutest quantity, having highly penetrating ability and homeopathy itself is a very much individualized method of treatment from the very beginning. 'Bryonia' can cure fever of one patient according to the specific combination of symptoms and 'Rhus tox' of another. Lack of proper penetration ability of the crude drugs to the diseased tissue cells and attenuation of detoxification mechanism of the diseased tissue causes failure of ordinary allopathic drugs, therefore the use of a 'vehicle' that can form a shield against detoxifying agents to guarantee drug delivery to the target tissue was essential. Application of 'vehicle', therefore, became no more a unique heritage of Hahnemann's method, but has gradually become corollary to the drug delivery system of mainstream medicine as well.

Discussion: The parenteral route refers to administering liquids, such as nutrition or medications, by bypassing the gastrointestinal system, literally it means "outside of the digestive tract" and allows an individual to bypass the usual process of eating and digestion. The parenteral route is used for administration of medicine, when a rapid drug effect is desired; a precise serum drug level is needed; or when drugs are unstable or poorly absorbed in the gastrointestinal tract. The parenteral route for medication administration can involve the intravenous, intramuscular, subcutaneous, and intrathecal routes. Although the homeopathic drugs are administered orally, but according to many scientists they are absorbed through the tongue and buccal cavity (Sukul et al 2002, Khuda-baksh, 2003). Curation by least amount of drugs is also the basic principle of homeopathy, which has been implemented in the parenteral drug delivery system. Moreover, according to many workers, succussion

is comparable to sonication (Sukul et al, 2002; Chattopadhyay, 2002), which produces micelle or liposome like secondary covering of alcohol molecules around hydrated drug molecules (Chattopadhyay 2002, 2003, 2006) protecting them from adverse physiological reactions in the route of penetration inside the body.

Oral administration of drugs faces some inconveniences to reach into the diseased organs. This is because, the drugs are exposed to high acid medium in the stomach, a major portion of the same becomes digested away, some passed out with fecal matter, some are degraded or excreted, some accumulated into healthy tissue; leaving a small remaining to act as medicine proper, which flows through blood stream and reaches to the target tissue. It might not be penetrating enough to the diseased tissue. Intravenous injection has solved the problem only to a little extent, but it remains. Moreover, drug molecules trigger detoxification mechanism in the body system, which decreases efficacy of the medicine in course. Lack of proper penetration ability of some drugs to the diseased tissue and attenuation of detoxification mechanism are the major problems of allopathic medicinal practice, so that a proper use of 'vehicle', which ensures drug delivery to the target tissue that can shield against detoxifying agents, was essential. Application of "vehicle" is, therefore, no more a unique heritage of Hahnemann's disciples; but has gradually been incorporated to the drug delivery system of mainstream medicine in order to increase invasiveness of medicines through the tissues and to decrease the required amount of medicine to a minimum. A number of technological advances have been made in the area of drug delivery leading to the development of sophisticated systems that allow drug penetration, targeting, and ensures sustained release of medicines in a controlled way. The main drug delivery technologies currently being introduced are Liposomes, Niosomes, Cyclodextrins, Prodrugs, Vaccine adjuvants, Nanoparticles, Emulsions, and Polymeric micelles (Amselem et al, 1990; Bally et al, 1990). All are nothing but different kinds of "vehicles" that ensure the delivery of drugs to the respective tissues. Inoculation of fatty emulsions of drugs, like cyclodextrin, doxorubicin, daunorubicin, cisplatin etc in the form of micelles, inverted micelles, and liposome are widely used against several incurable diseases, including cancer.

Hahnemann seems to be overwhelmed by seeing the penetrating ability of homeopathic drugs. He has written a little to explain the mechanism of penetration of drugs on different organs of the body.

He wrote that, “The homeopathic healing art develops from the spirit-like medicine-forces of the crude substances. By means of then untried treatment peculiar to that to a formerly unheard-of degree whereby they all only then become quite penetratingly efficacious and remedial, even those that in the crude state give no evidence of the slightest medicinal power on the human body” (“Organon”, 5th ed § 269). He believed that higher potency medicines have more rapid penetration capacity than the low potencies (“Organon”, 5th ed § 287 footnote).

Facilitated ‘encapsulation’ of drug molecules by ethanol, according to the proposed hypothesis, is responsible for their penetratingly efficacious nature. We know that some phospholipid molecules are amphipathic in nature, containing both hydrophilic and hydrophobic moiety. As for example, phosphoglycerides contain phosphorylated amphipathic molecules has been utilized for the

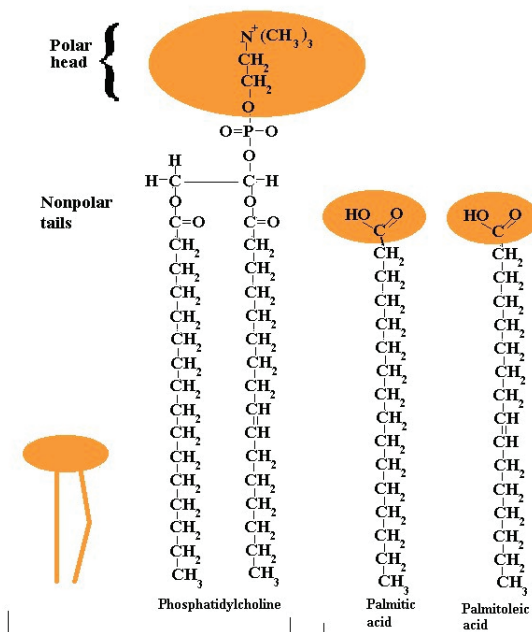


Figure 1 Structure of long-tailed Phospholipid molecules

formation of micelles, inverted micelles and liposomes. Micelles are small (4-10 nm), stable spherical droplet like aggregation of about 50-100 amphipathic molecules, hydrophobic units of which are all hidden in its interior, away from surrounding water, while their hydrophilic

polar groups are oriented on the outer surface of the droplet, closely associated with surrounding water molecules. Amphipathic molecules in non-polar medium form inverted or reversed micelles. Amphipathic molecules having single long hydrophobic tail generally form micelles, e.g. fatty acids, long-chain alcohols etc, but the molecules having double tail generally form liposomes, e.g., phosphatidyl choline.

Liposomes were discovered in the mid 1960s and originally studied to explain cell membrane models. They have since gained recognition in the field of drug delivery. Liposomes, by definition, are aqueous compartments, enclosed by lipid bilayer. Suspending suitable phospholipid molecules in an aqueous medium can form them. The mixture is then sonicated by high frequency sound to give a dispersion of closed vesicles that are quite uniform in size of about 50nm in diameter. Ions or molecules, even several drugs (Figure 2) including anti tumor, anticancer and antibacterial agents (Amselem et al, 1990) can be trapped in the aqueous compartment and by this way delivery of drugs to target tissue becomes possible. The process of 'encapsulation' can be compared with the application of liposome as a vehicle to carry drug materials, now widely used in mainstream medicine. Due to large size, liposomes cannot penetrate cell membrane. When injected into blood, generally they are transported and absorbed in liver, which restricts their medicinal use. Nowadays drug-loaded liposomes, coated with specific antibodies or ligands are being used for delivering drugs to different target organs. Later we shall discuss the recent advancements of liposomes as a vehicle for drug delivering system.

The role of ethanol in increasing efficiency of potentization is very crucial. Mechanical agitation such as succussion, comparable to sonication, produces random collision of molecules, cluster of molecules or solvated micelles of ethanol, resulting in the formation of strongly bound complexes (Connors et al 1987). Sonication of aqueous ethanol makes it more compact and homogeneous with increased density (Connors et al 1987).

We know that ethanol molecule is amphipathic in nature; it has a polar head indicated by -OH group and a non-polar hydrocarbon tail represented by $-C_2H_5$. Polar head is hydrophilic and non-polar group is hydrophobic in nature. Sukul et al (2003) has admitted that ethanol molecule, due to its non-polar part, can preserve or promote the same from natural degradation. In the absence

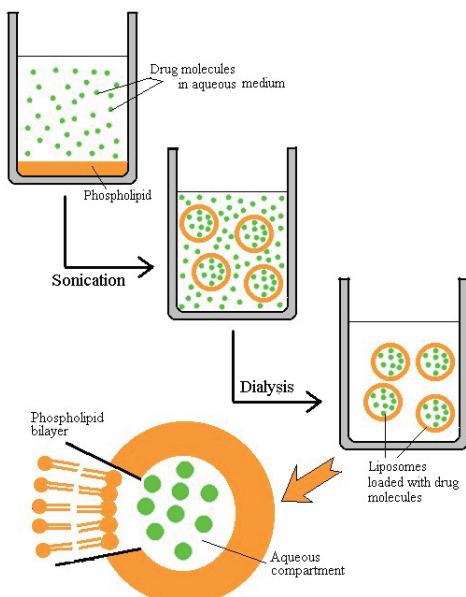


Figure-2 The Method of drug-loaded liposome preparation

of ethanol specified clusters of water molecule degrades very quickly and its medicinal property is gradually lost. This has already been confirmed by Sukul et al (2003) by repeating an experiment of Boyd, using modern technique. However, they cannot erect a self-explanatory model to prove how an ethanol bound water cluster induces other water molecules to produce similar cluster; how specific information remain stored within the clusters and why clusters are not degraded within the body fluid. It cannot provide a self-explanatory hypothesis, how the medicines retain their curative power in sugar globules when all the water molecules are evaporated and how the clusters become 'penetratingly efficacious' when higher potency is reached.

In the present discussion, we are trying to solve the above problems in a little different way. We have already mentioned that water forms hydration sheath around positive and negative charges of drug molecules in an aqueous solution. Ethanol, though has a polar hydrophilic head group and a very short hydrophobic tail (Figure 3A), it does not form visible micelles or liposomes. However, addition of it in crude drug aqueous solution (Figure 3B) can decrease the dielectric constant and increases attraction between positive and negative charges of drug molecules in mother tincture, in which ethanol molecules show inverted

micelle like orientation, forming a monolayer around hydrated drug molecule (Figure 3C). When it reaches to a high potency the number of ethanol molecules in relation to drug molecule increase enormously. By the repeated manual strokes at the bottom of the container (succussion) they arrange themselves into drug-loaded liposome like orientation (Chattopadhyay, 2002, 2003, 2006), where the ethanol molecules arrange themselves into symmetrical bilayer. Succussion of the alcoholic solution during potentization may be compared to sonication (Sukul et al 2002; Chattopadhyay 2002, 2003, 2006), applied to prepare liposome. Even in ultra high dilution it has been experimentally proved by Atomic Absorption Spectroscopy and Scanning Electron Microscopy, by using Homeopathic drugs of metallic origin that they contain traces of original molecules (Chattopadhyay, 2017, 2019, 2023; Chikramane et al, 2010, 2012; Upadhyay and Nayak, 2011). Repeated manual stroke creates an agitation, by which head and tail portion of ethanol molecules become reoriented to achieve greater thermodynamic stability, covering few water molecules that form hydration sheath around drug molecule. As the aggregation number of ethanol molecules is very small due to very short tail and small head, it can trap a very small number of drug molecules, so that they cannot form any visible micelle-like structure under microscope. Here the forces of stabilization are as follows:

1. Ion-dipole interaction (between drug versus water molecule, especially when the former is an electrolyte),
2. Hydrophilic interaction (between drug vs. water molecules and ethanol vs. water molecules),
3. Hydrophobic interaction (between “tails” of ethanol molecules) and
4. van der Waals force (between adjacent water molecules and adjacent ethanol molecules).

These are similar to that of liposomes. Isolation of drug molecules from ethanol becomes very difficult; because drug bound waters participate in azeotrope formation. Practically it becomes impossible with the increase of potency. When we continually increase potency of a medicine by centennial dilution and succussion ethanol molecules become supersaturated around hydrated drug molecule, form capsule of enormous strength in high potency solution and their penetration power increases. The widely used potencies, according to homeopathic literature are 1, 2, 3, 6,

12, 30, 200, 1000 and 10,000. It is notable that within the range of 1 to 30 there are six potencies, within the range of

30 to 1000, though the interval is wider, there is only three, and within the range of 1000 to 10,000, there are two. What is the reason behind it? The answer remains hidden in the ethanol 'encapsulation' model only. Within the range of 1 to 30, the number of encapsulating ethanol molecules that cover the hydration sheath of drug molecule increases proportionally with succussion and centesimal dilution. After attaining 30th potency the surface of the

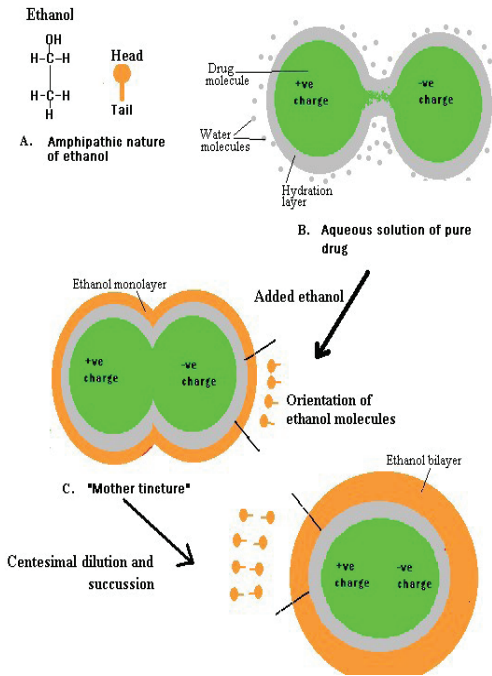


Figure 3 The molecular event of potentized drug preparation hydration sheath becomes almost saturated by ethanol molecules. Any further addition of such molecules would require much efforts of ritualized succussions, so that any further significant increase in strength of ethanol capsule could not be achieved before attaining 200 potency and above, where the capsule becomes very compact in nature with high penetrating ability.

It is evident from the above discussion that alcohols not only protects drug from bacterial spoilage but possess high potentizing capacity also,

and it could be used as a more precious and well-protected “vehicle” than distilled water alone. The term “vehicle” as expressed by Hahnemann was justified. He has written in a foot-note of aphorism

269 of “Organon”, 4th edition that “Metallic salts dissolved in a large quantity of water soon decompose and spoil:

their dilutions for homeopathic employment cannot therefore be made with water, which, moreover, is not suitable for dropping. Many metallic salts cannot be dissolved immediately in spirits of wine, but if dissolved in 100 parts of water without being precipitated, they may be further diluted with alcohol to as great an extent as the homeopathic practitioner requires.” Similar discussions were made in his “Materia Medica Pura”. Whenever an electrolyte (e.g., a salt) is dissolved in a polar solvent (e.g., water) it is dissociated into ions. We know that electrolyte salts in solid state cannot be dissolved in alcohol (though it is a polar solvent), because the salt molecules generally form crystal

lattice among themselves. Crystal lattice is represented in terms of a regular three-dimensional array of constituent atoms or group of atoms that remain arranged together as repeat units by some sort of energy, called lattice energy, which determines crystal shape of a salt. As water has a high dielectric constant, it can overcome lattice energy by lowering the force of attraction between positive and negative ions of a salt, so that salts easily dissolve in it; but alcohols, having low dielectric constant cannot do the same. For the same reason, ions are widely separated in aqueous solution. When alcohol (e.g., ethanol) is added to such a solution, the distance between ions decreases. As a result, solubility of the salt in such a solution decreases. By repeated downward succession, the salt gets more concentrated towards the bottom and homogeneity of the solution is lost. Moreover, as discussed above, ethanol molecules are arranged in such an orientation (like inverted micelle and liposome) surrounding the hydration layer of positive and negative charges that both the ions come to closer proximity. Herein lays the advantage of using alcohols for potentization purpose. Potentization is possible by water alone like that of pure ethanol, but potentization efficiency of the former is much lower than that of the latter.

Why potentization was essential to develop patient-like symptoms in prover as well as to cure a patient? In addition, why a potentized drug is ‘penetratingly efficacious’? To understand the actual mechanism

of penetration we should have some idea on modern concept of biological membranes, e.g., plasma membrane that surrounds the cell. Biological membranes are like a “sea” of lipid bilayer, where protein molecules float or remain submerged like “icebergs.” Biological membranes of Golgi body, endoplasmic reticulum and lysosome are also of similar nature. Different proteins become synthesized in rough endoplasmic reticulum, because, these are coated by ribosomes, from which proteins reach Golgi complex through secretory vesicles and are processed there to form different active form of proteins or enzymes. Some proteins remain restricted in lysosome as hydrolytic enzymes. All the biological membranes are semi-permeable in nature. Some compounds penetrate easily through the cell membrane, others cannot. Permeability of a material inside cell membrane to some extent depends on its lipid solubility. The material that is more soluble in lipid more easily gets entrance within the cell, while some are carried into the cell by the help of

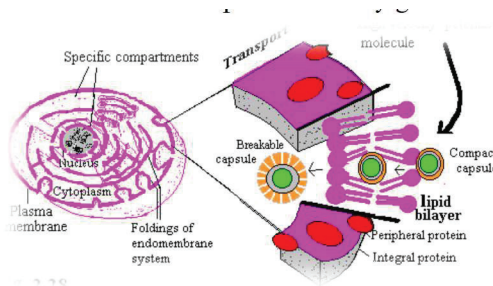


Figure 4 Penetration of potentized drugs inside the cells

specific receptor molecules. All the living cells in the body are suspended in a fluid matrix. Plasma membrane being the semi-permeable covering of the cell and endomembrane system, composed of Golgi body, endoplasmic reticulum and lysosome and even the nuclear membrane divides the cell into several spherical or concentric and parallel compartments or chambers where different enzyme mediated reactions are going on. The deficient enzyme (target enzyme) remains in such a ‘specific compartment’ (Figure 4) and the drug molecules should have to reach there and bind the same. Crude drug molecules cannot have much penetration power into the cell to bind these minute enzymes, but at potentized condition, they gain enough penetration ability and can enter into the interior of the body. Hahnemann directed the use of 30th attenuated stage they can move sufficiently interior and can induce proving symptoms.

We may consider ethanol as a precious “vehicle” for homeopathic drugs. Ethanol “encapsulated” drug molecules being very few in number move in a very high velocity through the body fluid, which acts like cell free system to them and does not restrict their free movement. They cannot participate in any chemical reaction due to their protective covering. As we use vehicles to reach safely to our working places, the minute drug molecules coated by alcohol (ethanol) or sugar of milk reach to their “working places”, i.e. ‘specific compartments’ of diseased cells, with safety. Moreover, the number of ethanol molecules, packing each hydrated drug molecule, remains in supersaturated condition, which provides enormous capsular strength to high potency drugs, so that the drug molecules remain unaffected from cross-reaction and undissociated within the body fluid. The drug capsules lastly attach themselves by their hydrophilic heads with the polar heads of lipid bilayer of membrane of affected cell, and due to high velocity and high partition coefficient drug loaded ethanol capsules can easily penetrate through it along with drug molecules, pass through endomembrane system, until it reaches to the ‘specific compartment’, where the target enzyme resides. This is equally true for a patient and a healthy person (prover). Penetration power of capsules increases with capsular strength, which is very high in higher potency drugs, that enables them to reach the innermost compartment of the cell; otherwise their ‘penetrating efficacy’ would have been highly restricted by the selective permeability of the membrane system. As for example, homeopathic medicine “Natum mur” is an ‘encapsulated’ form of sodium chloride, entrance of which into the cell is very much controlled by ionic channels; but when it is applied in potentized form such channels cannot affect their mobility. It can directly enter into the cell through the lipid bilayer, which shows ‘flip-flop’ transition . The ‘encapsulated’ medicine molecules have to cross several lipid bilayer of endomembrane system that snatches some ethanol molecules from the capsule rendering it breakable. When the ‘specific compartment’ is reached the capsule breaks, the drug molecule becomes excapsulated to bind the target enzyme as a ligand and attains a thermodynamically more stable form. The specific cellular compartment then could act as a sink for more ethanol trapped drug molecules that would rush towards the chamber by the attraction of thermodynamic pull (due to spontaneous chemical reactions). The cultured cells, where there

is no capillary or nerve connection, show response to homeopathic drugs. So Hahnemann's confusion has been solved; highly diluted homeopathic drugs due to their high velocity penetrate into the affected cell directly through the body fluid without the help of any blood vessel or nerve connection, because nothing can restrict their free movement *in vivo*. Conversely, the low potency drugs due to their slow rates of diffusion might be absorbed through blood vessels or nerve fiber. The aim of homeopathic treatment, as described above, is to ensure binding of a pure drug with the small fraction of a deficient enzyme of a patient, present in the inner compartments in a cell. It is needless to say, allopathic drugs, in general, cannot reach the innermost compartments of a cell. The same is true for homeopathic drugs of very low potencies, which causes difficulty in proving in many cases, i.e., if the medicine is unable to reach to the target enzyme how it could be able to bring exactly patient like symptoms in provers? During Hahnemann's time, it was felt that application of crude drug or mother tincture cannot bring exactly patient like symptoms in provers, but when low potency of the same was used, it was possible. However, it was only his intuition, which provoked him to use potentized medicines for proving purpose, whenever required.

Polymeric micelles are widely used as drug delivery system. Amphiphilic block copolymers such as the Pluronics (polyoxyethylene polyoxypropylene block copolymers) self-assemble into polymeric micelles. For drug delivery purposes, hydrophobic drugs may be solubilised within the core of the micelle (Connors, 1987; Hope et al 1998) or, alternatively, conjugated to the micelle-forming polymer (Connors, 1987). Pluronic micelles solubilizing epirubicin and doxorubicin increase the matricidal activity of these anticancer drugs (Hope et al, 1998) and polyoxyethylene polyaspartic acid micelle-forming block copolymers bearing covalently attached doxorubicin at the polyaspartic acid end reduce the toxicity of doxorubicin *in vivo* (Connors, 1987). Polymeric micelles bearing targeting ligands may also be used as drug targeting agents. Pluronic micelles solubilizing the neuroleptic drug haloperidol may be targeted to the brain when conjugated to brain specific antibodies (Bally, et al 1990).

Liposomes have wider application as drug delivery system. They are formed by the self-assembly

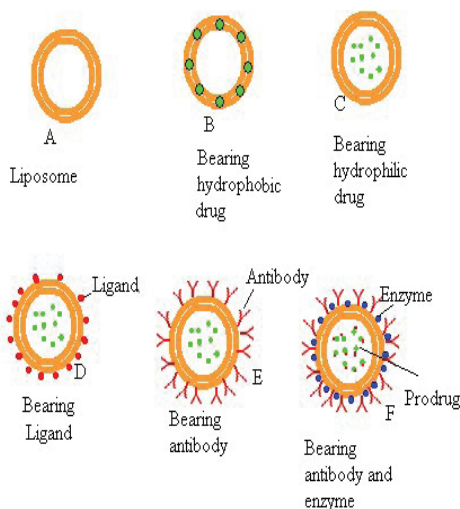


Figure 5 The use of liposomes as vehicle for drug delivery

of phospholipid molecules in an aqueous environment (Figure 5.A). We have mentioned in previous chapters in detail. Alternatively, lipid soluble drugs may form complexes with cyclodextrins and subsequently encapsulated within the liposome aqueous compartment. Liposomes can bear both hydrophobic (Figure 5.B) and hydrophilic drugs (Figure 5.C). The toxic side effects associated with the administration of anticancer drugs makes these as ideal candidates for drug targeting. Anticancer agents have been encapsulated within liposomes as an effort to target such agents to tumors. The use of liposomes as anticancer drug delivery systems was originally hampered by the realization that liposomes are rapidly cleared from the circulation and largely taken up by the liver macrophages. (Haseba et al 2006)

Liposome macrophage uptake by the liver and spleen (the reticuloendothelial system) hampered the development of liposomes as drug delivery systems for over 20 years. However, two discoveries helped liposomes transfer from the bench to the clinic. The first came from the finding in the late 1980s and early 1990s. It was proved that the presence of liposome surface ligands (Figure 5.D), such as monosialoganglioside (Gabizon and Papahadjopoulos, 1992) or polyoxyethylene, (Blume and Cevc, 1990; Klibanov et al, 1990; Haran et al, 1993) decreased the clearance of liposome (Maruyama et al, 1991; Klibanov et al, 1990) through liver and spleen. The second factor that enabled liposomes to

be developed into anticancer drug delivery systems was the elucidation of an efficient doxorubicin loading capacity (Haran et al, 1993). This produced liposomes with a high drug payload, thus reducing the level of phospholipid that had to be administered in order to achieve a desired dose. There is a variety of other methods employed to target liposomal anticancer drugs. These include the use of antibody targeted (immuno-) liposomes (Ahmad et al 1993; Huwyler et al, 1997), which are nothing but a specialized type of ligands (Figure 5.E). Technology exists to target liposomes to the spleen (Liu et al, 1991; Litzinger and Huang, 1992) and lung (Abra, 1984; Ninio et al 1994). Liposomes designed to combat cancer chemotherapy associated multidrug resistance (Krishna and Mayer, 1997) are also being developed. Liposomes have been firmly established as immunoadjuvants (enhancers of the immunological response), which induces both cell mediated and humoral immunity (Gregoriadis et al, 1996). Liposomal immunoadjuvants act by slowly releasing encapsulated antigen on intramuscular injection and by passively accumulating within regional lymph nodes (Gregoriadis, 1995). Sometimes a ligand, specific for affected tissue, is attached with the drug molecule through a polymer backbone, to ensure the easy delivery of the drug, particularly to the tumor or cancer tissue. Sometimes, a ligand, specific for particular tissue is attached to the surface of liposome to ensure drug delivery to that particular one. In some diseased tissues, certain kinds of receptors are over-expressed, which helps us a lot for drug targeting. These include the folate receptor, which become over-expressed in ovarian carcinoma. Liposomes bearing specific ligands such as folate, may be used to target ovarian carcinomas, while specific peptides or carbohydrates may be used to target integrins and selectins (Forsen and Willis 1998) which are the cell adhesion molecules, implicated in metastatic events (Forsen and Willis 1998)

Targeting with small ligands appears more likely to succeed than the use of antibodies, since these ligands are easier to handle and manufacture. The use of prodrugs in cancer chemotherapy is a means of targeting relatively toxic compounds to specific areas of pathology. Therefore, the normal tissues remain unaffected by the poisonous substance. Prodrugs are actually inactive complex of a toxic drug, but when it acts with specific enzyme, it becomes active. Prior to injection of prodrug the enzymes bound to specific antibodies of the target tissue are to be inoculated. Thus, enzymes would become accumulated to the target tissue. Now prodrugs are to be injected, which would start functioning

after reaching to the target tissue. Application of such a “prodrug” decreases the requirement of drug and reduces side effects. Application of liposome technology to prodrug therapy has decreased the risk of its failure. A further innovative utilization of immuno-liposomes involves a form of antibody directed enzyme prodrug therapy (ADEPT). Here polymer drug conjugates are used in antibody directed enzyme prodrug therapy. The use of antibodies to direct prodrug activating enzymes to tumor tissue is the principle behind ADEPT, (Bagshawe, et al

1991). ADEPT-type liposomes bear antibodies and enzymes on their surface (Vingerhoeds et al, 1996), which may be used to localize enzymes at the tumor site before administration of a prodrug, or prodrug remain encapsulated within the same liposome (Figure 5.F). In vitro, prodrugs of epirubicin (Vingerhoeds et al, 1993) and daunorubicin (Vingerhoeds et al, 1996) may be activated by pre-treating cells with liposomes bearing cell specific antibodies and prodrug specific enzymes. The density of surface enzyme directly influences the matricidal activity of the drug (Vingerhoeds et al, 1996) and hence these rather complex systems must be carefully titrated to produce an effective formulation

Liposomes due to their larger size could not achieve cent percent success to the process of penetration to the affected cells. Hence, the necessity was felt to produce smaller size of drug delivery system, which can easily penetrate the affected cells. Niosomes are such type of liposome-like vesicles, prepared from non-ionic surfactants. That are able to form closed bilayer vesicles, may be used for drug delivery. The niosomal encapsulation of methotrexate (Chandraprakash et al, 1993) and doxorubicin (Rogerson et al, 1988) increases drug delivery to the tumor and increases matricidal activity. Unlike non-stealth liposomes, 800nm doxorubicin niosomes, possessing a triglycerol (Cable, 1989; Vingerhoeds et al, 1993) or 200nm doxorubicin niosomes possessing a muramic acid (Uchegbu, 1998) surface are not taken up significantly by the liver. As such, these triglycerol niosomes accumulate in the tumor (Rogerson et al 1988). However, muramic acid vesicles do accumulate in the spleen (Uchegbu, 1998). On the other hand, doxorubicin niosomes of 200nm diameter, with a polyoxyethylene surface are rapidly taken up by the liver and become accumulated to a lesser extent in tumor. The accumulation of certain niosomes within the liver may be exploited, however. The activity of other anticancer drugs, such as vincristine, (Vingerhoeds et al 1996; Parthasarathi, et al 1994), bleomycin (Naresh,

R.A.R., and Udupa 1996) and plumbagin, a plant derived anticancer agent (Naresh1996) are also improved on niosomal encapsulation. Uptake by the liver and spleen (Uchegbu, and Vyas1998) make niosomes ideal for targeting diseases manifesting in these organs. One such condition is leishmaniasis and a number of studies (Baillie et al 1986; Carter et al 1988) have shown that niosomal formulations of sodium stibogluconate improve parasite suppression in the liver (Baillie et al 1986; Carter et al 1988) and spleen.

Conclusion

Homeopathy itself is a patient-tailored therapeutic system. Hence, the same drug cannot render reproducible effect to different patients suffering from the same pathological symptoms. However, when 'totality of symptoms' in two different individual patients matches, no matter whether their pathological symptoms are identical or different, it is more reproducible than so called allopathic method. The working principle of homeopathy is like patient-specific vaccination of the mainstream medicine. Most of the vaccines, as they arouse internal defensive mechanism, are used in relatively small quantity, homeopathy also does so at its supreme level. However, vaccination, before the recent advancements of medical science, was not used as a therapeutic method, but simply a protective measure, while homeopathy from its beginning was therapeutic as well as protective. For homeopathic medicine, as we have discussed earlier, when the aqueous solution of drug is mixed with alcohol, the ethanol molecules orient themselves around each drop in an inverted micelle like orientation, as water drops in oil. Heads of ethanol molecules remain attached to aqueous medium, keeping the tails towards ethanol medium. Thus, the alcohol molecules capsule each of the drops of aqueous drug solution, or simply around each hydrated drug molecule. When succussion and centennial delusions are made, ethanol molecules orient themselves more tightly and their heads and tails acquire drug-loaded liposome like orientation, more precisely, like that of Niosomes. Here is no necessity of surface ligands, because the drug molecule itself acts as ligand of the deficient minute protein factors. Hence, the mode of drug delivery system in homeopathy can be compared to the modern method of parenteral drug delivery system. Moreover, it has an added facility over liposome. The liposomes are prepared from long chain fatty acid and they incorporate too many drug molecules, as a result, they are enormously large. Consequently, their

entry inside the cell is a serious problem. Although some of them fuses with the plasma membrane of the affected cell or tissue, and release their content inside, but most of them flow away through blood vessels. In addition to that, the liposomes cannot be administered orally because they can easily be digested away in the intestine. Their fat content is absorbed in the lymph vessel, so that intravenous injection is necessary to assure the delivery of drugs, but homeopathic drug delivery system, on the contrary, are more penetrating due to small size and high velocity of the capsules. They start invasion from the mucous membrane of mouth, where they can penetrate easily into the blood vessels and reach even the innermost compartments of the target cells.

Now we may conclude here that implementation of Hahnemann's logic in the modern system of medicine can produce a breakthrough in future.

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Nano-Crystalline SnO₂ Butane Gas Sensor

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Abstract

In this paper, nano crystalline tin dioxide particles having size of the order of Debye Length value ($L_D \approx 3\text{nm}$) were synthesized at room temperature via ultrasonication assisted precipitation technique using liquor ammonia as the precipitant. The properties of these nano particles were characterized by TGA, XRD, Crystallite Size (CS), BET, TEM analysis and UV-Visible spectroscopy. The calcined SnO₂ powders at 400°C are found to be effective low temperature n-butane sensors.

1. Introduction

Tin dioxide (SnO₂) is an n-type wide band gap (3.5 eV) semiconductor with a rutile type crystalline structure which has well known wide-spread applications as microelectronics, imaging science, photo-electrochemistry, solar cells, electrode materials and optically transparent materials [1] because of its excellent photoelectric and chemical properties. Among gas-sensors, tin dioxide (SnO₂) due to its special properties such as chemical and thermal stability, natural non-stoichiometry and stable rutile phase, serves as one of the well known example for sensing and detection of low levels of inflammable pollutants or toxic gases such as CO, methane, butane, NO, NO₂, NH₃ and ethanol vapors, generally exhibiting high responses. But, the main drawback of this type of sensors is their relatively high operating temperature and also lack of selectivity. In order to lower the operating temperature, enhancement of the surface reaction kinetics is necessary which is done by increasing the available gas adsorption sites (i.e. oxygen vacancy defects) on the surface of SnO₂. This can only be done by the reduction of crystallite size to the order, comparable with the wavelength of the "critical Bohr radius" (i.e. 6 nm) which markedly improved the gas sensing properties of tin dioxide. This "critical size" is actually twice the

thickness of the Debye length L_D (3nm) of SnO_2 (i.e. $2L_D = 6 \text{ nm}$) when the sensitivity begins to increase sharply.

If the crystallite size is reduced to nanometers of the order of L_D , the properties of the entire particles, not just the surfaces or interfaces, change dramatically due to solid–gas interactions, leading to a substantial improvement in sensor response. Then both surface area and the ratio of charge depletion layer to the radius of particle will influence sensor responses and thus, how the sensitivity depends critically on crystallite size.

It is well known from the above discussion that the sensing behavior of a gas sensor is extremely sensitive to crystallite size and surface conditions. The basic principle of the operation of a semiconductor sensor is the control of the surface or interface potential barrier by adsorbed species (surface-charge or work function change). The gas detection mechanism is a reversible change in the resistance/conductivity of the SnO_2 surface induced by gas-solid interaction and is relevant to the e-depletion region on the surface of SnO_2 particles created by pre-adsorbed surface oxygen

Although, several methods are already reported for synthesis of nanocrystalline SnO_2 namely evaporative methods, sputtering, chemical vapor deposition methods and soft-chemical solution based methods [4], but most of them suffer from certain disadvantages such as low deposition rate, prolonged annealing time, highly expensive apparatus and costly chemical precursors. But, in this work, the precipitation via ultrasonication method used, is the most cost-effective and simplest method involving the most cheapest and generally lab used precursors to synthesize nanocrystalline SnO_2 .

In this paper, we have used the most simplest and the shortest route of ultrasonication assisted precipitation technique to prepare nanosized tin dioxide powders and studied the influence of the nano size effect on the low temperature butane gas sensing properties. The work also establishes that the non-stoichiometric nature of the nanocrystalline SnO_2 , the calcination temperature (T_c) and also the operating temperature (T_o) significantly affects the sensitivity. The nanocrystalline SnO_2 powders were also studied by TGA, XRD, Crystallite Size (CS), BET, TEM analysis and UV-Visible spectroscopy.

2. Experimental Section

2.1 Synthesis: In a typical ultrasonication method, 100 ml aqueous solution of reagent grade SnCl₂·2H₂O ([MERCK India, GR] of 0.2 (M) concentration was taken in a beaker and was ultrasonicated at room temperature for 15 minutes and then concentrated liquor ammonia (liq. NH₃) was added gradually dropwise from a burette into the above solution with vigorous stirring during the ultrasonication until the PH of the solution was 11-12 when finally colloidal white Sn(OH)₂ gets precipitated. The entire precipitation takes almost half an hour to complete and the solution was then further sonicated for another 15 minutes. Finally, the white precipitate was separated by centrifuging, followed by several times thorough washing with distilled water to make it chloride ion free and then oven dried to get the desired as-synthesized SnO₂ powders. In order to study the size effect on the gas sensing properties of SnO₂ of varying sizes, the as-prepared SnO₂ (SU) powder was calcined at different temperatures namely 400 °C, 600 °C, 800 °C, 1000 °C and 1200 °C for 6 h in air (henceforth named as SC4, SC6, SC8, SC10 and SC12 respectively, where in SCn 'S' stands for the sonochemical and the integer 'n' stands for different calcination temperature, T_c).

2.2 Characterization: Thermogravimetric Analysis (TGA) of the uncalcined as well as different calcined SnO₂ powders was carried out using SHIMADZU TGA-50 from room temperature to 800 °C employing a heating rate of 10 °C/min. The phase identification of the calcined powder was carried out by X-ray diffraction analysis (Philips PW1710) using Cu K_α radiation ($\lambda = 1.5406 \text{ \AA}$). The average crystallite size of the powder was calculated using the Debye-Scherrer formula from FWHM data based on the slow scan broadening of (220) lattice plane. The surface area analysis of the calcined powders was carried out using Brunauer-Emmet-Teller (BET) method on a Micromeritics Gemini II 2370 equipment. The particle morphology and local crystallographic structure were studied by transmission electron microscopy (TEM). The samples for microscopy were prepared by depositing micro-drops of the acetone dispersed sample onto carbon coated copper grids followed by drying. Absorption spectra of SnO₂ particles were recorded on a Perkin Elmer UV-VIS-NIR Spectrophotometer (Lambda 20) in the wavelength range of 190-800 nm using known quantities of the powder samples dispersed in ethanol under sonication.

The details about the sensor fabrication and processing for gas sensing study are reported elsewhere [5]. The electrical resistance of the sensors in air and their sensitivity in n-butane were measured at different temperatures (up to 500 °C) in an ambient of 60-70% relative humidity using a digital multimeter (Solartron) and a constant voltage/current source (Keithley 228A). All the samples were initially aged at 350 °C for 72 h to achieve the desired stability of the resistance value before the measurements. The sensitivity (S) of the films in gas was calculated as: $S = [(R_A - R_G) / R_A] \times 100$(3) where R_A and R_G are the sensor resistances in air and measuring gas, respectively. The response time (R_s) was measured as the time taken for a sensor to read 90% of full-scale reading after being exposed to a given gas and recovery time (R_c) was the time taken for a sensor to come back to its original state when the target gas is removed.

3. Results and Discussion

3.1 Characterization of as-synthesized as well as calcined SnO₂ nanopowders: Figure 1 (a) shows the TGA curve of the white tin hydroxide precipitate obtained from precipitation via ultrasonication method which initially shows a sharp and a single step decomposition of the associated water at 106°C, accompanied with a total initial weight loss of 48 %, A slight weight increase of around 2.0 % was also evident between 246°C-800°C corresponding to the oxidation of Sn(OH)₂ to SnO_{2-δ}. The inset of Figure 1 (a) show the TGA plot of the as-prepared powder where % weight loss was observed.

The XRD patterns (Figure 1b) of the as-prepared as well as 400 °C calcined powders for 6 hours show only the characteristic diffraction peaks of the cassiterite SnO₂ having the tetragonal rutile structure (JCPDS card No:77-0447).

The very broad and of low intensified nature of the diffraction peaks in case of SU and SC4 powders suggests the more non-stoichiometric nature of the SnO_{2-δ} powder. The crystallite size (D_{XRD}) was calculated based on FWHM data, and the lattice strain (η) based on formula $\eta = [(\beta \cos \theta - \lambda / D_{XRD}) / \sin \theta]$, [8], using the slow scan broadening of (211) peak of the different calcined SnO₂ powders and was given in Table 1.

Figure 1(c) shows the FESEM images of the SC4 particles. The pictures reveal that the sensor coating consisted of ultrafine particles of

3-5nm size and the particles are highly porous in nature and this nano effect in fact, is responsible for the faster response and enhanced gas sensing characteristics (sensitivity) of the SC4 sensor. The 3.2 nm size of SC4 powder almost essentially is found to be identical with the particle size observed by FESEM analysis Figure 1c suggesting that each particle of SnO₂ prepared by ultra-sonication method observed by FESEM is a single crystal of SnO₂.

The presence of more surface defects of smaller sized (below 6 nm) SC4 samples is further supported by their UV-visible spectral analysis. The UV-visible spectra dispersed in alcohol, of all the different calcined SnO₂ powders, having varying crystallite size is also found to be almost similar as in [9]. Now, the energy band gap is one of the important parameters of any semi-conducting material and its change in fact leads to a shift of optical absorption edge. Both the direct as well as indirect band gaps [Figures 2c (i-ii)] so calculated from all the above UV-spectras are found to be of the order of 4.59-4.716 eV, almost similar to [9]. Thus, the blue shift so observed in different calcined of varying sized SnO₂ powders is due to the quantum nano size effect and is noticed maximum in SC4 powder because of its lowest crystallite size. This blue shift therefore, clearly indicates the presence of changes in the structural arrangements of surface of the nanoparticles of SC4 powder i.e. presence of more surface defects which in fact leads to this highest change in band energy.

Figures 3(a)-(c) shows the (%) responses of all the calcined SnO₂ (SC4, SC6 and SC8 samples towards different concentrations (500, 1000 and 5000 ppm) of n-butane at different operating temperatures of 350°C-500°C. The careful analysis of Figure 3(a) revealed that only the SC4 powder shows the highest sensitivity of 75 % at 350°C, 85 % at 450°C and 88 % at 500°C compared to only 60 % -70 % at 350°C-450°C and 82-85% at 500°C of responses of SC6 and SC8 samples towards low concentration of 500 ppm of n-butane respectively. But, towards, higher concentrations (1000-5000ppm) of n-butane, the sensitivity values of SC4 increased to 93-97 % at 350°C compared to the slightly lower responses of SC6 and SC8 samples of only 85-87 % and 90-94 % at 350°C towards 1000 ppm (Figure 3b) and 5000 ppm (Figure 3c) n-butane in respectively. Thus, due to the lowest crystallite size of the order of L_D of 3.2 nm, SC4 exhibited the maximum % responses towards all concentrations of n-butane. Whereas, the sensitivity values of SC6

and SC8 samples having sizes also within the critical size i.e. of the order of $2L_D$ of 4-6 nm, are also quite high. But in case of SC10 and SC12 powders where crystallite size is 3-4 times $\gg L_D$ of SnO_2 and even much $\gg 2L_D$, the % response decreases drastically to a lower value of only 30-46 % at 350°C even towards the highest concentration (5000 ppm) of n-butane.

In Figures 4(a)-(c), SC4 powder with lowest critical crystallite size of 3.2 nm was chosen and the variation of its R_{Air} and % sensitivity with T_O and % response with time (R_s) were studied. With increase in temperature from 160°C to 450°C, R_{Air} of SC4 sensor decreases from 2.45 M Ω to 0.25 M Ω (Figure 4a). The plot of % sensitivity vs response time (R_s) in Figure 4(c) indicates that the response time for maximum % response of SC4 sensor is about 10 sec towards 1000 ppm of n-butane.

Moreover, also, due to the very small crystallite size of the order of L_D and higher specific surface area of 65 m²/gm, the SC4 sensor surface contains more oxygen vacancy defects (V_O) and hence is more reactive. Thus, the nano-effect is solely responsible for the enhanced gas sensing properties i.e. sensitivity and selectivity in SC4 sensor and is also the cause of difference in sensitivity towards n-butane in different sized SnO_2 sensor.

4. Conclusion

In summary, we have synthesized nano particles of $\text{SnO}_{2-\delta}$ (~3 nm) by a simplest and the shortest route of ultrasonication assisted controlled precipitation technique using liquor ammonia as the precipitant. The sensors prepared using these nano $\text{SnO}_{2-\delta}$ powders exhibited a very good influence of the nano size effect on the gas sensing properties. It was found that sensors having size within order of L_D or $2L_D$ of SnO_2 (i.e. 3 nm) had very good n-butane sensitivity at much lower temperatures. The reason is solely the size effect which leads to the more non-stoichiometric nature and also the presence of more surface oxygen defects in case of sensors having size within order of L_D or $2L_D$ of SnO_2 (i.e. 3-6 nm) as confirmed from the FESEM and UV-Visible spectroscopic analysis. So, it is expected that reducing size below a 'critical size' can always produce a dramatic change in the sensor response.

5. References

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Table 1: Physico-chemical and gas sensing properties of pure SnO₂ powders obtained through precipitation assisted ultrasonication process.

Sample ID	TC (oC)	Weight loss	Color of the calcined powder	SBET (m ² / gm)	Crystallite size (D X R D) (nm)	Rair (350oC)	Sensitivity (5000 ppm n-butane)	η (lattice Strain) [8]
		(%)			(D X R D) (nm)	(MΩ)	(%)	(%)
S n O 2 (SC4)	400	0.52	Light Ash	65	3.2	0.28	96.5 ±0.3	1.04

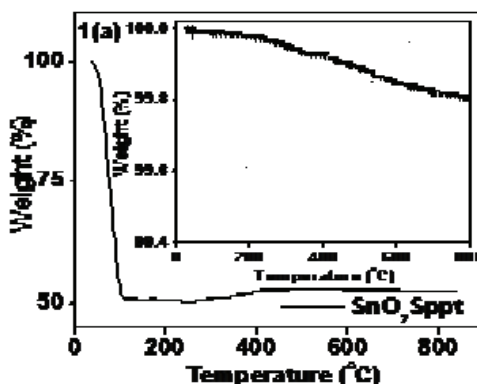


Figure 1. TGA plot of (a) SnO₂ Precipitate and (inset) SnO₂ uncalcined powder

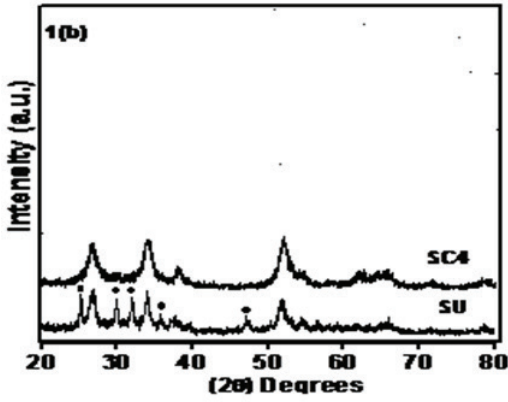


Figure 2. (a) XRD patterns of SnO₂ uncalcined powder

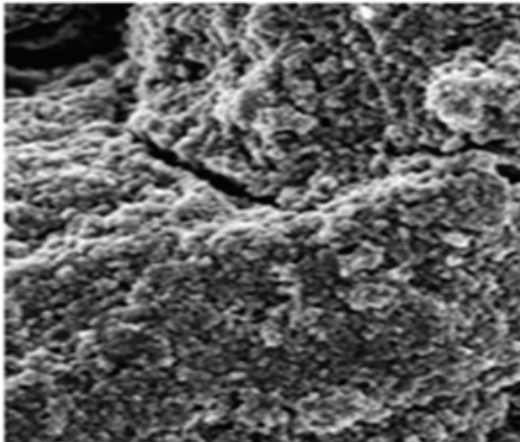


Figure 2. (b) FESEM images (SC4) of SnO₂ powders

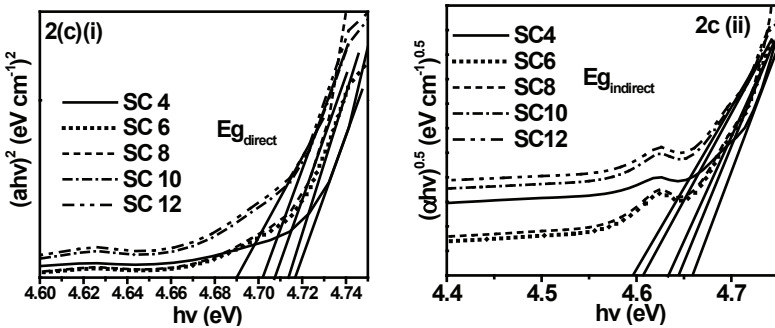


Figure 2. (c) Band gap [(i) Eg_{direct} and (ii) Eg_{indirect}] evaluation

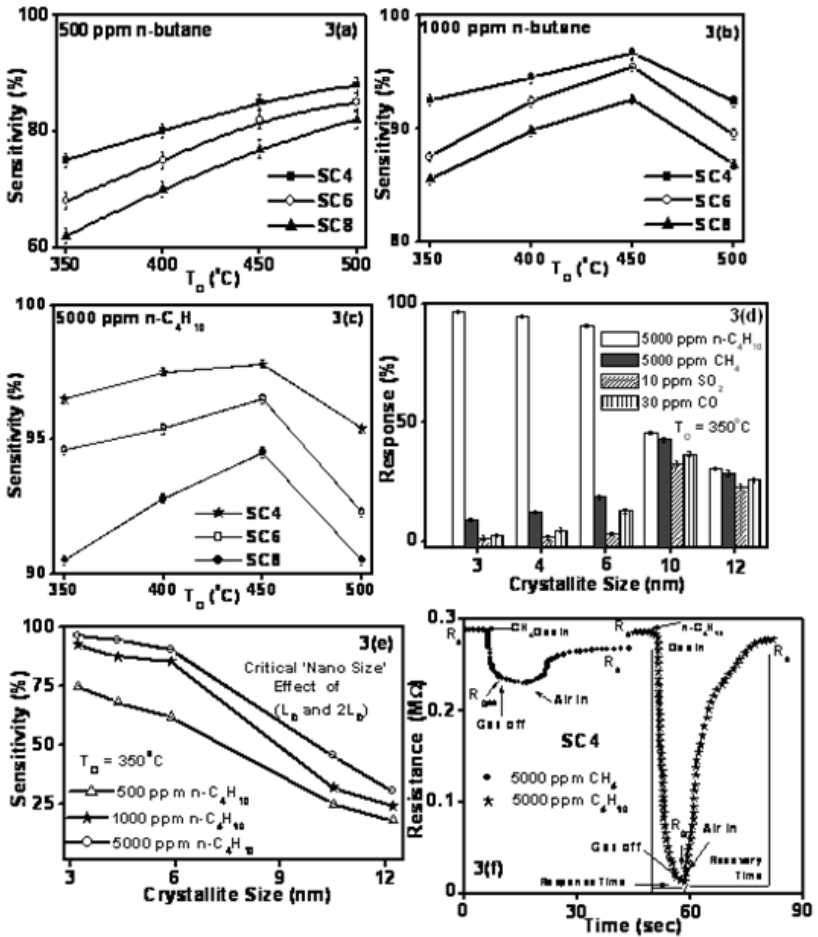


Figure 3. Gas sensing characteristics of different SnO₂ sensors having LD or 2LD order crystallite size towards (a) 500 ppm, (b) 1000 ppm, (c) 5000 ppm n-C₄H₁₀ at TO (°C) of 350°C-500°C, (d) Selectivity towards 5000 ppm n-C₄H₁₀ at 350°C in presence of other gases like CH₄, CO and SO₂ vs crystallite size (e) Critical 'Nano Size' Effect of LD or 2LD on the enhanced sensitivity of SnO₂ sensors with crystallite size ≤ 2LD, (f) XY recording of (%) response towards both 5000 ppm n-C₄H₁₀ and 5000 ppm CH₄ vs time (sec) in a serial order.

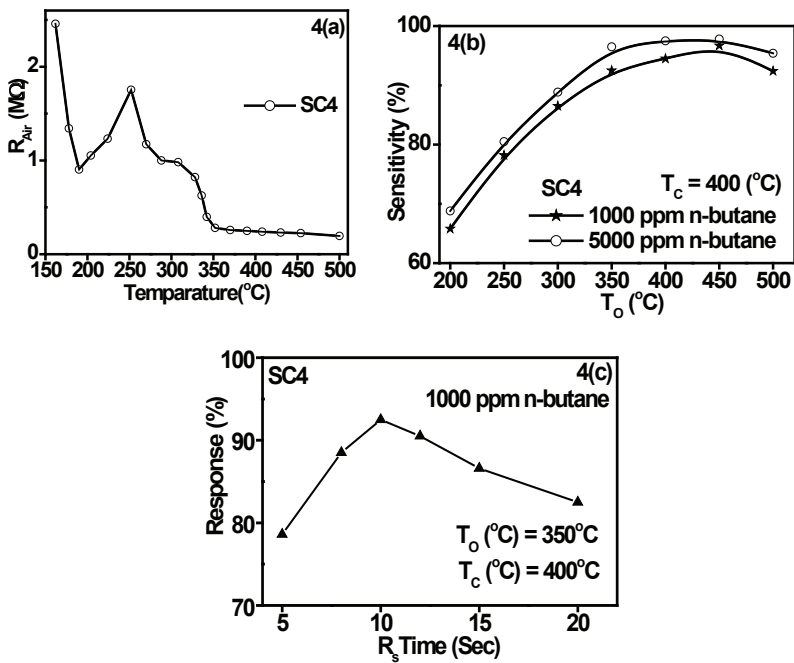


Figure 4. Gas sensing characteristics of SC4 sensor - (a) R_{Air} vs T_o (°C), (b) (%) response of SC4 towards 1000 ppm and 5000 ppm $n-C_4H_{10}$ versus T_o (°C) (c) (%) response of SC4 towards 1000 ppm $n-C_4H_{10}$ vs time (sec) at T_o (°C) of 350°C

Analysis of Impact of Trade on Shipping in India

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Abstract

This paper reveals the impact of Trade on Shipping in India. It mainly focuses on the study of the impact of the growth of total trade on the total shipping performance over time at all ports. We also want to study the impact of Overseas Trade on Overseas Shipping at all Ports in India during the period (1989-90-2018-19), to study the joint impact of firstly, the growth of UL, L on the growth of Indian overseas vessels (OV) and also that of secondly, the growth rate of UL (i.e, UL_1), L (i.e, L_1) on the growth rate of OV (i.e, OV_1). Moreover, we also want to add with this the study of the shipping performance in response to the change in the volume of overseas trade [OT= (L+UL)] and thus examine the change in the growth of OV with respect to the change in the volume of OT and also the individual impact of the growth rate of OT (i.e, OT_1) on the growth rate of OV (i.e, OV_1) respectively over the said period.

Keywords

Impact; Trade; Shipping; Overseas;

1. Introduction

Ports form an important infrastructure in the Indian economy as they are the main centres of trade in facilitating international trade and commerce by providing an interface between ocean transport and land - based transport system. Ocean transport or shipping still plays an important role in trade and economic development of India as transport, trade and economic development are mutually supportive (Barke 1986).

The Maritime Sector in India comprises of Ports, Shipping, Shipbuilding and Shiprepair and Inland Water Transport Systems. India, with a long coastline of 7600 kilometres, is served by 13 major ports (12 government and 1 corporate) and 187 notified minor and intermediate ports, spreading across nine coastal states of the country-

West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat. There are thirteen major ports, with six ports namely Jawahar Nehru Port Terminal or JNPT (Navi Mumbai) (1986), Bombay, presently Mumbai (1875), Cochin, presently Kochi (1930), New Mangalore (1974), Mormugao (1963) and Kandla (1955) are on west coast and rest namely, Calcutta, presently Kolkata (1870), Haldia (1977), Paradip (1966), Vishakapatnam (1933), Ennore (2001), Madras, presently Chennai (1916), Tuticorin (1974) are on east coast.

2. Objectives

The objective of this paper is to study the impact of Trade on Shipping In India. It mainly focuses on the study of the impact of the growth of total trade on the total shipping performance over time at all ports, to study the impact of Overseas Trade on Overseas Shipping at all Ports in India during the period (1989-90-2018-19), to study the joint impact of firstly, the growth of UL, L on the growth of Indian overseas vessels (OV) and also that of secondly, the growth rate of UL (i.e, UL_1), L (i.e, L_1) on the growth rate of OV (i.e, OV_1). Moreover, we also add with this, the study of the shipping performance in response to the change in the volume of overseas trade [$OT = (L+UL)$] and thus examine the change in the growth of OV with respect to the change in the volume of OT and also the individual impact of the growth rate of OT (i.e, OT_1) on the growth rate of OV (i.e, OV_1) respectively over the said period.

3. Literature Review

Studies available on port literature reveals that it has been a relatively neglected branch of Indian economic literature till mid-60s. Other important studies on CPT and Haldia Port include those made by Banerjee, (1975), Ray (1993), Chakraborty (1995) (ed.) and Sau (1997). Finally, Singh (2010), Bose (2010), Munshi (2011) and Shaw (2012) had focused on the urbanization of Indian cities of current decades.

4. Data and Methodology

Secondary data on shipping, volume of exports (loaded), imports (unloaded) and total trade (measured in '000 tonnes), and that of the efficiency indicator (either measured in days or in '000 tonnes) are taken mainly from the various issues and publications and from the websites of the following sources such as (i) Basic Ports Statistics of India (ii) Indian Ports Association.

5. Results and Discussion

5.1 Impact of Trade on Shipping

First, to study the impact of the growth of total trade on the total shipping performance over time at all ports, a time series analysis of a Classical Linear Simple Regression Model (CLSRM) is constructed over the given period [1989-90-2019-20], with the following regression equation as follows:

$$TV_t = \alpha + \beta X_t + u_t \quad (1)$$

Here slope coefficient (β) measures the absolute change in TV for the given absolute change in [total trade] X over time.

Secondly, regarding the impact of Overseas Trade on Overseas Shipping at All Ports in India during the period (1989-90-2019-20), our objective is to obtain the mean response of the shipping performance (Y) for the given change in the volume of both overseas imports [Unloaded (UL)], say, X_1 and overseas exports [Loaded (L)] say, X_2 i.e. (all explanatory variables, Xs) respectively, over the said period of 10 years, i.e., to study the joint impact of 1) the growth of UL, L on the growth of Indian overseas vessels (OV) and also that of 2) the growth rate of UL (i.e, UL_1), L (i.e, L_1) on the growth rate of OV (i.e, OV_1).

For this, a time series analysis of the Classical Linear Multiple Regression Model (CLMRM), with one dependent variable (Y), and more than one independent variables (Xs), linear in their parameters, are constructed with the following Multiple Regression equations,

$$OV_t = \beta_0 + \beta_1 UL_t + \beta_2 L_t + u_t \quad (2)$$

$$OV_{1t} = \beta_0 + \beta_1 UL_{1t} + \beta_2 L_{1t} + u_t \quad (3)$$

Here, OV denotes the growth of overseas vessels, measured in numbers, as the dependent variable (Y). UL and L denotes the growth of the volume of overseas imports and exports, both measured in million tonnes, as the two independent variables X_1 and X_2 respectively. β_0 is the intercept which measures the mean or the average value of Y (the growth of the Indian overseas vessels, (OV) when both X_1 and X_2 are set equal to zero. β_1 , β_2 are the individual partial regression coefficients (slope coefficients) of X_1 and X_2 respectively, which measures the change in the mean value of the (Y) per unit change in one independent variable, (say, X_1 or X_2), holding the value of the other independent variable constant.

That is, it gives the “direct” or “net” effect of a unit change in X_1 (or X_2) on the mean value of Y , net of any effect that X_2 (or X_1) may have on mean Y for β_1 (or β_2).

Moreover, in order to study the shipping performance in response to the change in the volume of overseas trade [$OT = (L + UL)$], we want to examine 1) the change in the growth of OV with respect to the change in the volume of OT and also 2) the individual impact of the growth rate of OT (i.e., OT_1) on the growth rate of OV (i.e., OV_1) respectively over the said period. For this, Simple Regression Model (SRM) is constructed over a period of 10 years, with the following two simple regression equations, (4) and (5).

$$OV_t = \beta_0 + \beta_3 OT_t + u_t \quad (4)$$

$$OV_{1t} = \beta_0 + \beta_3 OT_{1t} + u_t \quad (5)$$

Here, OT and OT_1 denote the growth and the growth rate of overseas trade respectively, also measured in million tonnes, as the third independent variable in the model. β_0 s are the intercepts which measures the mean or the average value of Y (the growth of the Indian overseas vessels, OV) when OT is set equal to zero. β_3 s are the individual regression coefficients (slope coefficients) which measure the change in the mean value of the OV s per unit change in the independent variables OT and OT_1 .

In order to test the significance of the individual partial regression coefficients (slope coefficients) of both our CLMRM and SRM, accordingly, the null hypotheses are constructed in MRM and SRM.

For equations (2) and (3), in case of MRMs

H_0^1 : Change in UL (or UL_1), holding L (or L_1) constant, have no significant influence on OV (or OV_1) respectively.

H_0^2 : Change in L (or L_1), holding UL (or UL_1) constant, have no significant influence on OV (or OV_1) respectively.

To test the overall significance of MRM,

H_0^3 : Change in UL (or UL_1), and L (or L_1) have no linear influence on OV (or OV_1) respectively [$(H_0: \beta_s = 0)$ as against $(H_1: \beta_s \neq 0)$].

For equations (4) and (5), in case of SRMs, to test the individual regression coefficients (β s),

H_0^4 : No significant change in OV (or OV_1) with respect to the given change in OT (or OT_1) respectively.

The regression results [Gujrati, D. N. & Sangeetha (2008)] are given in Table 1 for both MRM and SRM.

Table 1: Summary statistics of Regression Analysis and ANOVA

Equation No.	Variables	Coefficient	Lower 95 percent	Upper 95 percent	t stat	P value	F	R2	Adjusted R2
2	Intercept	133.207	104.62	161.80	11.02	1.13E-05	41.03	0.9214	0.8989
	UL	1.082	0.726	1.44	7.2	0.000178			
	L	-1.073	-1.55	-0.60	-5.34	0.001074			
3	Intercept	2.59	1.8382	3.35	8.122	8.27E-05	40.65	0.9207	0.8981
	UL1	1.034	0.733	1.334	8.13	8.22E-05			
	L1	-0.562	-0.7774	-0.347	-6.2	0.000452			
4	Intercept	172.14	115.37	228.91	7.00	0.000114	7.68	0.4899	0.4262
	OT	0.163	0.0274	0.30	2.77	0.024225			
5	Intercept	4.127	2.62	5.64	6.304	0.000232	4.16	0.3419	0.2597
	OT1	0.225	-0.0295	0.48	2.04	0.076			

Source: www.shipping.nic.in,

In case of MRM, from Table 1, corresponding to (2) and (3), the estimated multiple regression equations are

$$OV_t = 133.207 + 1.082UL_t - 1.073L_t \tag{2}$$

$$OV_{1t} = 2.59 + 1.034 UL_{1t} - 0.562L_{1t} \tag{3}$$

From the above equations (2) and (3), regarding the impact of the joint performance of change in imports and exports on shipping, it is found from the summary statistics of Regression Analysis, that, $R^2 = 0.9214$ of (2), as compared to $R^2 = 0.9207$ of (3), implies a greater variation in the growth of OV as explained jointly by the change in the volume of both L and UL . Moreover, it is found from the individual partial slope coefficients of UL and UL_1 , that, both have led to a rise in the growth of OV and OV_1 , with absolute growth of overseas vessels (OV) being greater than its relative growth, (OV_1) [as β^*_1 of (2) $>$ β^*_1 of (3)], holding L and L_1 constants respectively. But both the individual partial slope coefficients of L and L_1 are found to be negative and even smaller than those of UL and UL_1 respectively. Thus they lead to a fall in

the growth of OV and OV_1 , holding UL and UL_1 constants respectively. Here the fall in the growth of OV and OV_1 , otherwise, implies that there must be a fall in both the absolute and relative demand of the overseas vessels meant for the exports as compared to that for the imports, with the absolute fall in the demand of vessels for exports being greater than its relative fall. This implies that the relative demand of the vessels for exports (growth of OV_1) is slightly higher (by 0.51023 units). But if compared to the imports, it (growth of OV_1) is still lesser than relative growth of OV (1.034) caused by UL_1 and even much lesser than the absolute growth of OV meant for the imports. Next, from the simultaneous study of both the slope coefficients of the above equations [i.e. either with a joint per unit rise in the volumes of UL and L in case of (2), or with the same in both the volumes of UL_1 and L_1 in case of (3) respectively], it is found that since the same number of overseas vessels are used for loading (or export) and unloading (or imports) purposes, here, the import demand for the overseas vessels exceeds that of the export demand in both cases (as is evident from the slope coefficients of UL, UL_1 and L, L_1). Therefore it leads to a more usage of the vessels for imports and hence a fall in the usage (or less usage) of the vessels for exports [as is evident from negative β coefficients of L and L_1]. But both the β coefficients (slope coefficients) of UL and L are, again, greater than UL_1 and L_1 , together with also that of UL being greater than UL_1 . This, further, implies that, with the joint rise in per unit volume of both the absolute exports (L), and imports (UL), higher absolute import demand for the overseas vessels (OV), therefore, leads to a greater rise in the absolute growth of the usage of the vessels only meant for unloading purposes and even the usage of those unused vessels meant for loading purposes.

Again, in case of SRM, regarding the impact of the sole performance of overseas trade on shipping, from Table 1, corresponding to the equations (4) and (5), the following estimated simple regression equations are

$$OV_t = 172.14 + 0.163OT_t \quad (4)$$

$$OV_{1t} = 4.127 + 0.225OT_{1t} \quad (5)$$

From the equations [(4) and (5)], OT and OT_1 alone have explained only 49 percent ($R^2 = 0.4899$) of the variation in OV and that of 34 percent ($R^2 = 0.3419$) in OV_1 respectively, implying a greater variation in the growth of absolute volume of trade (OT). This is simply due to

the less contribution of exports, L , and a much lesser contribution of its growth rate, L_t , from those of the equations [(2) and (3)] to explain the same in OV and OV_t .

Thirdly, in order to study the impact of the growth of overseas traffic performance on the growth of the total shipping performance at Major Ports during the period (1989-1990 to 2019-20) i.e., we have examined i) the simultaneous impact of the absolute growth of L and UL on the growth of total vessels (category-wise cargo vessels) (TV) and also on that of the total grand fleet (TGV) respectively, and ii) the individual impact of the absolute growth of overseas trade (OT) on the growth of total fleet (category-wise) (TV) and on that of total grand fleet (TGV) respectively over time.

For (i), a time series analysis of a Classical Linear Multiple Regression Model (CLMRM) is constructed over the said period of 30 years, with the following regression equations (6) and (7).

$$TV_t = \beta_0 + \beta_1 UL_t + \beta_2 L_t + u_t \quad (6)$$

$$TGV_t = \beta_0 + \beta_1 UL_t + \beta_2 L_t + u_t \quad (7)$$

Here, both TV and TGV denote the absolute growth of vessels, measured in numbers, as the dependent variable. UL and L denote the absolute growth of the volume of imports and exports, both measured in million tonnes, as the two independent variables. β_0 is the intercept which measures the mean or the average value of the growth of TV or TGV when both UL_t and L_t are set equal to zero. β_1 , β_2 etc. are the individual partial regression coefficients (slope coefficients) of UL_t and L_t respectively, which measure the proportional change in TV_t and TGV_t per unit change in one independent variable, (say, UL_t or L_t), holding the value of the other independent variable constant. That is, it gives the "direct" or "net" effect of a unit change in UL_t (or L_t) on the mean value of the growth of TV or TGV respectively, net of any effect that L_t (or UL_t) may have on the mean growth of TV or TGV for β_1 (or β_2).

For (ii), a time series analysis of a Classical Linear Simple Regression Model (CLSRM) is constructed over the period of 30 years (1989-90 to 2019-20) with the following regression equations, (8) and (9).

$$TV_t = \beta_0 + \beta_3 OT_t + u_t \quad (8)$$

$$TGV_t = \beta_0 + \beta_3 OT_t + u_t \quad (9)$$

Here, the slope coefficients (β s) measure the proportional change in TV_t and TGV_t respectively for the given proportional change in OT_t over time.

In case of MRMs and SRMs, to test the individual partial regression coefficients (β s), the null hypotheses ($H_0: \beta = 0$) are constructed against the alternative hypotheses ($H_1: \beta \neq 0$) for the respective equations, which are as follows:

For equations (6) and (7), in case of MRMs

H_0^5 : Change in (UL_t) , holding (L_t) constant, have no significant influence on TV_t (or TGV_t) respectively.

H_0^6 : Change in L_t , holding (UL_t) constant, have no significant influence on TV_t (or TGV_t) respectively.

To test the overall significance of MRM,

H_0^7 : Change in UL_t and L_t have no linear influence on TV_t (or TGV_t) respectively [$(H_0: \beta_s = 0)$ as against $(H_1: \beta_s \neq 0)$].

For equations (8) and (9), in case of SRMs,

H_0^8 : Change in OT have no linear influence on TV_t or (TGV_t) respectively.

The regression results are given below in Table 2 for both MRM and SRM.

Table 2 reveals the joint impact of the performance of absolute overseas imports and exports on total shipping, corresponding to the above equations (6) and (7). From the summary results of the Regression analysis of the above MRM model, it is found that the joint impact of the growth of both the absolute overseas imports and exports have led to the greater significant rise in the absolute growth of the total category –wise cargo vessels, (TV) than the total grand fleet, (TGV). This is evident from the much higher values of R^2 , t and F values of the equation (6) than those corresponding values of the equation (7). Moreover, from the overall significance of the model, it is found that both UL and L jointly have led to the significant rise in TV than TGV as the computed F value for both UL and L of equation (6) [142.2] being much higher than that for both UL and L [$F=73.5$] of equation (7), given the critical value of $F_{.05, 2, 12} = 3.89$, to reject H_0^7 .

Table 2 : Summary statistics of Regression Analysis and ANOVA

Equation No.	Variables	Coefficient	Lower 95 percent	Upper 95 percent	t stat	P value	F	R2	Adjusted R2
6	Intercept	8173.82	6932.3	9415.4	14.34	4.67E-09	142.2	0.96	0.953
	UL	36.8	13.17	60.4	3.39	0.005			
	L	23.6	-7.70	54.9	1.64	0.13			
7	Intercept	9347.63	7680.70	11014.55	12.12	3.96E-08	73.5	0.925	0.912
	UL	20.94	-10.75	52.64	1.44	0.176			
	L	42.10	0.10	84.10	2.18	0.050			
8	Intercept	8327.31	7296.91	9357.73	17.46	2.09E-10	300.8	0.958	0.955
	OT	31.13	27.25	34.99	17.34	2.27E-10			
9	Intercept	9101.61	7711.45	104991.8	14.14	2.84E-09	153.7	0.922	0.916
	OT	30.01	24.8	35.24	12.4	1.41E-08			

Source: www.shipping.nic.in

Further, from both the equations (6) and (7), β^*_{UL} [t=3.39] is also highly significant in raising TV than β^*_{UL} [t=1.44] in raising TGV and even more significant than β^*_L [t = 1.64] in raising TV and β^*_L [t=2.18] in raising TGV, to arrive at a greater statistical significance of the overall growth of UL and L on the growth of TV than TGV. Moreover, compared to all p values of t of UL and L of both the equations (6) and (7), p value of t of UL of equation (6) being lower than that of the equation (7) and even much lower than all p values of both L of the equations (6) and (7), to reject H_0^5 , with respect to TV than others [H_0^6], to arrive at a greater statistical significance of UL and L for the growth of TV than TGV.

Moreover, from Table 2, in case of SRMs, regarding the impact of the sole performance of absolute overseas trade on shipping, corresponding to the equations (8) and (9), it is found from the summary results of the Regression and TOSA analysis that the sole impact of the absolute growth of overseas trade (OT) have led to the higher growth of both the total category-wise cargo vessels (TV) and total grand fleet (TGV), with absolute growth of the total category-wise cargo vessels, (TV) being greater than that of the total grand fleet (TGV) over time. This is evident from the much higher values of R^2 , β^* , t and F values of OT for TV of equation (8) than those corresponding values of OT for TGV of equation (9).

From both the equations (8) and (9), β^*_{OT} [t=17.34] is also found to be highly statistically significant in raising TV than β^*_{OT} [t=12.4] in raising TGV, to arrive at a greater statistical significance of the overall growth of OT on the growth of TV than TGV. Moreover, compared to all p values of t of OT of both the equations (8) and (9), p value of t of OT of equation (8) being lower than that of the equation (9), to reject H_0 ⁸, with respect to TV than TGV, to arrive at a greater statistical significance of OT for the growth of TV than TGV.

6. Conclusion

In conclusion, it can be said that the total trade has significantly explained the variation in total shipping in case of India. We have studied the impact of Overseas Trade on Overseas Shipping at all Ports in India during the period (1989-90-2019-20) and obtained the mean response of the shipping performance (Y) for the given change in the volume of both overseas imports [Unloaded (UL)], say, X_1 and overseas exports [Loaded (L)] say, X_2 i.e. (all explanatory variables, Xs) respectively, over the said period of 30 years, i.e., studied the joint impact of the growth of UL, L on the growth of Indian overseas vessels (OV) and also that of the growth rate of UL (i.e, UL_1), L(i.e, L_1) on the growth rate of OV (i.e, OV_1). In this case, overseas imports are found to be more important than overseas exports.

Moreover, we also studied the shipping performance in response to the change in the volume of overseas trade [OT= (L+UL)] and obtained the change in the growth of OV with respect to the change in the volume of OT and also the individual impact of the growth rate of OT (i.e, OT_1) on the growth rate of OV (i.e, OV_1) respectively over the said period. In this case, overseas trade are found to be more important than its growth rate over the said period.

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γ -Fe₂O₃ Nanoparticles for the Photocatalytic Degradation of Rose Bengal and Methylene Blue Dyes

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Abstract

γ -Fe₂O₃ nanoparticles (NPs) were synthesized from a single-source precursor complex [Fe₃O(C₆H₅COO)₆(H₂O)₃]NO₃ by a simple thermal decomposition process and have been characterized by X-ray diffraction analysis (XRD), transmission electron microscopy (TEM) and UV-Vis spectroscopic techniques. The NPs were highly pure and well crystallized having hexagonal morphology with an average particle size of 35 nm. The prepared γ -Fe₂O₃ (maghemite) NPs, show effective photo-catalytic activity toward the degradation of rose bengal (RB) and methylene blue (MB) dyes under visible light irradiation and can easily be recoverable in presence of magnetic field for successive re-uses. The possible photocatalytic decomposition mechanism is discussed through the detection of hydroxyl radical (OH•).

Keywords

γ -Fe₂O₃ nanoparticles; single source precursor; photocatalytic activity; hydroxyl radical; rose Bengal; methylene blue

Introduction

The textile dyes with high aromaticity and low biodegradability have emerged as major environmental pollutants [1,2] and nearly 10–15% of the dye is lost in the dyeing process and is released in the waste-water which is an important source of environmental contamination. Considerable amount of water is used for dyeing and finishing of fabrics in the textile industries. The waste-water, from textile mills, causes serious impact on natural water bodies and land in the surrounding area. High values of COD and BOD, presence of particulate matter

and sediments, chemicals which are dark in color leading to turbidity in the effluents causes depletion of dissolved oxygen, which has an adverse effect on the marine ecological system. As dyes are designed to be chemically and photolytically stable, they are highly persistent in natural environments. The improper handling of hazardous chemicals in textile water also has some serious impact on the health and safety of workers putting them into the high-risk bracket for contracting skin diseases like chemical burns, irritation, ulcers, etc. and respiratory problems [3]. Various physical, chemical and biological pre-treatment and post-treatment techniques have been developed over the last two decades for treatment of textile waste water although most of them were found to be not effective and inexpensive [4, 5]. Thus, decomposition of organic pollutants using various nanomaterials in presence of sun light has been a topic of contemporary interest. Semiconducting nanomaterials are especially important for this purpose as the reactions require very mild condition and use at low concentrations. During the past 20 years, many photo-excitabile inorganic semiconductors have been used as photo-catalysts to decompose or destroy the organic pollutants [6–11]. The development of facile, cheap and green methods for treatment of organic pollutants has been a focal subject in the field of environmental science and technology. Among many strategies including physical, chemical, biological and photo-catalytic methods, photo-catalysis is a promising technology for the treatment of contaminants due to its potential use of sunlight as the energy source to degrade organic pollutants [12–14]. Organic dyes have the attractive advantages of possessing high molar absorptivity in the visible region, which matches the light source emission spectrum with solar light [15]. TiO₂ is a well-known catalyst for photo-degradation of toxic organic compounds [16–19], however, it is catalytically active only under UV irradiation ($\lambda < 387$ nm) because of its wide band gap energy ($E_g \approx 3.2$ eV) [20]. Of late, a few non-titania-based several metal oxides (e.g. CuO, ZnO, MnO₂, Fe₂O₃, Fe₃O₄, Co₃O₄, Al₂O₃) and metal sulfides (e.g. CdS, CuS, ZnS, MnS, Sb₂S₃, In₂S₃, Bi₂S₃, Co_{0.85}Se etc.) [21–25] have been found to exhibit visible-light-driven catalytic activity. Obviously, there remains great demand for exploration of inexpensive and environmental friendly materials that might be used for photo-degradation of organic dyes in sun light, especially for effluents of textile waste-water. In this regard, the use of iron oxide nanoparticles, which is commonly known as superparamagnetic nanoparticles (MNPs), as catalyst carriers is

very promising due to their large surface area resulting in high catalyst loading capacity, high dispersion, outstanding stability, low-cost preparation and environmentally-friendly materials [26–28]. Another major advantage for the use of iron oxide nanoparticles is that, owing to the presence of their interesting magnetic properties the separation at the end of the reaction is facilitated by their attraction to a magnetic field [29–31] which is much easier than by cross-flow filtration and centrifugation. In addition, the magnetic properties of the particles are stable enough to tolerate most chemical environments, with the exception of those that are extremely acidic or corrosive. For this reason, recently, some iron oxide-based nanomaterials have been investigated for photo-degradation of organic pollutants like 4-chlorophenol, congo red, phenol etc [32–34]. To the best of our knowledge, no one has developed to decompose rose bengal (RB) and methylene blue (MB) dyes, which are also extensively used in dyeing and printing industries, using γ -Fe₂O₃ NPs through photo-catalytic degradation process. Moreover the removal technique of these dyes from waste-water has not received sufficient attention recently. This was our encouragement for doing this work.

Keeping this in mind, in this article, we have synthesize γ -Fe₂O₃ NPs through a very simple thermal decomposition process from a trinuclear iron(III) single-source precursor complex. Then it was tested as photo-catalyst for the degradation of organic dyes and exhibits enhanced photocatalytic efficiency towards decomposition of rose bengal and methylene blue compared to that of TiO₂.

2. Experimental

2.1. Chemicals and materials

All chemicals were of reagent grade and used without further purification. Fe(NO₃)₃·9H₂O, sodium benzoate (C₆H₅COONa) and terephthalic acid (TA) were purchased from commercial sources. Rose bengal (RB) and methylene blue (MB) were purchased from Sigma-Aldrich. Nano-sized titanium dioxide (Degussa-P25) was purchased from Degussa Company. Solvents were used as received.

2.2. Preparation of γ -Fe₂O₃ NPs

0.50 g precursor complex [Fe₃O(C₆H₅COO)₆(H₂O)₃]NO₃ (To an aqueous solution (50.0 mL) of sodium benzoate (1.44 g, 0.01 mol),

an aqueous solution (30.0 mL) of Fe(NO₃)₃·9H₂O (2.02 g, 0.005 mol) was slowly added with stirring. After immediately, an orange red compound was precipitated. The compound was collected by filtration, washed with double distilled water and dried in air. The compound was re-crystallized from CH₃CN) was taken in a quartz boat and placed inside a quartz tube, which was put in a horizontal tubular furnace. The complex was heated under flow of nitrogen at 670 °C and kept at that temperature for 1 h. After that the furnace was turned off and the product was cooled to room temperature under the steady stream of nitrogen.

2.3. Physical measurements

Powder XRD pattern was obtained on a Philips PW 1140 parallel beam X-ray diffractometer with Bragg-Bretano focusing geometry and monochromatic CuK α radiation ($\lambda=1.540598$ Å). TEM measurement was made on a JEOL JEM-2100 microscope using an accelerating voltage of 200 kV. UV-Vis absorption spectra were recorded on a JASCO V-530 UV-Vis spectrophotometer. Photo-catalytic activity was studied spectrophotometrically using Agilent-8453 diode-array spectrophotometer.

2.4. Photo-catalytic activity measurements

The as-prepared γ -Fe₂O₃ NPs was tested as photo-catalysts by the degradation of rose bengal (RB) and methylene blue (MB) dyes in aqueous solution under neutral pH. The experiments were carried out in a round bottom flask kept in a thermostated bath at 22 °C and a visible-light source was used for the degradation process. The solution of RB and MB were prepared by dissolving it in Milli-Q Millipore water to obtain solutions of 6×10^{-5} M (RB) and 2.25×10^{-6} M (MB). The catalytic experiments were carried out with 40 mL aqueous solution using 25 mg of the catalyst (γ -Fe₂O₃). Before irradiation, the suspensions were magnetically stirred in the dark for 30 min to reach the adsorption-desorption equilibrium of RB/MB with the catalyst. After a given interval of illumination, 3 mL of the aliquot was withdrawn from the solution mixture and NPs were separated using magnetic field. The clear solutions of the dyes were measured on a UV-Vis spectrophotometer at 540 nm for RB and 650 nm for MB, respectively. Commercial photo catalyst TiO₂ (Degussa-P25) was also used as the reference to compare the photo-catalytic activity under the same experimental conditions.

3. Results and discussion

3.1. Powder X-Ray diffraction (XRD) analysis

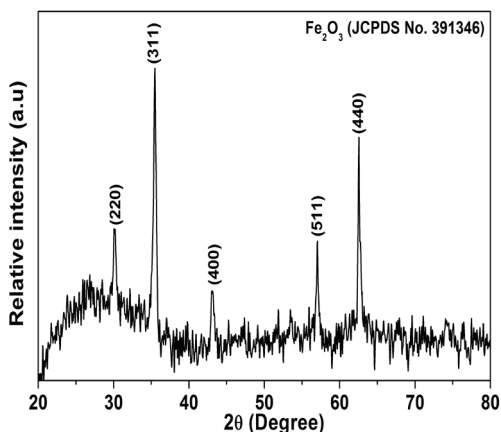


Fig. 1 Powder XRD patterns of γ - Fe_2O_3 NPs.

The crystallinity and phase purities of γ - Fe_2O_3 NPs were first examined by the X-ray diffraction (XRD) technique. The diffraction pattern of the crystalline product (Fig. 1) matches quite well with the standard diffraction data for the pure maghemite (Fe_2O_3) (JCPDS ID. 391346). In Fig. 1, the peaks at 2θ values of 30.2, 35.49, 43.20, 57.18 and 62.78 can be indexed to the (220), (311), (400), (511) and (440) planes of Fe_2O_3 , respectively. The relative broad feature of the peaks (FWHM) indicates the presence of smaller crystallites. The average grain size of the NPs, as calculated by the Debye-Scherrer equation ($D = 0.9\lambda/(\beta \cos \theta)$), where D is the crystallite size (diameter), λ the wave length of X-ray (1.540598 Å), β the value of FWHM of the most intense peak (after correcting the instrumental broadening) and θ the Bragg's angle, was found to be around 24 nm.

3.2. Transmission electron microscopy

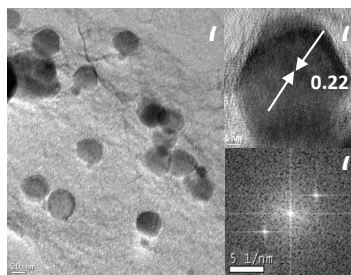


Fig. 2 TEM image of γ - Fe_2O_3 NPs. Inset: corresponding Live FFT image.

The size and morphology of the product was analyzed by transmission electron microscopy (TEM). Typical TEM image (Fig.2a) illustrates that the sample is composed of well-dispersed hexagonal γ -Fe₂O₃ NPs with an average particle size of about 35 nm. From the HRTEM image (Fig. 2b), it is obvious that the surface of an individual γ -Fe₂O₃ NPs is single crystalline with a lattice fringe spacing of 0.22 nm corresponding to (311) plane. In addition, the corresponding Fast Fourier Transform (Live FFT) image (Fig. 2c) also supports the single-crystalline nature of the γ -Fe₂O₃ NPs.

3.3. Optical properties

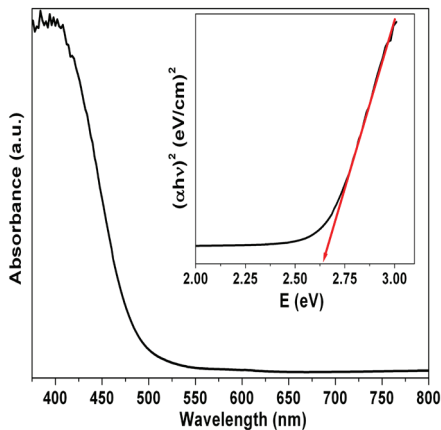


Fig.3 UV-Vis absorption spectrum of γ -Fe₂O₃ NPs. Inset: corresponding Tauc's plot.

The room temperature absorption spectrum of γ -Fe₂O₃ NPs was recorded as shown in Fig. 3 by dispersing the sample in water. The NPs shows sharp band edge absorption at around 480 nm. From this band edge absorption, the band gap energy of γ -Fe₂O₃ NPs was calculated using the Tauc's relation $[(\alpha h\nu)^{1/n} = A(h\nu - E_g)]$ (Fig. 3 inset), where, $h\nu$ is the incident photon energy, 'A' is a constant and 'n' is the exponent the value of which is determined by the type of electronic transition causing the absorption and can take the values 1/2 or 2 depending upon whether the transition is direct or indirect, respectively [35]. We can evaluate the value of E_g as 2.64 eV, from the intercept of the straight line plot of $(\alpha h\nu)^2$ vs. $h\nu$ at $\alpha = 0$, which is blue shifted relative to the characteristic band gap energy of the bulk Fe₂O₃ ($E_g = 2.00$ – 2.2 eV) [36]. The higher band gap energy compared to the bulk material is due to the decreasing particle size.

3.4. Photo-catalytic activity

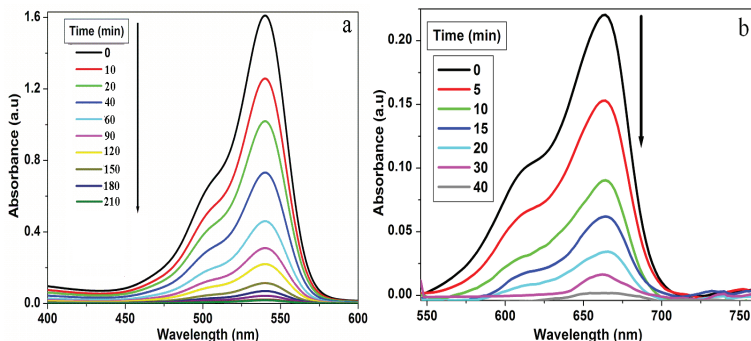


Fig.4 UV-Vis spectral changes of (a) RB and (b) MB in aqueous $\gamma\text{-Fe}_2\text{O}_3$ dispersion as a function of irradiation time. Insets show the photography of corresponding colour change during degradation process.

To demonstrate the potential application of the prepared $\gamma\text{-Fe}_2\text{O}_3$ NPs in photo-catalysis, we have studied its photo-catalytic activity relative to that of commercial TiO_2 through the degradation of RB and MB, at ambient temperature under the visible-light illumination. The characteristic absorptions of RB and MB in the wavelength range 400–600 nm and 550–750 nm, respectively, were chosen as the monitored parameter for photocatalytic degradation process. In presence of the catalyst, the peak intensities of RB and MB decreased rapidly with the passage of time (Fig. 4a and b) and consequently solutions became colourless (Fig. 4a and b inset).

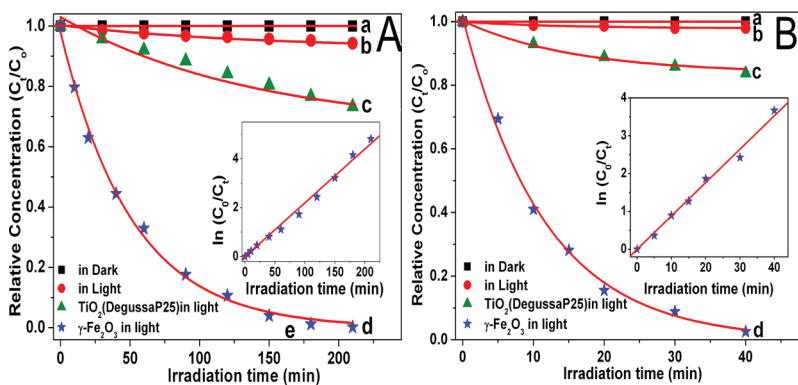


Fig.5 Reaction profile of photocatalytic degradation of (A) rose bengal and (B) methylene blue with pseudo-first order kinetics fitting: (a) without catalyst in dark, (b) without catalyst in light, (c) TiO_2 (Degussa P25) in light, (d) $\gamma\text{-Fe}_2\text{O}_3$ in light. Inset: the corresponding kinetic plots.

The time dependent concentration changes of the dyes in presence of the catalyst γ -Fe₂O₃ NPs, TiO₂ and in absence of catalyst are compared in Fig. 5A (for RB) and 5B (for MB). In presence of TiO₂, 27% RB and 17% MB were degraded, whereas 98.9% of both RB and MB were decomposed in presence of γ -Fe₂O₃ NPs for the same irradiation time. The decomposition processes have been modeled as a pseudo-first order reaction with the kinetics expressed by the equation $\ln(C_0/C_t) = k t$, where C_0 represents the initial concentration, C_t denotes the concentration at a given reaction time ' t ', and k is the reaction rate constant. From the linear extrapolations (Fig. 5 insets), the reaction rate constants were calculated and summarized in Table 1. It is worthy to note that the catalytic activity of the γ -Fe₂O₃ NPs is significantly better compared with TiO₂.

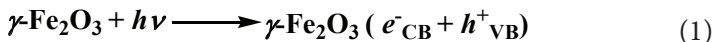
Compare to our previously reported semiconductor nanomaterials such as CuO [37], ZnS [38], α -Fe₂O₃ [6] (Table 1), the present γ -Fe₂O₃ NPs showed comparable or slightly higher photocatalytic efficiency towards degradation of RB under the similar conditions but the γ -Fe₂O₃ NPs shows enhanced photocatalytic efficiency toward degradation of MB compared to our FeS nanoparticles [7, 39].

Table 1. Comparison of the kinetic parameters of γ -Fe₂O₃ NPs with different semiconductor nanomaterials.

Photo-catalyst	Rate constant with RB (min ⁻¹)	Rate constant with MB(min ⁻¹)	Reference
γ -Fe ₂ O ₃	2.15×10 ⁻²	8.80×10 ⁻²	This work
TiO ₂	1.43×10 ⁻³	4.35×10 ⁻³	This work
CuO	7.10×10 ⁻³	–	[37]
ZnS (from HDA)	2.17×10 ⁻²	–	[38]
α -Fe ₂ O ₃	2.65×10 ⁻²	–	[6]
FeS	–	2.71 ×10 ⁻²	[7]
FeS	6.02×10 ⁻²	5.73×10 ⁻²	[39]
FeSe	3.39×10 ⁻²	2.32×10 ⁻²	[39]

3.5. Photocatalytic mechanism

The possible mechanism of the photocatalytic reaction is explained on the basis of Scheme 3. Upon irradiation, the semiconducting γ -Fe₂O₃ NPs utilizes the incident light energy to excite electron from its valance band (VB) to the conduction band (CB), thus leaving behind hole. This hole can abstract electron from water to generate hydroxyl radical (OH•) [40, 41]. These radicals will then oxidize the dyes. The overall reactions are presented in equations (1)–(4).



In addition, the aromatic dyes may be further degraded by O_2^- active species, which was generated on the surface of $\gamma\text{-Fe}_2\text{O}_3$ NPs. The probable mechanism can also be explained through the electronic transition from VB to CB due to absorption of light and followed by capturing by the adsorbed O_2 molecules to form O_2^- active species. The produced O_2^- also react with the photo-generated electrons and H^+ ion to form H_2O_2 which then further react with photo-generated electrons to produce OH^- and the hydroxyl radical $\cdot\text{OH}$. Finally the OH^- reacts with photo-generated holes to form the active species $\cdot\text{OH}$. Both O_2^- and $\text{OH}\cdot$ then oxidize RB and MB dyes [43]. The complete reactions can be written in equations (6)–(10).



To investigate the final product after the photocatalytic degradation process, the LC-MS spectrum was collected from the colorless solution of RB degradation. The mass spectrum did not show any peak corresponding to high molecular weight compounds. A significant peak could only be observed at $m/z = 113.1$, which corresponds to the chlorobenzene group, indicating the total breakage of the RB molecule into very small fragments. Therefore, it can be concluded that a complete decomposition of RB has been achieved using $\gamma\text{-Fe}_2\text{O}_3$ NPs as a photocatalyst under light illumination.

Conclusion

In summary, we have developed a stable, environmental friendly, cheap photocatalyst- $\gamma\text{-Fe}_2\text{O}_3$ NPs, which was prepared in a simpler, cost-

effective, and eco-friendly method, for photo-degradation of rose bengal and methylene blue. The hexagonal γ -Fe₂O₃ NPs with average crystal size of 35 nm and intrinsic band gap energy of 2.64 eV, can easily be activated by visible light in photocatalytic reactions and hence show effective photocatalytic activity for degradation of rose bengal and methylene blue dyes. The possible pathway of the photocatalytic decomposition process has been discussed through the corresponding active species, hydroxyl radical.

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m-Topology on Rings of Functions which are Discontinuous on a Set of Measure Zero

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Abstract

Let (X, τ) be the ring of real-valued functions that are discontinuous on a set of measure zero. Here we define m -topology in usual manner and call it (X, μ) . We prove that (X, μ) is a Hausdorff regular space. Analogously we define u -topology and denoted by (X, ν) . We establish a theorem that a space X is $\tau A\mu$ -pseudocompact if and only if $(X, \mu) = (X, \nu)$.

Keywords

m -topology, u -topology, topological ring, $\tau A\mu$ -pseudocompact.

1. Introduction

Let (X, τ) be a topological space. Consider the quadruplet $(X, \mathcal{A}, \mu, \tau)$, where \mathcal{A} is a σ -algebra containing τ and μ represents a measure on \mathcal{A} and $(X, \mathcal{A}, \mu, \tau)$ is referred to as A -space. For a function f from (X, τ) into the real line not necessarily continuous, the set $D_f = \{x: f \text{ is discontinuous at } x \text{ in the topology } \tau\}$ forms an-subset of (X, τ) . Hence D_f is measurable and $\mu(D_f)$ can be defined. Let (X, τ) be the ring of real-valued functions that are discontinuous on a set of measure zero (discussed extensively in [3], [5], [7]) and $(X, \mu) = \{f \in (X, \tau) \text{ such that } f \text{ is bounded}\}$. Let (X, μ) be collection of positive units of (X, τ) . We set $B(f, u) = \{g \in (X, \tau): |f - g| < u\}$ and $\mathcal{B}(f, u) = \{B(f, u) : u \in (X, \mu)\}$ for every $f \in (X, \tau)$ and $u \in (X, \mu)$ and m -topology on (X, μ) is denoted by (X, μ) . We prove (X, μ) is a topological ring in Theorem 3.2. Also, we prove (X, μ) is a Hausdorff regular space. A $\tau A\mu$ -space X is called $\tau A\mu$ -pseudocompact if $(X, \mu) = (X, \nu)$ and we establish that a

$\tau A\mu$ -space X is $\tau A\mu$ -pseudocompact if and only if $(X, \mu) = (X, \mu)$ (see Theorem 3.4). In Theorem 3.5, we prove that (X, μ) does not contain any almost P-point. Finally, if we consider a measure in which measure of every finite subset is zero, then we can easily check that for an infinite $\tau A\mu$ -space X , a subset F is a compact subset of (X, μ) , then $F = \emptyset$.

2. Preliminaries

Let (X, μ) be the ring of functions $f: X \rightarrow \mathbb{R}$, discontinuities in a set of measure zero set. We set $(X, \mu) = \{f: f \text{ is a unit of } (X, \mu)\}$ and $(X, \mu) = \{f \in (X, \mu): f \text{ is a positive unit of } (X, \mu)\}$.

Define $B(f, u) = \{g \in (X, \mu): |f - g| < u\}$ and $B(f, u) = \{B(f, u): u \in (X, \mu)\}$ for every $f \in (X, \mu)$ and $u \in (X, \mu)$.

For every $f, g \in (X, \mu)$ and $u, v \in (X, \mu)$, the following statements hold-

- i. $f \in B(f, u)$.
- ii. $B(f, u \wedge v) \subseteq B(f, u) \cap B(f, v)$.
- iii. For every $g \in B(f, u)$, there exists an element $v \in (X, \mu)$ such that $B(g, v) \subseteq B(f, u)$. We can choose $v = u - |f - g|$.
- iv. If $U \in \mathcal{B}$, then $f \in U$.
- v. If $U, V \in \mathcal{B}$, then $U \cap V \in \mathcal{B}$.
- vi. If $U \in \mathcal{B}$, then there is a $V \in \mathcal{B}$ such that $U \subseteq V$ for each $g \in V$.
- vii. But the statement (8), given in [8] (pg. 86), if $U \in \mathcal{B}$ and $U \subseteq V \subseteq M(X, A)$, then $V \in \mathcal{B}$ was not correct. Take $M(\mathbb{R}, A)$, ring of Lebesgue measurable functions on \mathbb{R} . Let $f(x) = x$ for all $x \in \mathbb{R}$, $u = 1$ and $U = B(f, u)$. set $V = \cup U_g$, where $g(x) = x+2$ for all $x \in \mathbb{R}$. Then there does not exist any positive unit $\in M(X, A)$ such that $B(f,) = V$. i.e., V does not belong to \mathcal{B} .

If $\mathcal{B} = \{U \subseteq (X, \mu): \text{for all } f \in U \text{ there exists } B \in \mathcal{B} \text{ such that } B \subseteq U\}$. Then \mathcal{B} is a topology on (X, μ) and the neighbourhood system at each $f \in (X, \mu)$ is \mathcal{B}_f . This topology is called m -topology on (X, μ) and the notation (X, μ) will be used when referring to (X, μ) under m -topology. Again if $\mathcal{B} = \{U \subseteq (X, \mu): \text{for all } f \in U \text{ there exists } \epsilon > 0 (\in \mathbb{R}) \text{ and } B(f, \epsilon) \subseteq U\}$, then \mathcal{B} is a topology on (X, μ) which is called uniform topology (or the u -topology) on (X, μ) . Throughout the article, the notation (X, μ) will be used when referring to (X, μ) under u -topology. (X, μ) and (X, μ) are defined similar way.

3. Topological properties of (X, μ)

In this section, we mainly discuss about some topological properties of m-topology on rings of functions which are discontinuous on a set of measure zero.

Proposition 3.1. Let X be a $\tau A\mu$ -space. Then the following results hold.

- i. (X, μ) is a completely metrizable space.
- ii. (X, μ) is a completely metrizable space.
- iii. (X, μ) is a Banach space.

Proof. We can easily proof the above results using the fact that every metric space topologically equivalent to a bounded metric space and Theorem 2.4,[3].

Theorem 3.2. Let X be a $\tau A\mu$ -space. Then the ring (X, μ) with the m-topology is a topological ring.

Proof. Let $f, g \in (X, \mu)$ and $U \in \mathcal{U}$ such that $f + g \in U$. Then there exists $u \in (X, \mu)$ such that $B(f+g, u) \in U$. For every $(t, k) \in B(f, v) \times B(g, v)$, $|f + g - (t + k)| \leq |f - t| + |g - k| < u$. Therefore, addition operation is continuous.

Let $f, g \in (X, \mu)$ and $U \in \mathcal{U}$ such that $fg \in U$. Then there exists $u \in (X, \mu)$ such that $B(fg, u) \in U$. We set $v = u$, then $v < u$ and $v \in (X, \mu)$. Now for every $(t, k) \in B(f, v) \times B(g, v)$, $|fg - tk| \leq |f - t||g| + |f - t||g - k| + |f||g - k| < (v + |g| + |f|)v < (1 + |g| + |f|)v < u$. Thus, multiplication operation is continuous. Hence the proof is completed.

Theorem 3.3. (X, μ) is a Hausdorff regular space.

Proof. Let $f, g \in (X, \mu)$ with fg given. Then there exists an element $p \in X$ such that $f(p)g(p) \neq 0$. Consider $u = |f(p)g(p)|$. If $h \in B(f, u) \cap B(g, u)$, then $|f(p) - g(p)| \leq |f(p) - h(p)| + |h(p) - g(p)| < 2u = |f(p) - g(p)|$, which is contradiction. Therefore (X, μ) is a Hausdorff space.

Let $f \in (X, \mu)$ and a neighbourhood U of f in (X, μ) . Then there exists an element $u \in (X, \mu)$ such that $B(f, u) \subseteq U$. If $g \in B(f, u)$, then there exists an element h in $B(g, u) \cap B(f, u)$, which implies that $|f - g| \leq |f - h| + |h - g| < u + u < 2u$. Therefore, $f \in B(f, u) \subseteq B(f, u) \subseteq U$. This completes the proof.

A $\tau A\mu$ -space X is called $\tau A\mu$ -pseudocompact if $(X, \mu) = (X, \mu)$ and we have the following theorem.

Theorem 3.4. A $\tau A\mu$ -space X is $\tau A\mu$ -pseudocompact if and only if $(X, \mu) = (X, \mu)$.

Proof. Clearly, \subseteq . Let $U \in \mathcal{U}$ and $f \in U$. Then there exists an element $u \in (X, \mu)$ such that $B(f, u) \subseteq U$. Since X is $\tau A\mu$ -pseudocompact then we conclude that $\epsilon = \inf\{ \mu(B(f, u)) \}$ is a non-zero real number, which implies that $B(f, \epsilon) \subseteq B(f, u) \subseteq U$. This implies $U \in \mathcal{U}$. Therefore \subseteq . Conversely, let X is not $\tau A\mu$ -pseudocompact and f is an unbounded function in (X, μ) . Then there exists an element $\epsilon > 0 (\in \mathbb{R})$ such that $B(0, \epsilon) \subseteq B(0, \cdot)$, which implies $\cdot \in \mathcal{U}$. Then $|f| \wedge 1 < 2\epsilon$ i.e., f is bounded, a contradiction. Thus $\not\subseteq$. This completes the proof.

A point x of a topological space X is called an almost P-point of X , if $x \in Z(f)$ for some $f \in C(X)$ (ring of continuous functions) implies $x \in Z(f)$. Equivalently, x is an almost P-point if and only if every \mathcal{U} -set containing x has non-empty interior.

Theorem 3.5. Let X be a $\tau A\mu$ -space. Then (X, μ) does not contain any almost P-point.

Proof. Let $f \in C(X, \mu)$, then $\{f\}$ is a \mathcal{U} -set in (X, μ) . Since $f \in B(f, u)$ for every $u \in (X, \mu)$, we conclude that $\{f\}$ is not open, which implies $\{f\} = \emptyset$. Therefore, f is not almost P-point.

Theorem 3.6. Let X be a $\tau A\mu$ -space. Then the following statements hold.

- i. (X, μ) is never a pseudocompact space.
- ii. (X, μ) is never a countably compact space.

Proof. (i) Let $a \in X$ be fixed, we define $f : (X, \mu) \rightarrow \mathbb{R}$ by $f(x) = f(a)$. Since $(g) = g(a) \in (f(a) - \epsilon, f(a) + \epsilon)$ for every $\epsilon \in (0, \infty)$ and every $g \in B(f, \epsilon)$, we conclude that f is a continuous function. Now using $(\underline{n}) = n$ for every $n \in \mathbb{N}$, we obtain that f is a unbounded continuous function. Therefore (X, μ) is not a pseudocompact space.

(ii) Since every countably compact space is pseudocompact, (X, μ) is not countably compact space.

If we consider a measure in which measure of all finite subsets are zero (for example we can take Lebesgue measure), then the following theorem is how we characterize compact subsets of X in this restricted measurable space.

Theorem 3.7. Let X be a $\tau A\mu$ -space in which measure of finite subsets are zero and let X be infinite set. If F is a compact subset of (X, μ) , then $F = \emptyset$.

Proof. Let $f \in F$. Then there exists a positive unit $u \in (X, \mu)$ such that $B(f, u) \subseteq F$. By hypothesis, there exist $\epsilon \in F$ such that $F \subseteq B(\epsilon, \cdot)$. Let $A = \{ \dots,$

, } $\subseteq X$. We set $\epsilon = \epsilon(X, \mu)$ and $h_i = f_i$ for every $1 \leq i \leq n+1$, then $\epsilon \in B(f, u) \subseteq F$. Now by 'pigeon-hole' principle, there exist $1 \leq i_j \leq n+1$ and $1 \leq s \leq n$ such that $\epsilon \in B(f, \epsilon)$, which implies that $|\epsilon| = |\epsilon| \leq |\epsilon| + |\epsilon| < \epsilon$. Therefore $|\epsilon| = |\epsilon - \epsilon| < \epsilon$, a contradiction. This completes the proof.

4. References

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Advantages and Disadvantages of New Education Policy in India

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Abstract

Economic growth of a country is directly determined by education system of the country. Education is a pillar for growth of a country. The New Education Policy (NEP) in India, introduced in 2020, aims to overhaul the country's education system to make it more holistic, flexible, multidisciplinary, and suited to the needs of the 21st century. It emphasizes foundational literacy and numeracy, critical thinking, experiential learning, and skill development. The NEP also proposes several structural changes, including the restructuring of school curricula, the introduction of a new pedagogical and assessment framework, the establishment of multidisciplinary higher education institutions, and the promotion of research and innovation. Additionally, it advocates for the integration of technology in education, greater inclusion and diversity, and increased autonomy and accountability for educational institutions.

Keywords

NEP 2020, Educationists, Advantage, Disadvantage.

Review Literature: The National Education Policy 2020 (NEP 2020) is formulated to revamp education system and lay down road map for new India. (Power, et al, 2022). Significantly, the policy lays emphasis on four key areas of reforms viz. curricular changes to build strong foundational skills, improving quality of learning across all levels of education (KPMG, 2020). It is very important for having a well outlined and innovative education policy at all levels of schools and colleges which gives betterment in social and economic context. (Banerjee, et al, 2021).

Objectives: The objectives of the research article are to find out the advantages and disadvantages of New Education Policy in India that

is emphasizes on foundational literacy and numeracy, critical thinking, experiential learning, and skill development.

Methodology: The study followed the Historical Context of this section explored the historical evolution of education policies in India leading up to the NEP 2020, highlighting key milestones, reforms, and challenges faced by the education system. The study followed various aspects of New Education Policy, like- the Policy Analysis, Implementation Challenges etc. Finally it followed the result of the NEP system would analyze the NEP document itself from secondary data, examining its objectives, principles, and proposed reforms across different levels of education, including early childhood, school, higher education, and vocational training.

Discussion: The New Education Policy (NEP) of India, introduced in 2020, marks a significant milestone in the country's educational history. However, the journey towards this policy has been shaped by various historical developments and educational reforms over the decades. Here's a brief overview:

- a. **Colonial Legacy:** India's education system was largely shaped by the colonial rulers during British rule. The British established a system that served the interests of the colonial administration, focusing on producing a class of clerks and civil servants to assist in the governance of the country. This system emphasized English education and neglected indigenous languages and cultural heritage.
- b. **Post-Independence Reforms:** After gaining independence in 1947, India embarked on a series of educational reforms to address the challenges inherited from the colonial era. The government aimed to expand access to education, especially in rural areas, and promote social justice and equality through education. Key initiatives included the establishment of the University Grants Commission (UGC) in 1956 and the introduction of the three-language formula in schools.
- c. **National Policy on Education, 1968:** The first National Policy on Education (NPE) was formulated in 1968, outlining the principles and objectives of India's education system. It emphasized the importance of universal elementary education, vocational training, and the promotion of science and technology. The policy also advocated for the use of regional languages as the medium of instruction in schools.

- d. **Subsequent Reforms:** Over the years, several committees and commissions were appointed to review and recommend reforms to the education system. Notable among these were the Kothari Commission (1964-66), the National Policy on Education, 1986, and its Programme of Action (1992), and the Yash Pal Committee (2009).
- e. **Challenges and Criticisms:** Despite these efforts, India's education system continued to face challenges such as low literacy rates, regional disparities, quality issues, and lack of employability skills among graduates. Critics argued that the existing system focused too much on rote memorization, lacked innovation, and did not adequately prepare students for the demands of the modern world.
- f. **Introduction of the New Education Policy, 2020:** In July 2020, the Indian government unveiled the New Education Policy (NEP), after nearly three decades since the last comprehensive policy update. The NEP aims to address the shortcomings of the previous system by promoting holistic and multidisciplinary education, flexibility, and skill development. It emphasizes the use of technology in education, vocational training, and the integration of Indian knowledge systems into the curriculum.

Features of New Education Policy in India: This policy aimed to overhaul the country's education system, focusing on holistic development, flexibility, and skill enhancement. Here are some key highlights of the NEP:

Early Childhood Care and Education (ECCE): The NEP emphasizes the importance of ECCE for children aged 3-6 years. It aims to ensure universal access to quality early childhood education.

Foundational Literacy and Numeracy: The policy prioritizes foundational literacy and numeracy for all students by Grade 3, ensuring that every child achieves basic proficiency in reading, writing, and mathematics.

Curriculum and Pedagogy Reforms: NEP promotes a multidisciplinary approach in education, reducing the emphasis on rote learning and encouraging critical thinking, creativity, and conceptual understanding. It also advocates for the integration of vocational education from the secondary level onwards.

Assessment Reforms: The policy suggests a shift from summative to formative assessments, focusing on regular assessment of learning outcomes. It aims to reduce the emphasis on board exams

and encourage competency-based assessments. **Teacher Training and Professional Development:** NEP emphasizes the continuous professional development of teachers, promoting their training in pedagogy, subject knowledge, and technology integration. **Higher Education Reforms:** The policy proposes structural changes in higher education, including the establishment of multidisciplinary institutions, autonomy to colleges, and a revised accreditation framework. It also encourages flexibility in curriculum design and multiple entry and exit points in degree programs. **Promotion of Regional Languages:** NEP promotes the use of regional languages as the medium of instruction in schools, alongside the three-language

The New Education Policy (NEP) of India, unveiled in 2020, marks a significant shift in the country's approach to education. Here's a detailed description of its key features and components:

Foundational Learning: NEP emphasizes the importance of foundational literacy and numeracy, aiming to ensure that every child attains basic reading, writing, and mathematical skills by Grade 3. **Curriculum Reforms:** The policy proposes a comprehensive overhaul of the curriculum at all levels, from school to higher education. It advocates for a more holistic, flexible, and multidisciplinary approach to learning, reducing curriculum load and promoting experiential and inquiry-based learning methods. **Multilingualism:** NEP promotes multilingualism and proposes a three-language formula, encouraging the learning of regional languages alongside the mother tongue and Hindi or English. This aims to preserve linguistic diversity while facilitating national integration and promoting proficiency in multiple languages. **Assessment Reforms:** The policy advocates for a shift from rote memorization to competency-based assessment methods, focusing on assessing students' understanding, critical thinking, and problem-solving abilities rather than mere memorization of facts. **Teacher Training and Professional Development:** NEP emphasizes the continuous professional development of teachers, including rigorous pre-service training, ongoing support, and opportunities for career advancement. It also aims to attract high-quality talent into the teaching profession and improve teacher-student ratios. **Technology Integration:** The policy recognizes the transformative potential of technology in education and proposes the integration of digital tools and resources to enhance teaching and learning experiences, promote digital literacy, and bridge

the digital divide. Vocational Education and Skill Development: NEP places a strong emphasis on vocational education and skill development, aiming to equip students with relevant skills and competencies for employment and entrepreneurship opportunities. It proposes the integration of vocational training into mainstream education and collaboration with industry partners to ensure alignment with market demands. Higher Education Reforms: The policy envisions a reimagined higher education system that is more flexible, interdisciplinary, and research-oriented. It proposes the establishment of multidisciplinary universities and colleges, the promotion of research and innovation, and greater autonomy for institutions to foster academic excellence and global competitiveness. Inclusive and Equitable Education: NEP prioritizes inclusivity and equity, aiming to address disparities in access to education based on socio-economic status, gender, geography, and disability. It proposes measures to improve access for marginalized and underrepresented groups, including special provisions for children with disabilities and those from disadvantaged backgrounds. Governance and Regulatory Reforms: The policy advocates for governance and regulatory reforms to streamline the administration of education institutions, enhance transparency and accountability, and promote greater autonomy and decentralization at the institutional level.

Objectives of the New Education Policy: The New Education Policy (NEP) in India, (2020), outlines several key objectives aimed at transforming the country's education system. Here are some of its primary objectives of NEP:

1. **Universalization of Education:** The NEP seeks to ensure universal access to quality education from early childhood to higher education, with a focus on equity and inclusion, irrespective of socio-economic background, gender, or location.
2. **Foundational Literacy and Numeracy:** It aims to ensure that every child achieves foundational literacy and numeracy by the end of Grade 3, laying a strong foundation for further learning and development.
3. **Holistic Development:** The policy emphasizes holistic development, aiming to nurture the cognitive, socio-emotional, and physical development of students, fostering critical thinking, creativity, and ethical values.

4. **Curriculum Reforms:** NEP proposes a comprehensive restructuring of the curriculum at all levels, making it more flexible, multidisciplinary, and suited to the needs of the 21st century, with an emphasis on reducing curriculum load and promoting experiential learning.
5. **Teacher Training and Professional Development:** It prioritizes the continuous professional development and empowerment of teachers, ensuring they are equipped with the necessary skills, knowledge, and support to facilitate effective learning experiences for students.
6. **Promotion of Indigenous Knowledge:** NEP advocates for the promotion and integration of indigenous knowledge systems, languages, and cultures into the education curriculum, fostering a deeper appreciation for India's rich cultural heritage and diversity.
7. **Technology Integration:** The policy recognizes the transformative potential of technology in education and aims to leverage it effectively to enhance learning outcomes, promote digital literacy, and bridge the digital divide.
8. **Promotion of Research and Innovation:** NEP emphasizes the importance of research, innovation, and entrepreneurship in driving socio-economic development and global competitiveness, encouraging greater investment in research infrastructure and collaboration between academia, industry, and government.
9. **Promotion of Inclusive and Flexible Education:** It seeks to create a more inclusive and flexible education system that accommodates diverse learning needs, abilities, and interests, providing multiple pathways for students to pursue their educational and career goals.
10. **Governance and Regulatory Reforms:** The policy proposes governance and regulatory reforms to streamline the administration of education institutions, enhance transparency and accountability, and promote greater autonomy and decentralization at the institutional level.

Advantages and disadvantages of New Education policy in India.

The study followed the various aspects of NEP to evaluate the advantages and disadvantages of the policy.

Historical Context, Policy Analysis, Implementation Challenges,

Implementation Challenges, Equity and Inclusion, Curricular Reforms, Teacher Empowerment, Teacher Empowerment, Stakeholder Perspectives, Global comparison, Impact Assessment, Future Directions - of this section explore the historical evolution of education policies in India leading up to the NEP 2020, highlighting key milestones, reforms, and challenges faced by the education system.

Advantages

1. **Holistic Development:** The NEP emphasizes holistic development by focusing on both cognitive and socio-emotional skills, ensuring students are well-rounded individuals.
2. **Flexibility and Choice:** It provides flexibility in choosing subjects and courses, allowing students to explore diverse interests and talents.
3. **Multidisciplinary Approach:** By promoting multidisciplinary learning, the NEP aims to bridge the gap between theoretical knowledge and practical application, better preparing students for the complexities of the modern world.
4. **Skill Development:** There is an increased focus on skill development, which is crucial for enhancing employability and fostering entrepreneurship.
5. **Emphasis on Early Childhood Education:** The policy recognizes the importance of early childhood education and aims to provide foundational literacy and numeracy to all children.

Disadvantages:

1. **Implementation Challenges:** Implementing the NEP effectively across a vast and diverse country like India presents significant challenges, including infrastructure limitations, resource constraints, and resistance to change from various stakeholders.
2. **Digital Divide:** The policy's emphasis on technology integration may widen the digital divide, as many students in rural and underserved areas lack access to adequate technology and internet connectivity.
3. **Standardization vs. Diversity:** Critics argue that the NEP's push for standardization and common entrance exams may undermine the diversity of India's education system, neglecting regional, linguistic,

and cultural differences.

4. **Language Issue:** The three-language formula proposed in the NEP has sparked controversy, with concerns raised about its potential to marginalize regional languages and cultures.
5. **Privatization Concerns:** Some critics fear that the NEP's provisions for greater autonomy and privatization of education institutions could exacerbate inequalities by favoring elite institutions and neglecting public education.

Conclusion

The feedback on the NEP may vary. Some stakeholders might appreciate its ambitious goals and comprehensive approach to reforming the education system, while others might have concerns about its implementation challenges, resource allocation, and potential impact on marginalized communities. According to educationists its merits and demerits will depend on various parameters like- Holistic Approach, Emphasis on Multidisciplinary Learning, Flexibility in Education, Teacher Training and Professional Development, Digital Integration, Regional Language Preservation etc. Overall, while there is optimism about the transformative potential of the NEP, educationists emphasize the importance of continuous dialogue, collaboration, and monitoring to address challenges and maximize its benefits for India's education system.

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Depletion Of Mangrove: A Threat For Biodiversity

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Abstract

The Sundarbans is the largest tidal halophytic mangrove forest in the world. The typical littoral forests of Sundarbans comprises of a host of trees species adapted to the peculiar estuarine condition of high salinity, lack of soil erosion and daily inundation by high tides. The biodiversity of Sundarban includes numerous species of phytoplankton, zooplankton, micro-organisms, benthic invertebrates, mollusks, amphibians and mammals. Sundari and Gewa occur prominently throughout the area with discontinuous distribution of Dhundul and Kankra. The area is known for the eponymous Royal Bengal Tiger (the only mangrove tiger land on the earth) as well as numerous fauna including species of birds, spotted deer, crocodiles and snakes. Sundarbans Mangrove is the home of a number of endangered and globally threatened species. The tidal forms and the mangrove vegetation in Sundarbans are responsible for dynamic eco-system, vigorous nutrient cycling both terrestrial and aquatic. The human population in the Sundarbans, now estimated at more than two million, continues to increase very rapidly. To fulfill the demand of this large population hunting and trapping wildlife, cutting and lopping trees for fuel wood and to make charcoal, and overexploiting the trees for timber by the forestry industry are some of the most severe threats to this ecoregion's biodiversity.

Keywords

Halophytic, Mangrove, phytoplankton, zooplankton, micro-organisms, benthic invertebrates, mollusks, amphibians, mammals, endangered, threatened species, overexploiting, ecoregion, biodiversity.

1. Introduction

Mangroves are one among the most productive ecosystems on the earth. They serve as custodians of their juvenile stock and form most

valuable biomass (Odum, 1971). The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world – lies in the vast delta formed by the confluence of Ganga, Brahmaputra and Meghna river. The Indian part of the forest is estimated to be about 19 percent, while the Bangladeshi part is 81 percent. The Indian part of Sundarbans is estimated to be about 4,110 square kilometers, of which about 1,700 square kilometers is occupied by water bodies in the forms of river, canals and creeks of width varying from a few meters to several kilometers. Rivers in the Sundarbans are meeting places of salt water and freshwater. Thus, it is a region of transition between the freshwater of the rivers originating from the Ganges and the saline water of the Bay of Bengal. Thus, the physiography is dominated by deltaic formations that include innumerable drainage lines associated with surface and subaqueous levees and tidal flats. [9]

The area experiences a subtropical monsoon climate with the annual rainfall of about 1600-1800 mm and several cyclonic storms. The area is also characterized by high temperature (about 43°C in March and 32°C during monsoon) and humidity (>80%) throughout the year.



FIGURE: Map of Sundarbans

The Sundarbans wetlands act as a natural shield that protects the coastal area from storm surges and cyclones in pre and post monsoon periods. The mangrove vegetation itself assists in the formation of new landmass and the intertidal vegetation plays a significant role in swamp morphology. The mangrove ecosystem of Indian subcontinent is well known not only for the aerial extent, but also for the species diversity. The biodiversity of

Sundarbans includes numerous species of phytoplankton, zooplankton, micro-organisms, benthic invertebrates, mollusks, amphibians and mammals. It is the only mangrove tiger land on the earth. It has been declared as a world heritage site by International Union for Conservation of Nature (1987). However, the landscape of the Sundarbans has changed remarkably due to neo-tectonic movement compounded with large scale human intervention, as a result several species have become extinct or are in very much threatened or degraded state.[7] Despite the intense and large-scale exploitation, our scientific understanding of these wetland forests remained poor until the 1970s. During past three decades or so, these wetland forests have received increasingly greater attention.[3]

2. Methodology

The present work is based on secondary data, which are collected from various government and non-government sources. The qualitative analysis has been done by literature survey and quantitative analysis of data by cartographic techniques.

3. Sundarbans Mangroves and its Biodiversity

The Sundarbans is rich in biodiversity and the biotic factors here play a significant role in physical coastal evolution and for wildlife. The Sundarbans Mangroves ecoregion on the coast forms the seaward fringe of the delta and is the world's largest mangrove ecosystem, with 20,400 square kilometers of area covered.

3.1 Floristic diversity:

The dominant mangrove species *Heritiera fomes* is locally known as *sundri* or *sundari*. The Sundarbans flora is characterized by the abundance of *sundari* (*Heritiera fomes*), *gewa* (*Excoecaria agallocha*), *goran* (*Ceriops decandra*) and *keora* (*Sonneratia apetala*) all of which occur prominently throughout the area. The varieties of the forests that exist in Sundarbans include mangrove scrub, littoral forest, saltwater mixed forest, brackish water mixed forest and swamp forest. Besides the forest, there are extensive areas of brackish water and freshwater marshes, intertidal mudflats, sand flats, sand dunes with typical dune vegetation, open grassland on sandy soils and raised areas supporting a variety of terrestrial shrubs and trees.[9] The Sundarbans includes 26 true mangrove species, 29 mangrove associates, and 29 back mangrove species of 40 families and 60 genera. [4]

3.2 Faunal diversity

In terms of faunal endowment Sundarban is famous for Royal Bengal Tigers. It is the only mangrove forest in the world that hosts tigers. It is also the single forest tract where the largest number of tigers is found. Sundarbans provides a unique ecosystem and a rich wildlife habitat. Most importantly, mangroves are a transition from the marine to freshwater and terrestrial systems, and provide critical habitat for numerous species of small fish, crabs, shrimps and other crustaceans that adapt to feed and shelter, and reproduce among the tangled mass of roots, known as pneumatophores, which grow upward from the anaerobic mud to get the supply of oxygen. Fishing cats, macaques, wild boars, common grey mongooses, foxes, jungle cats, flying foxes, pangolins, and spotted deer are also found in abundance in the Sundarbans. The Sundarbans is an important wintering area for migrant water birds and is an area suitable for watching and studying avifauna. [9] It is also home to a good number of globally endangered animals like estuarine crocodile, fishing cat, Gangetic dolphin, olive ridley and green sea turtles etc. All these make Sundarbans a biodiversity hotspot and its conservation is a global concern. [4]

3.3 How The Sundarban Mangroves Protect Its Species:

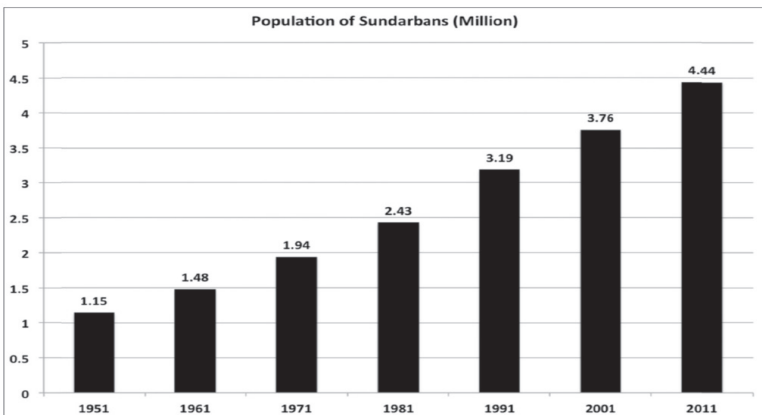
- The mangrove's massive root system is efficient at dissipating wave energy. So, the Mangroves protect coastal areas from erosion, storm surge (especially during hurricanes) and tsunamis and as protector of shorelines.
- Mangroves have an extraordinary ability to capture carbon and if the carbon released in the atmosphere it contributes to global warming.
- Purify the water by absorbing impurities and harmful heavy metals and help us to breathe a clean air by absorbing pollutants in the air.
- Sundarban mangroves act as a buffer Zone between the land and sea.
- Sundarban mangrove forests comprising of more than 60% of total Indian mangrove form the largest nursery for fish and shell fishes and are responsible for the coastal fishery of the whole of eastern India.
- Mangrove forests are dynamic areas, rich in food and biodiversity which providing a habitat for wide varieties of animals and plant

species. Live and decaying mangroves leaves and root provide nutrients that nourish plankton,algae,fish, shellfish. The dense root system forms a home for fish, crabs, shrimps and molluscs.The young fish stay in the forest; where there is plenty of food and they can shelter from predator, until they are old enough to move theirreef [1]. So, the mangroves save the marine diversity, which is fast diminishing.

4. Depletion of Mangroves and Its Effect on Biodiversity:

4.1 Causes of Depletion of Mangroves:

- Rapidly growing population of Sundarban wetlands is one of the main causes of depletion of mangroves. Agriculture, commercial and residential developments are responsible for deforestation and over exploitation of mangrove forests of Sundarban. Plants of mangroves are the source of timber, charcoal,fodder, barks of tannin extraction, which caused depletion of this forest. To fulfill the demand of population of this area the conversion of land from mangrove forests and wetlands to paddy cultivation land, human settlement land, fish ponds; the forests resources are reducing drastically at very alarming rate.[2]



Source: Census of India

- Global warming and sea level rise is another greatest threat to the future of Sundarban mangrove forests. A World Bank report has expressed alarm over rising sea level in the Sundarbans, the world's largest mangrove forest. A 2013 study by the Zoological

Society of London found the Sundarbans coastline retreating at about 200 meters (650 feet) a year. The Geological Survey of India says at least 210sq km (81 square miles) of coastline on the Indian side has been lost in the last few decades [8]. Past century saw an increase in average global temperature by 1°C. At the present rate the temperature is slated to increase by another 3.50C in next fifty years. The melting of polar ice cap is direct and certain fallout and much of the coastal low-lying areas in the world are threatened by possible submersion. Along the Indian coastline, the sea level is estimated to be rising at the rate of 2.5 mm per year. Research from Jadavpur University's Research from Jadavpur University's Centre for Oceanographic Studies has estimated that along the eastern coast of India, this rise is even faster at a rate of 3.14 mm per year. It is estimated that by 2020, around 15% of Sundarban area will be around 15% of Sundarban area will be submerged and an estimated 70,000 people will be 'environmental refugees.[4]

4.2 Effects on Biodiversity/Threat for Biodiversity:

The loss of biodiversity of Sundarban Mangroves has taken place from the day, when the human settlement began. Due to habitat degradation and ecological changes, some principal varieties of wild animals of Sundarbanlike Tigers, Leopards, Rhinoceros, Wild Buffaloes, Wild Hogs, Wild Cats, Spotted Deer, Hog Deer, Barking Deer, and Monkeys etc. became extinct during the last hundred years.

Among all the above said species Royal Bengal Tiger is the iconic species of Sundarban Mangroves. The major threat to this species is poaching for its body parts for "medicines". It is also suffering heavily from habitat loss which is leading to a decline in prey for the animal. As per December 2001 census, the number of tigers in Indian Sundarban is 271[4] and According to the 2015 tiger census, the Sundarban have about 170 tigers (106 in Bangladesh and 64 in India) [9]. The tiger census data shows that decreasing rate of Tigers of Sundarban mangrove is at alarming rate.

Fishing cat is another endangered species of Sundarban Mangrove. Fishing cat is found in wetland habitat such as swamps, marshland and mangroves. The species depend for their prey primarily on fish but they are also known to eat birds, insects and rodents as well. As the species depends on this type of habitat, the main threat to this is

wetland destruction, degradation, and deforestation of mangroves for aquaculture and agriculture.

Among the endangered species of Sundarban Mangrove tiger prawn is one of them. The major threat this species is the collection of its seeds. At the time of the collection of tiger prawn people are using nylon nets, which are dragged along the river banks. In the process, apart from destroying mangrove seedlings and eliminating the possibility of a regeneration of mangroves along the river banks, at least 74 species of fish are also destroyed. Estimates by the Marine Biological Research Institute, 24 Parganas (South), revealed that in the process of collecting 519 prawn seeds, on an average 5,103.25 gm of other seed varieties that sustain different categories of fish are destroyed. As a result, the food chain of this ecosystem is breaking down[4].

Among the floristic species, Sundari (*Heritiera fomes*) is the most important, because the name Sundarban may have been derived from its name. Now it is an endangered species of mangrove forest of Sundarban. This species is quickly disappearing in many parts of its range due to coastal development (urban, agricultural, and industrial), disease, typhoons, aquaculture and selective cutting of charcoal.

So, the threats to the mangrove ecosystem are arising partly due to climatic change, sea level rise and partly due to anthropogenic stress on environment.

Conclusion & Recommendation:

Ecologically the Sundarban Mangrove Forest is very significant. This forest protects its surrounding from both natural hazards and environmental pollution. It is a home of endangered species. But the balance of ecosystem of Sundarban Mangrove is affected due to depletion of its forests and loss of species. So, for better future, the Mangrove forests must be protected.

- Poaching of wild animals and unauthorized timber collection should be punishable.
- Collection of tiger prawn seeds along the river bank with fine nylon net should be banned.
- To stop deforestation for agriculture (such as paddy cultivation) alternative employment opportunity should be introduced.

- Environmental friendly tourism may be considered as an alternative opportunity of employment.
- To improve knowledge about the importance of mangrove forest, proper educational campaign with proper planning should be done. Because awareness of people is the main key to lock the depletion of mangroves.

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**Section
Humanities**

Industrial Study of Pakistan, Afganisthan and Baluchistan: A Review

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Abstract

This paper analyses an industrial development of the three landlocked countries namely Pakistan, Balochistan and Afghanistan, differing in their geographical topographic features.

Keywords

Pakistan; Balochistan; Afghanistan; Industrial development

Introduction

1.1 A Brief History of Pakistan, Afganisthan and Baluchistan

Pakistan is a federal parliamentary republic in South Asia which is situated on crossroads of Central Asia and Western Asia. Pakistan has the largest coal reserves, approximately 184.623 billion tones, found in Sindh. These coal mines play a big role in contributing to Pakistan's economic prosperity.

Afghanistan is a landlocked country located within South and Central Asia. It has a population of approximately 32 million, making it the 42nd most populous country in the world. It is bordered by Pakistan in the south and east; Iran in the west; Turkmenistan, Uzbekistan, and Tajikistan in the north; and China in the far northeast.

The Baloch is one of the oldest nations of Iranian plateau. Infact, it is not so easy to locate Baloch history mainly due to the unavailability of documentary evidences. The first comprehensive work on Baloch history was carried out by Dames in 1904 who traced the origin of the Baloch. However, Dasthi (2012) stated that the Baloch had remained a distinctive ethnic group and possessed their own language, own territorial independence (Harrison, 1981).

In early 20th century, Baloch middle class begun to mobilise a political struggle (Dashti, 2012). They established the Anjuman-e Ithad-e-Balochistan (the Association for the Unity of Balochistan), which was a political party and a social organisation. According to Bugti (1996), Baloch (1987) and Nasir (2010) its aims were; 1) ending the colonisation of Balochistan from the British; 2) unifying Balochistan; 3) the abolition of the Sardari system in Balochistan; and 4) establishing an independent united Balochistan (Harrison, 1981). The decade of 1930 was a crucial period for Balochistan, when the British were planning to leave and divide India (Ahmed, 1975).

The legislature was composed of two houses: the Upper House and the Lower House (Talbot, 1998). Thus, Balochistan became a province of the federation of Pakistan. It is the southwest part of Pakistan and covers an area of 347,190 square kilometres.

Industrial Development in Balochistan: Mineral Resources, Mining, Gems and Stones and Several Other Industries

There are important contrasts between Balochistan and the rest of Pakistan in terms of comparative advantage and potential sectors of economic growth. Balochistan is relatively scarce in its endowments of human capital, agricultural growth and industrial investment.

Balochistan is the largest province of Pakistan, whose strengths lie in its wealth of natural resources, rich mineral and hydrocarbon deposits. But this enormous resource potential remains untapped, and Balochistan lags behind other provinces in economic development. Thirty-nine minerals out of the recorded 50 mines, are now being mined in the province.

The discovery of large copper deposits in the Chagai district, coupled with the coal and iron ore production in the province, can generate significant additional income for the provincial government. The Sui Gas case can be quoted as a classic illustration of economic exploitation of Balochistan. Natural gas was discovered on Sui site in the Dera Bughti District in Balochistan in the early 1950s and supplied to all provinces of Pakistan except Balochistan. Another example of resource of Balochistan is the Sandak Copper and Rek - e - Dik gold-copper projects respectively in Chagi District.

The Balochistan is a land rich of natural resources with all the ores

of iron, coal and chromate mineral mines. The surveyor, Geologist and Mining Engineer's explored about 32 types of minerals in Balochistan. Of which most important minerals found are copper, gold, limestone, uranium and silver. Balochistan possesses great potential of metallic and non-metallic minerals such as are Coal, Chromite, Barytes, Marble, Iron Ore, Quartzite, Limestone and Sulphur.

Sizable deposits of **chromite** minerals are found at Muslimbagh, districts Killa Saifullah, Lasbela, Khuzdar, Kharan and Chaghi districts. The biggest deposit of barytes is located near Khuzdar. Sulphur deposits are available at Koh-e-Sultan in Chaghi District.

Among the Minerals and Mining of Balochistan, silicate minerals including Feldspar and Mica Groups are also abundant in Balochistan. It is also rich in Aegirine Gallery of mineral specimens including albite, epidote, spodumene, heliodor, microcline, imperial topaz, babingtonite, hemimorphite, kunzite, kyanite and vesuvianite. Barrack Gold Corporation, Antofagasta Minerals and Tethyan Copper Company (TCC) are lands of Gold mines.

Coal has also been a traditionally important mineral resource of Balochistan. The rate of royalty on coal and Natural gas has also been multiplied three folds from 20 to 60 with effect from June 2006. In addition to natural gas and coal, Balochistan is also rich in precious metals and uranium. Balochistan has large copper reserve. The largest copper and gold mining project in Balochistan is the "Saindak Copper Gold Project" in Chagai. A second major copper-gold mining project is in the Rekodiq area also in district Chaghi.

Marble is also another important mineral resource. An estimated 200 million tonnes of marble reserves of good quality are present in Chagai, Zardkan, Siah-Chang, Jhulli, Patkok, Maskichah, Zeh, Chilgazi and Buttak. Onyx reserves are present in Chaghi, Bolan, Lasbela and Khuzdar. The marble and onyx from Balochistan are of superior quality and are used extensively in the local construction industry. In addition, Balochistan has almost 30 million tonnes of iron ore reserves in Chaghi and approximately 200 million tonnes of 150 million years old hematitic sedimentary ironstone bed in Mustang. Quartzite in Lasbela, Limestone in Quetta, Kalat, Harnai, Sor Range, Spintangi areas and Sulphur in Chaghi are also present. Approximately ten million tonnes of Baryte, a mineral used by OGDC and oil drilling companies, is present in

Khuzdar. In 2004-05, almost 40,000 tonnes of baryte was extracted, which generated a royalty of Rs.3.83 million.

Industrial Development in Pakistan: Metallic and Non-Metallic Mineral Resources, Mining and Other Industries

According to the latest data compiled by the Geological Survey of Pakistan, nearly 80 per cent of all minerals produced in Pakistan come from Balochistan. According to the Economic complexity index, Pakistan is the 67th largest export economy in the world and during the fiscal year 2015–16, Pakistan's exports stood at US\$20.81 billion and imports at US\$44.76 billion, resulting in a negative trade balance of US\$23.96 billion.

Northern and western regions of Pakistan are rich in high quality gemstones. Some of the major gemstones available are Peridot, Aquamarine, Topaz of various colours such as violet, pink, golden, and champagne, Ruby, Emerald, rare earth minerals like Bastnaesite and Xenotime, Spinel, Tourmaline and various types of Quartz. The main mining areas of these gems are in Khyber Pakhtunkhwa and federally administered Tribal Areas and Gilgit-Baltistan.

The industry specific data shows that Chemicals recorded 10.01 percent (compared to 6.67 percent last year), Rubber Products 11.68 percent (compared to 1.88 percent last year), Leather products 12.18 percent (compared to 9.11 percent last year), Pharmaceuticals 7.21 percent (compared to 6.84 percent last year), Non Metallic mineral products 10.23 percent (compared to 2.71 percent last year), Food, Beverages and Tobacco 3.66 percent (compared to -0.93 percent last year), Coke & Petroleum Products 2.40 percent (compared to 5.47 percent last year) and Textile 0.62 percent (compared to 0.97 percent last year). The other sectors that showed decline included Wood Product (58.03 percent), Engineering Products (17.64 percent), Paper and Board (2.90 percent) and Iron & Steel products (7.48 percent). In March 2016, however, highest increased was recorded in Non metallic mineral product 20.61 percent, Food, Beverages & Tobacco 17.77 percent, Fertilizers 14.88 percent, Rubber product 12.00 percent, Paper and Board 9.26 percent, Pharmaceuticals 8.54 percent and Chemical 0.75 percent.

The growth of Chemical sector recorded at 10.01 percent during the

period 2016 mainly arrived from Sulphuric acid which recorded growth of 25.75 percent, Paints & Varnishes 21.18 percent and Caustic soda 26.85 percent. In Non-metallic mineral products, cement managed to grow by 10.41 percent during late 2016 and 7.7 percent in early 2016. The steep fall of global coal prices helped cement manufacturers. Coke and Petroleum products growth mainly arrived from the production of LPG 17.27 percent, Lubricating oil 16.85 percent, Motor sprits 2.23 percent and Jet oil 6.96 percent. The Food, Beverages & Tobacco remained under stress mainly due to delay in cane crushing during this season. However, some items including tea blended which grew by 13.83 percent, soft drinks 4.14 percent, cooking oil 8.44 percent, vegetable ghee 6.12 percent, Sugar 2.85 percent and juices, syrups & squashes 2.93 percent showed positive growth during 2016.

For textile sector, the import of raw cotton during 2016 remained high at 345.363 thousand tons compared to 97.354 thousand tons in last year showing a growth of 254.75 percent in quantity. Exports increased from 23.111 million dozens in various types of readymade garments worth US\$ 1544.530 million in 2015 compared to 23.472 million dozens worth \$1609.452 million in 2016, showing an increase of 4.20 percent in terms of value and 1.56 percent in term of quantity. During 2016, synthetic textile fabrics worth \$ 222.163 million were exported as compared to \$ 255.674 million showing a decline of 13.1 percent as compared to last year. The main products manufactured by the woollen industry are carpets and rugs. During 2016, carpets and rugs worth \$ 74.027 million were exported as compared to \$ 92.924 million showing a decrease of 20.34 percent. In Quantity term the export of carpets and rugs also decreased by 26.53 percent.

The main products manufactured by the Jute Industries are Jute Sacks and Hessian cloth, which are used for packing and handling of Wheat, Rice and Food Grains. The production of the Jute goods during 2016 and last year was 45,402 and 71,670 metric tons, respectively showing a decrease of 37 percent.

The fertilizer industry has a significant role in the country. The actual production for all products remained at 7,116 and 8010 (estimated) thousand product tonnes for 2014-15 and 2015-16 which is less by 20.8 and 10.8 percent respectively, than the installed production capacity. Fertilizer sector is the fourth largest consumer of gas. At present, the

installed production capacity (6323 thousand tonnes) of urea fertilizer is more than national demand of about 6000 thousand tonnes per annum but the actual production is below than their required level. The annual production of urea for 2015-16 is estimated as 5417 thousand tonnes, which is less by 14.3 percent of installed capacity of urea fertilizer.

During 2015-16, the cement industry dispatches improved to 26.97 million tonnes in local market posting a healthy growth of 17.31 percent compared with 22.99 million tonnes last year. The growth situation during the current year improved to 9.7 percent compared to 3.9 percent last year.

There are various types of large and small scale industries in Pakistan which are given in Table 1.

Table 1: List of several Large and small scale industries in Pakistan

Name	Industry
Adam Motor Company	Consumer goods
Al-Ghazi Tractors	Consumer goods
Allied Bank Limited	Financials
Amir Adnan	Consumer goods
ARY Digital Network	Consumer services
Askari Aviation	Consumer services
Askari Bank	Financials
Attock Petroleum	Oil & gas
Attock Refinery	Oil & gas
Avari Hotels	Consumer services
Bank Al Habib	Financials
Bank Alfalah	Financials
Bank of Khyber	Financials
Bank of Punjab	Financials
BankIslami Pakistan	Financials
bareeze	Consumer services
Byco Petroleum	Oil & gas
Chenab Group	Consumer goods
ChenOne	Consumer services
City 42	Consumer services
Dalda	Consumer goods
Dawn Group of Newspapers	Consumer services
Dawn News	Consumer services
Dawood Hercules	Basic materials
DESCON Engineering	Industrials
Dewan Farooque Motors	Automobiles Consumer goods
Dunya News	Consumer services

Name	Industry
<u>EFU Life</u>	Insurance Financials
<u>Engro Corporation</u>	Basic Chemical materials
<u>Express News</u>	Media Consumer services
<u>Faisalabad Electric Supply Company</u>	Utilities
<u>Fauji Fertilizer Company Limited</u>	Basic materials
<u>Faysal Bank</u>	Financials
<u>Fecto Sugar Mills</u>	Consumer goods
<u>First Women Bank</u>	Financial Banks
<u>Geo Tez</u>	Consumer services
<u>Geo TV</u>	Consumer services
<u>GlaxoSmithKline Pakistan</u>	Pharmaceuticals Health care
<u>Gourmet Foods</u>	Retail Consumer services
<u>Gujranwala Electric Power Company</u>	Utilities
<u>Habib Metropolitan Bank</u>	Financials
<u>HBL Pakistan</u>	Financials
<u>HSY Studio</u>	Consumer goods
<u>Hub Power Company</u>	Utilities
<u>Hussain Industries</u>	Consumer goods
<u>Hyderabad Electric Supply Company</u>	Utilities
<u>ICI Pakistan</u>	Basic materials
<u>Indus Oil Refinery Ltd</u>	Oil & gas
<u>Indus TV</u>	Consumer services
<u>Ittefaq Group</u>	Basic materials
<u>Ittehad Chemicals</u>	Basic materials
<u>JK Fibre Mills & Spinning Mills</u>	Consumer goods
<u>JS Bank</u>	Financials
<u>JS Group</u>	Financials
<u>KASB Bank</u>	Financials
<u>Khaadi</u>	Consumer goods
<u>Khalifa Coastal Refinery</u>	Oil & gas
<u>Kot Addu Power Company</u>	Utilities
<u>Lahore Electric Supply Company</u>	Utilities
<u>Madina Sugar Mills</u>	Consumer goods
<u>Mari Petroleum Company Limited</u>	Oil & gas
<u>Masood Textile Mills</u>	Consumer goods
<u>Master Motors</u>	Consumer goods
<u>MCB Bank Limited</u>	Financials
<u>Meezan Bank</u>	Financials
<u>Millat Tractors</u>	Consumer goods
<u>Mitchell's Fruit Farms Limited</u>	Consumer goods
<u>Mobilink</u>	Telecommunications
<u>Multan Electric Power Company</u>	Utilities
<u>Murree Brewery</u>	Consumer goods
<u>National Bank of Pakistan</u>	Financials
<u>National Engineering Services Pakistan</u>	Industrials

Name	Industry
<u>National Foods</u>	Food & beverage Consumer goods
<u>National Logistics Cell</u>	Industrial transportation
<u>National Refinery</u>	Oil & gas
<u>NayaTel</u>	Telecommunications
<u>News One</u>	Consumer services
<u>Oil and Gas Development Company</u>	Oil & gas producers
<u>Pak-Arab Refinery Limited</u>	Oil & gas producers
<u>Pakistan International Airlines</u>	Travel & leisure Consumer services
<u>Pakistan Oilfields</u>	Oil & gas producers
<u>Pakistan Petroleum</u>	Oil & gas producers
<u>Pakistan Refinery Limited</u>	Oil & gas producers
<u>Pakistan State Oil</u>	Retail Consumer services
<u>Pakistan Steel Mills</u>	Basic materials resources
<u>Pakistan Telecommunication Company</u>	Fixed line Telecommunications
<u>Pakistan Tobacco Company</u>	Tobacco Consumer goods
<u>Pearl Air</u>	Travel & leisure Consumer services
<u>Pearl-Continental Hotels & Resorts</u>	Consumer services
<u>Peshawar Electric Power Company</u>	Electricity Utilities
<u>PTV Home</u>	Media Consumer services
<u>PTV World</u>	Consumer services
<u>Quetta Electric Supply Company</u>	Electricity Utilities
<u>Ramzan Sugar Mills</u>	Consumer goods
<u>SAMAA TV</u>	Consumer services
<u>Servis Shoes</u>	Retail Consumer services
<u>Servis Tyres</u>	Automobiles Consumer goods
<u>Shaheen Air International</u>	Consumer services
<u>Shakarganj Mills</u>	Consumer goods
<u>Shan Food Industries</u>	Food & beverage Consumer goods
<u>Shezan International</u>	Consumer goods
<u>Siemens Pakistan</u>	Industrial engineering
<u>Sigma Motors</u>	Automobiles Consumer goods
<u>Sindh Bank</u>	Banks Financials
<u>Soneri Bank</u>	Financials
<u>Southern Networks</u>	Mobile Telecommunications
<u>Star Air Aviation</u>	Industrial transportation
<u>Style 360</u>	Consumer services
<u>Such TV</u>	Media Consumer services
<u>Sui Northern Gas Pipelines</u>	Oil & gas Pipelines
<u>Sui Southern Gas Company</u>	Oil & gas
<u>Summit Bank</u>	Financials
<u>TMC Automobiles</u>	Consumer goods
<u>TCS Courier</u>	Industrials
<u>Telenor Pakistan</u>	Mobile Telecommunications
<u>Transworld</u>	Fixed line Telecommunications
<u>Tuwairqi Steel Mills</u>	Basic materials

Name	Industry
<u>TVOne Global</u>	Consumer services
<u>Ufone</u>	Telecommunications
<u>Unilever Pakistan Limited</u>	Personal Consumer goods
<u>Wateen</u>	Fixed line Telecommunications
<u>Worldcall</u>	Telecommunications
<u>Zishan Engineers</u>	Industrial engineering
<u>Zong Pakistan</u>	Mobile Telecommunications

Industrial Development in Afghanistan

Afghanistan is an impoverished least developed country. It is one of the world's poorest country because of decades of war and lack of foreign investment. As in 2014, the nation's GDP stands at about \$60.58 billion with an exchange rate of \$20.31 billion, and the GDP per capita is \$1,900. The country's exports totaled \$2.7 billion in 2012. Its unemployment rate was reported at about 35% in 2008. The Afghan economy has been growing at about 10% per year in the last decade, which is due to the infusion of over \$50 billion in an international aid and remittances from Afghan expats. It is also due to improvements made to the transportation system and agricultural production, which is the backbone of the nation's economy. The list of most old and noted industries situated at Kabul in Afghanistan are given in Table 2.

Table 2: List of some old and noted industries in Afghanistan

Name	Industry	Founded
Lion Pictures	Media Consumer services	2015
East Horizon Airlines	Travel & leisure Consumer services	2013
<i>CodeZone</i>	ICT	2013
Khaama Press	Media Consumer services	2010
AZ Corporation	Construction & materials Industry	-
Azizi Bank	Bank Financials	2006
Safi Airways	Travel & leisure Consumer services	2006
Afghan Telecom	Fixed line Telecommunications	2005
Ariana TV	Media Consumer services	2005
First MicroFinance Bank-Afghanistan	Bank Financials	2004
Afghanistan International Bank	Bank Financials	2004
New Kabul Bank	Bank Financials	2004
<i>Afghan Scene</i>	Media Consumer services	2004
Pajhwok Afghan News	Consumer services	2003

Name	Industry	Founded
Roshan	Mobile Telecommunications	2003
Kam Air	Travel & leisure Consumer services	2003
Watan Group	Conglomerate	2002
Khyber Afghan Airlines	Industrial transportation	2001
Afghan Wireless	Mobile Telecommunications	1998
Pamir Airways	Consumer services	1994
Ariana Afghan Airlines	Travel & leisure Consumer services	1955
Spinzar Cotton Company	Basic material resources	1930

Conclusion

It is found that significant growth and development had occurred in industrial sectors of Pakistan. But, Baluchistan and Afghanistan had shown a comparatively poor growth in this sector inspite of both being rich in mineral resources. Hence, being land-locked neighbouring countries, these three countries could properly and efficiently utilize their own mineral and energy resource base for further better industrial and infrastructural growth of the latter two countries and better improvements of their own economies in the near future.

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Industrial Growth of Jammu and Kashmir in India: A Review

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Abstract

The Jammu and Kashmir state is a border State, with distinct geographical and topographic outlook and climatic zones, unlike rest of the country. Such geographical position, coupled with the varied physiography has offered a wide range of choices to the country in respect of crop diversification and industrial growth, through increased productivity, generating employment and in enhancing exports besides providing household nutritional security. Hence, emergence of Horticulture sector as an important sector for diversification of agriculture, together with the growth of small scale industries has played its due role in the economic development of the State. This paper therefore attempts to analyse the industrial growth of the State of Jammu and Kashmir in terms of the growth of industries such as Handlooms, Handicrafts Sector, khadi, village industries and other small scale industrial sector.

Keywords

Industrial Growth; small scale industries; Jammu and Kashmir; India

Introduction

The Jammu and Kashmir state is a border State and so shares its international border with Pakistan & China. The State comprises of three regions namely Jammu, Kashmir and Ladakh having distinct geographical outlook and agro climatic zones. Each zone having its own characteristics that largely determines the cropping pattern and productivity of crops. The State of Jammu and Kashmir is located in the north Western corner of India, extending, almost in the middle of three climatic regimes of Asia such as Pakistan, Afghanistan and China. The Jammu and Kashmir State lies in the extreme north of the Himalaya and constitutes about 67.5 per cent of the North West Himalayan region.

So, this geographical position, coupled with the varied physiography, provides the State a wide climatic variation with the overall annual maximum and minimum temperature for the State almost exhibiting a uniform trend during last 40 years, unlike rest of the country. Hence, such climatic variations has led to significant shift in cropping pattern of Jammu and Kashmir which has taken place towards horticulture and floriculture based production system during the past few decades, with a vast scope and potential growth of both of them in the valley,

Not only that, crop diversification, with the growth of horticulture as an important and growing sub sector of agriculture, also has provided ample opportunities for the emergence of large number of sustained growth of agro and small scale industries which can generate substantial employment opportunities for the state over the years.

The Industries Sector is now playing its due role in the economic development of the State and in generating employment opportunities for the unemployed youth. Previously it used to be only the Handicrafts, Handlooms and Cottage Industry providing livelihood to a large population at different stages of production, sale and export.

Objectives

The objective of this paper is to focus on the study of the growth of industries such as Handlooms, Handicrafts Sector, khadi, village industries and other small scale industrial sector in the State of Jammu and Kashmir in order to facilitate promotion of new growth of Industrial units.

Industrial Growth of Jammu and Kashmir

The state of Jammu & Kashmir with its varied and diversified geographic, agro-climate and topographic features poses peculiar and unique problems of development. There is a rapid growth of various economic sectors such as horticulture, floriculture, sericulture, industrial sector, small scale industrial sector (such as handicrafts, handlooms, khadi and village industries). The industry, volumes and value of exports, imports and trade, foreign trade exchange earnings, together with the employment generation potential of the state had also improved.

Rise of Industrial Sickness is almost a common phenomenon in the growth of industries, especially, those in small scale sector in the state of Jammu and Kashmir due to the continuous political unrest between India and Pakistan. Although the number of Small Scale Industrial units in the state has gone up, there are cases of sickness of units with some of them having become non-functional and others simply untraceable due to this constant political unrest. From the Census data of Status of Small Scale Industries (SSI Units), it is observed that almost 22709 units in the Census year 2021-22 have decreased to 5825 units as the rest have become Closed/ untraceable Units. Moreover, from Table 1, a glance at Year-wise achievement under Small Scale Industries over the years shows that from 2021-22 to 2022-23, there had been a sharp fall in all the cases i.e. lower number of registered units along with low employment generation and low Investment (Rs. in Crores) during the said period. Thus, Small Scale Industrial Sector had suffered a large set back in the globalisation period.

Year	No. of Units Registered	Employment Generated	Investment (Rs. in Crores)
2021-22	1170	8842	408.78
2022-23	1028	6801	257.11
2023-24	494	3626	173.46

3.1 Growth of Small Scale Industries

3.1.1 Khadi & Village Industries

Jammu and Kashmir Khadi and Village Industries Board, established in the year 1962, has played a vital role in generating employment for rural poor, unemployed youth and down-trodden artisans of the state by providing financial and technical assistance for setting of micro and small industrial production units under various schemes which come under the purview of All India Khadi and Village Industries Commission, Government of India. The main objective of Jammu and Kashmir Khadi and Village Industries Board, is to create employment opportunities in rural areas by promoting various Khadi and Village Industrial activities and to impart training to the rural artisans in various crafts. Table 2 shows an overall increasing trend in production, sale and employment in Khadi industry from 2021-22 to 2023-24.

Table 2: Khadi Industry

Year	Production (Rs in lacs)	Sale (Rs in lacs)	Employment
2021-22	385.72	417.45	1458
2022-23	478.69	549.66	2280
2023-24	752.53	602.53	2404

3.1.2 Handicrafts

Handicraft activities occupy an important position in the economic structure of Jammu and Kashmir State as they are best suited to the state, because of the following inherent characteristics. They are more environment friendly, more labour intensive and less capital intensive in nature, thereby, having greater scope for employment generation at a large scale. The Kashmir handicraft products have earned worldwide fame for their attractive designs, functional utility and high quality craftsmanship. In absence of other manufacturing industries in the state, handicrafts remained a key economic activity from time immemorial. The artistic imagination and craftsmanship of the Artisans reflected through a wide range of products, has delighted the connoisseurs world over for centuries. Crafts like Woollen Shawls, Crewel, Namdha, Chain Stitch, Wood Carving, Paper Machine, Costume Jewellery, Kani Shawls and the Carpets hold a significant share in the overall production and export of the State. Silken carpets in particular constitute a specialty having no parallel in quality and design at national level and, therefore, occupy an important position in the international market. The handicraft sector of the state also has great contribution towards foreign exchange earnings to the state and country in particular. Table 3 shows a sharp fall in the Exports of some items of Handicrafts Goods (Rs. in Crore) such as carpets, woollen shawls, paper machine and other items. Moreover, the value of production of woollen shawls had also declined .

Table 3: Exports of Handicrafts Goods (Rs. in Crore)

Year	Carpet	Woollen Shawls	Paper Machine	Other Items	Total
2020-21	649.02	310.29	33.65	207.51	1200.47
2021-22	326.00	226.50	41.00	112.00	705.50
2022-23	567.13	607.03	98.24	370.97	1643.37
2023-24	455.86	620.02	104.11	358.29	1538.28

3.1.3 Horticulture Sector

Jammu & Kashmir State is well known for its horticultural produce both in India and abroad. The state offers good scope for cultivation of horticultural crops, covering a variety of temperate fruits like apple, pear, peach, plum, apricot, almond, cherry and sub tropical fruits like mango, guava, citrus litchi, phalsa and Berete. Besides, medicinal and aromatic plants, floriculture, mushroom, plantation crops and vegetables are cultivated in the state. Apart from this, well known spices like saffron and black Zeera are also cultivated in some pockets of the state. Horticulture is gaining momentum in the state as its contribution to GSDP remains around 7-8 percent over the past few years. Horticulture development is one of the thrust areas in the state which involves directly or indirectly many people associated with it, thereby resulting in the generation of higher incomes in the rural areas, thus improving the quality of life in villages. It is found from Table 4 that the overall production of both dry and fresh fruits has been recorded to be decreasing largely from 2021-22 to 2022-23.

Table 4: Production of Fruit during 2021-22 to 2022-23 (000 Mts)

	Fresh Fruits				Dry fruits		Total Fruits
	Apple	Pear	Others	Total	Walnuts	Almonds	
2021-22	1852.41	62.5	130.64	2045.55	163.74	12.5	2221.98
2022-23	1747.22	58.21	127	1932.43	224.59	3.74	2161.04

Also, from Table 5, Export of fruit outside the State, and Import of fruits and vegetables which have occupied a prominent place in trade of the State have shown a decreasing trend over the years during 2020-21 to 2023-24.

Table 5: Export of fruit outside the State and Import of fruits and vegetables (lakh metric tonnes)

Year	Export of fruit outside the State (lakh Metric tonnes)			Import of fruits and vegetables (lakh metric tonnes)	
	Fresh Fruits	Dry Fruits	Total Fruits	Fruits	Vegetables
2020-21	10.87	0.25	11.12	2.03	2.91
2021-22	10.11	0.19	10.3	1.95	2.84
2022-23	7.05	0.16	7.21	1.93	2.43
2023-24	7.02	0.18	7.20	1.65	1.35

The Government is making all efforts to promote exports from Jammu and Kashmir State. State's fruit, especially dry fruits are also exported to other countries and in turn earns substantial foreign exchange.

Table 6: Quantity and Value of Imports & Exports

Year	Export to Pakistan		Import from Pakistan	
	Quantity (Qtls) Value	Value INR Crore	Quantity (Qtls)	Value (in Crores) Pak currency
2021-22	465272.41	320.19	368535.17	531.24
2022-23	768061.86	371.67	790245.70	657.79

The Quantity of total dry fruits exported (in MTs) has decreased from 2021-22 to 2022-23 and the foreign exchange earned (in Rs. in crore) on horticulture produce has consecutively decreased from 2021-22 to 2022-23.

Table 6 also depicts the quantity and value of Imports and Exports between the two countries in the years 2021-22 and 2022-23 which shows a small fall in Export and a slight increase in Import data of trade of Jammu and Kashmir to Pakistan, as LOC trade.

Conclusion

The State of Jammu and Kashmir has shown a steady growth in various industrial sectors particularly small scale industries such as Horticulture, Handlooms, Handicrafts Sector, khadi, village industries and other various small scale sectors particularly because of its vital geographical position.

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Changes and Existence of Kinship Terminology and Kinship Relations in Contemporary World: An Anthropological Analysis

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Introduction

Kinship is the universal feature of human society and culture that served as the major organizing principle in human societies. It can be defined as a principle by which individuals or groups of individuals are organized into social groups, roles, categories and genealogy by means of kinship terminologies (Dube, 1974; Barnard and Good, 1984; Uberoi, 1994; Ahuja 2012). A number of anthropologists have given the definitions of kinship in their own way. W.H.R. Rivers (1924) defines Kinship as the “social recognition of biological ties”. On the other hand, Radcliffe Brown (1950) defines Kinship as “a social relationship based on descent”. Besides, according to Evans-Pritchard (1951), Meyer Fortes (1969), Lucy Mair and several anthropologists Kinship is defined as a relationship based on culturally defined principle of consanguinity. Moreover, Claude Levi Strauss as well as Louis Dumont (1981) defines Kinship as a totality of relationship governed by the rules of consanguinity and affinity.

Thus, kinship is the most basic of all human relationships and is based on ties of blood, marriage, or adoption. There are two basic types of kinship ties like those based on blood that traces descent and those based on marriage, adoption, or other connections. Kinship system is the interconnected network of social relationships that people form with their family members and relatives. It is significant in the lives of individuals across all societies and shapes our identities within the social fabric. Moreover, this kinship system maintains unity, harmony, and cooperation among relationships. Therefore, kinship sets guidelines for communication and interactions among people. Where marital taboo exists decides who can marry whom. Kinship regulates

the behavior of different kin. For this reason the study of kinship construction, terminologies, and holistic systems of kinship in the present day times and its changing pattern are very important to the sociologists and anthropologists.

Objectives and Methods

Kinship is a socio-cultural construction, one that creates a network of social and biological relationships between individuals. Through kinship systems, humans create meaning by interpreting social and biological relationships. In social-cultural anthropology, kinship is a network of social and biological relationships between individuals. It's a culturally defined relationship between people based on descent or marriage. Kinship can refer to the patterns of social relationships themselves, or it can refer to the study of the patterns of social relationships in one or more human cultures. Kinship systems have often been theorized as classification systems and grammars. Kinship can signify specific kinds of connections and inclusions, but also specific kinds of disconnections and exclusions. Kinship also speaks of the possibilities for equality, hierarchy, and violence. Kinship studies are central to anthropology and provide insights into human relationships and alliances. They can also help people understand their lineage, family history, and cultural heritage. Kinship contributes to the formation of social identity and a sense of belonging, and helps people define their roles within the family and wider society. Keeping all these understandings in mind, this present article has tried to understand the concept of kin terms, kin terminologies, and kinship systems as well as existence of kinship terminologies in the contemporary world by extensive literature review and reflections from the available evidences.

Kinship Systems and Kinship Terminology

Kinship refers to a principle by which individuals or groups of individuals are organized into social groups, roles, categories and genealogy by means of kinship terminologies. Kinship is the method of reckoning relationship. Moreover, kinship system is referred to as a structured system of statuses and roles and of relationship in which the kin (primary, secondary, tertiary and distant) are bound to one another by complex interlocking ties. Most features of the kinship system of any society are usually reflected in the way kinship terms are used in that society. Generally a person would apply the same term to those relatives

who belong to the same category of kin relationships. In this case, these relatives would also occupy similar kinship roles. Thus, kinship terms play very significant role in the kinship system. Also, kinship terms are words used to identify relationships between individuals in a family, and kinship terminology is the term used to differentiate between kins in a society. Kinship terms can include words like “father”, “mother”, “uncle”, “aunt”, “brother”, and “sister”. Consequently, kinship terminology is the system of words used to identify relatives in different languages or communities. These terms can be used to refer to the relationship between individuals, such as “mother,” “grandfather,” or “father’s brother”. They can also be used to address relatives directly, such as “Mom,” “Uncle,” and “Grandpa”. Again in a simple way, kinship terminology is the system used in languages to refer to the persons to whom an individual is related through kinship. Different societies classify kinship relations differently and therefore use different systems of kinship terminology; for example, some languages distinguish between consanguine and affinal uncles (i.e. the brothers of one’s parents and the husbands of the sisters of one’s parents, respectively), whereas others have only one word to refer to both a father and his brothers. Kinship terminologies include the terms of address used in different languages or communities for different relatives and the terms of reference used to identify the relationship of these relatives to ego or to each other.

Anthropology and Study of Kinship Systems

The system of kinship plays a central role in all human societies. The study of kinship in the discipline of Anthropology existed in the mid to late 1800s, when L.H. Morgan and other anthropologists invented the study of kinship. Historically, the systematic study of kinship terminology began with the American ethnologist Lewis Henry Morgan, whose pioneering work, *Systems of Consanguinity and Affinity of the Human Family*, was published in 1871. An important element in Morgan’s formulation was the distinction between classificatory and descriptive systems of kinship. L.H. Morgan (1871) described that kin terms are reflected the forms of marriage and the related makeup of the family. In this regard, Robin Fox (1983) opined that kinship is to anthropology what logic is to philosophy and the nude is to art; it is the basic discipline of the subject. Robin Fox (1967) writes: “The study of kinship is the study of what he (man) does and why he does it and the consequences of the adoption of one alternative rather than another”. Fox further

says: “The study of kinship is the study of what man does with these basic facts of life such as mating, gestation, parenthood, socialization, siblingship, etc.” Evans-Pritchard’s study of the Nuer of the southern Sudan (1951) focused on kinship groups, based on male descent groups from common ancestor; recognized recruitment, perpetuation and functioning of such groups. Morgan called them gens (clans). However, Morgan’s view along with that of McLennan and Sir Henry Maine, about the Kinship system should be equated with evolutionary law is not in favour with contemporary anthropologists.

The central method to the anthropological study of kinship is comparative method. Many anthropologists and sociologists emphasized on kinship system in their own way by emphasizing the role of biology and alliance in the formation of kin relation. Like Meyer Fortes, he mainly emphasized on the interpersonal relations between individuals and groups in the kinship system. This ultimately suggests that we should look at society as a whole which helps in finding how it works. Radcliffe- Brown (1952) said that kinship terms are like signposts to interpersonal conducts or etiquette, with the implication of appropriate reciprocal right, duties privileges and obligations. He designated the study of kinship system as a field of rights and obligations and viewed it as a part of the social structure. Conversely, the French anthropologist Claude Lévi-Strauss (1949) in his famous book “*The Elementary Structures of Kinship*” explained the alliance theory of kinship and believed that kinship and its related notions are at the same time prior and exterior to biological relations to which we tend to reduce them. According to Levi-Strauss (1969), members are recruited to kinship groups in kinship system through marriage, such as Female can be seen as a wife, daughter-in-law and Male can be seen as a husband, son-in-law of his wife’s parents. Besides, according to J. Beattie (1974), kinship is not set of genealogical relationships; it is set of social relationships.

Kinship Terminology, Rituals and Human Connection

Kinship terms can also help identify and distinguish various kin on the basis of roles and responsibilities. For example, terms of reference are the words that are used to describe the relationship between individuals, such as “mother,” “grandfather,” or “father’s brother”. Terms of address are the terms people use to speak directly to their kin, such as “Mom,” “Uncle,” and “Grandpa”. Furthermore, kinship terminology can be

descriptive and classificatory. Descriptive kinship terminology is used to describe a person's direct blood relationship with the person being addressed. For example, the terms "father" and "mother" are descriptive terms. In a descriptive system, only the children of the mother or father are called sister or brother. Conversely, classificatory kinship terminology applies to people of two or more kinship categories. For example, in English, the term "grandmother" can refer to both the mother's mother and the father's mother.

Kinship relations determine the participation of kin in life cycle rituals. In many societies, life cycle rituals indicate the importance of certain kin. For example, in patrilineal society, during a naming ceremony, the newborn babies' name must be given by the father's sister. During the marriages of daughters, specific rites and rituals must be conducted by the mother's brother. Close relatives are obligated to give gifts to newlywed couples, and they in return are equally rewarded from both the bride's and groom's family. During funeral rituals, it is customary for close kinsmen to practice mourning for specified period. Besides role in rituals, in simple societies, kinship also regulated political life, the position of chief was hereditary. Segmentary lineage functioned to maintain law and order in stateless society as found in the Nuer society (Evans-Pritchard, 1951). With the formation of nation state the political function of kinship became institutionalized. Caste-class identity becoming flexible, the adherence to marriage rules has been affected. Despite these changes kinship system does remains an integral and universal in all societies.

Kinship Systems and Kinship Groups in India

Kinship groups play a very important role in the daily life, rituals and social ceremonies among the Indian people. K.M. Kapadia (1947) has used classical texts to describe Hindu kinship. Hindu Social Organisation by P.H. Prabhu (1954) is also based on Sanskrit texts. Similarly, IrawatiKarve (1953) and G.S. Ghurye (1946) have extensively worked on Indian kinship system. Both have used textual sources to explain kinship pattern in different regions of India from a socio-historical perspective. Moreover, to better understand the structure of the kinship system in India, it is necessary to divide the country into different zones to understand the complexity of the kinship system. In this context, IrawatiKarve (1953) provides us the comparative analysis of

four cultural zones in India i.e. Northern zone, Southern zone, Eastern zone and Central zone, keeping in view the linguistic, caste and family organization. Karve's comparative study takes the following points into consideration i.e. list of kinship terms in Indian languages, mainly focused on the difference between Sanskritic North and Dravidian South. In spite of these factors, she also analyzed the caste endogamy and incest taboo. She studied the process of acculturation and accommodation in context of kinship. So, the very usage of kinship term also makes clear the kind of behaviour expected from a kin. For example, Oscar Lewis (1958: 189), in his study of a North Indian village, has described the pattern and relationship between a person and his elder brother's wife. This is popularly known as *Devar-Bhabhi* relationship, which is characteristically a joking relationship. As a contrast to the joking relationship is the behaviour of avoidance between a woman and her husband's father. Similarly, she has to avoid her husband's elder brother. The term for husband's father is *shvasur* and for husband's elder brother is *bhasur*. *Bhasur* is a combination of the Sanskrit word *bhratr* (brother) and *shvasur* (father-in-law), and is, therefore, like father-in-law.

Kinship Terminology and Kinship Relations: Changes and Existence

Kinship terminology refers to the set of words and phrases that societies use to identify and categorize various relationships among family members. Kinship terminology is not just linguistic expressions; they reflect the underlying social structures, roles, and obligations within a given culture. Kinship terminology plays a vital role in shaping our understanding of familial bonds and interactions. It is like a roadmap that guides us through the intricate maze of connections that define our social world. Kinship terminology shows various distinct features that shed light on the intricate nature of human relationships. Kinship terminology determines inheritance patterns and the passing down of property, wealth, and titles. This can have significant implications for societal hierarchies. Kinship terminology reflects cultural norms and values, reinforcing a sense of identity and belonging within a specific group. Kinship terms play a role in determining who can marry whom, considering factors like consanguinity and affinity. These regulations help prevent incestuous relationships and ensure social stability. In many societies, kinship ties extend beyond biological relationships to create alliances and partnerships between families, fostering cooperation and

mutual support. India, with its rich cultural diversity, boasts a mixture of kinship terminology reflecting its intricate social fabric. India's kinship system accommodates both joint and nuclear family structures. This is evident in terms like *bade-papa* (paternal uncle) and *chhote-papa* (maternal uncle) used to distinguish relationships within these structures. Kinship terminology often varies based on caste and region, showcasing the nuanced layers of Indian society. Kinship terms are filled with notions of hierarchy and respect, reflecting the importance of age and authority within the family.

Besides, kinship terminology in the rapidly developing background of the 21st century continues to adapt to changing societal norms and structures in India and also in other parts of the World. For example, with the rise of blended families resulting from divorce and remarriage, kinship terminology is adapting to encompass step-relations and half-siblings. On the other hand, kinship terms are evolving to include same-sex partners, challenging traditional binary notions of family. Other examples show that new kinship categories emerge as technologies like surrogacy and assisted reproduction reshape the concept of biological parenthood. Furthermore, kinship terms must accommodate the complexities of global families, where members are scattered across different countries and cultures. In addition to the changing scenario of kinship terminologies and relations in the present day world many changes are taking place in all the institutions of the rural society including kinship relations. Changes can be seen as demand for ownership titles by women. Rules of marriage are being challenged and the traditional rules regarding divorce are also getting weakened. Though some of the aspects of kinship are losing their importance, few others are gaining prominence. Kinship is playing an important role in the field of politics, especially in rural elections like Panchayati Raj. Favoritisms, in jobs, are being observed among the kinsmen. Due to the emergence of such new forces, kinship may acquire new structure and form.

Conclusion

Kinship systems are broad in their scope and intermixed with religious, economic, political, and other social systems. The study of kinship is very useful to understand the elements of social organization. Morgan and other early anthropologists tried to explain the distribution of kinship types, correlating with the economic, political and cultural stages in

a progressive series. Kinship systems are rather like natural languages which acts as platforms on which many and perhaps all different kinds of economic, political and cultural organization may be built. In this connection, kinship terminology is more than just a collection of words; it is a reflection of the intricate bonds that tie us together. From the shores of India to the farthest corners of the world, these terms shape our understanding of family, society, and identity. As we continue to navigate the ever-changing scenery of human relationships, the threads of kinship terminology remind us of the enduring and universal nature of human connection. Kinship, a fundamental concept in anthropology and sociology, serves as the foundation of human interaction and social structure. Presently, kinship is constructed in a diverse fashion and the usage of kinship is widespread and not merely restricted to family, marriage, clan and caste. Kinship now moves beyond 'biology' and being a 'natural fact' to a more complex interplay of surrogacy, assisted conception, and cloning.

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How the Growth of Tourism Affects the Overall Indian Development

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Abstract

The paper studies the impact of tourism on both urban and external sectors in the context of development of India through multiplier and spill over effects. The study finds positive growth rate of number of foreign tourists' arrival in India over the years from 2000 to 2016 via gender wise, age wise and also through mode of travel wise, how growth of the tourism led to the development of urbanization and foreign exchange earning of the country. The study puts light on future of tourism industry thorough, well designed economically efficient policies of the government to prosper in long run.

Key words

Tourism; development; India

Introduction

Travelling and Tourism has been an integral part of Indian culture and tradition. Tourism is the social, cultural and economic phenomenon which entails temporary, short term movement of people to destination for various purposes (may be personal or professional) outside those places where they regularly live and work. The World Tourism Organization defines tourism as “beyond the common perception of tourism as being limited to holiday activity only, as people travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes” (Subhas, 2015). In 2016, there were 1235 million international tourist arrivals worldwide with France being at the top and 25th rank being occupied by India in the world list. In the same year, there were over 308 million international tourist arrivals to Asia and the Pacific Region, with China in the first place and India occupying the eighth rank in this top destinations

list. The foreign tourist arrivals in India continued to grow from 2.64 million in 2000 to over 8.80 million in 2016, which finally reached over 10 million in number in 2017 [Indian Tourism Statistics at a glance, 2017]

The history of tourism started almost 2,000 years back during early Roman era when rich people of ancient Rome preferred to take trips to the countryside and the coast rather than to stay in the city during hot summers. Next it was during the 18th and 19th centuries that tourism began to slowly evolve into a form similar to tourism today, when over these 200 years, tourism turned to move from being an occupation that was almost exclusively confined to the rich to something that became increasingly accessible to the middle and lower classes, even nowadays. Therefore, tourism can be recognized as long as people have travelled (Towner, J et al, 1991).

Tourism in India is also economically important and is growing rapidly. India is a country of villages and showcasing the rich rural life, art, culture and heritage in villages in responsible manner would be mutually beneficial since tourism and conservation complement each other. Tourism in India has come into its own as a brand – **Indian Tourism**. The Indian tourism sector has been flourishing in recent years due to the improved connectivity to and from the country, better lodging and accommodating facility and favorable government policy on visa reforms like Visa-on-arrival (Shankar, 2015).

1.1 Different types of Tourism in India

Each part of India offers identifiable differences from the rest of the nation. Hence Indian tourism can broadly be classified region wise as North Indian Tourism, East Indian Tourism, West Indian Tourism, and South Indian Tourism. Besides these, the Ministry of Tourism in India promoted some new tourism, depending on economic purpose and objective such as Cruise Tourism, Tiger Tourism, Eco Tourism, Adventure Tourism, Wildlife Tourism, Medical Tourism, Pilgrimage Tourism, Cultural Tourism, Historical Tourism, Ayurveda Tourism and many others for development, some of which are discussed below [www.employmentnews.gov.in, dated: 7-13 July, 2018.]

As per the Supreme Court directions, the Ministry of Environment and Forests has issued guidelines for tourism activities in tiger reserves in the country, notably known as **Tiger Tourism** such as Sunderban Tiger Project of West Bengal as part of East Indian Tourism.

Eco-tourism entails sustainable preservation and sustenance of the indigenous populace, by encouraging wildlife and habitats, making as little environmental impact as possible, when visiting a place or region such as Kaziranga National Park, Gir National Park, being a part of North Indian and West Indian Tourism respectively (Malik, 2014).

Medical tourism focuses on the availability and easy access of cost-effective but superior quality healthcare in terms of surgical & general medical attention to the tourists thronging to India from all over the world. The city of Chennai attracts around 45percent of medical tourists from foreign countries as part of South Indian Tourism.

Adventure Tourism, recently grown up tourism, involves exploration of remote areas & engaging in various adventure activities such as trekking as, tourists prefer to go for trekking to places like Ladakh, Sikkim & Himalaya region, Jammu-Kashmir etc.

Wildlife Tourism, famous in India, because of its rich forest cover has some beautiful and exotic species of even endangered wildlife; all of which has boosted this type of tourism in India e.g. Sariska Wildlife Sanctuary, Corbett National Park etc (Padmanabhan , 2018).

Pilgrimage Tourism is increasing growing its gradual popular significance rapidly in the recent years, primarily because of better transport connectivity and telecommunication system through internet facilities owing to the impact of globalization. India is famous for its well known temples such as Vaishno Devi, Golden Temple, Char Dham, Mathura & Vrindavan, Tirupati, etc., which has also led to consequent growth of **Historical Tourism** as repercussion effect of trade and linkage effect of urbanisation.

The study on **Historical Tourism & Architecture** always recognises India as a land which gave birth to many legendary rulers and warriors creating a glorious historical background and marvellous magnificent architecture in India found all over the country such as Ajanta, Ellora, Khajuraho, Delhi-Agra, Konark, Hampi, Mahabolipuram etc. Not only that, India is well known for its rich heritage and an element of mysticism, for which tourists come to India to experience it and boost up **Cultural Tourism** for themselves such as in Pushkar Fair, Taj Mahatsav. India has also witnessed an overall growth in tourist arrivals due to the **Ayurveda Tourism** which has its popular destination in Kerala in South India.

There are also many ashrams in India encouraging **Yoga Tourism** such as in Dehradun, Rishikesh, Kedarnath, Gangotri where many people come to learn yoga, meditate or spend time. Another moving experience by the foreigners is to take part in an evening aarti (fire worship) along the Ganges River at Rishikesh, Haridwar or Varanasi in India (Upadhyay, Awasthi, Rawal 2017).

Above all, the main cause behind growth of tourism in India can be traced from the Indian Hospitality which ensure a safe and pleasant stay and explore spirituality to the tourists to inspire and refresh their soul. There's nothing like Indian Hospitality, which comes from a saying in India, "Atithidevo Bhava", which means 'the guest is god'. It smiles from Indians as a welcoming gesture for foreigners which compel them to feel that it is actually their 'home away from home' (Mir 2014). This is one of the reasons why are foreigners in love with India [<http://www.quora.com> and <http://www.tripsavvy.com>]

1.2 Overall Impact of Tourism

The success of any nation's tourism sector doesn't only depend on the natural beauty of that nation, but its key to success ultimately depends on the performance of the business within it and also on the infrastructure. The tourism industry requires availability of proper transport (like airlines, railways, cars and waterways), places for proper food and accommodation such as hotels, camping grounds or parks, youth hostels, restaurants, cafes and bars etc. The following major impacts of tourism conducive for economic growth of any country are discussed below.

With the growth of hospitality/tourism business, there is a huge employment generation in any country, with additional employment creation and several employment opportunities within various different segments related to hospitality and tourism sectors.

Again, there is a one to one relationship between the growth of tourism sector and growth of infrastructure development as most of the emerging countries build new highways, airports, hotels, lodges, restaurants, guesthouses and trekking ways to improve their tourism sector, which attracts huge and heavy investments for infrastructural growth, vital to attract more number of tourists (Kaur and Sharma, 2012).

Apart from these, hospitality tourism business benefits the local individuals to learn more about the different lifestyles and religions, through **cultural development**, as tourists are known for being a central way to exchange culture values.

Moreover, tourism and hospitality business helps in revenue generation within the economy of any country through creation of more income for the local traders to receive extra revenue and profits by shopping and also via payment of taxes to the government.

As a worldwide export category, tourism ranks third after fuels and chemicals, even, ahead of food and automotive products. In many developing countries, tourism ranks as the first export sector. By UNWTO region, America and Asia and the Pacific, both recorded close to 6 percent growth in international tourist arrivals [www.employmentnews.gov.in, dated: 7-13 July, 2018.].

Role of Tourism Industry in overall Growth of India

The Travel & Tourism Competitiveness Report for the year 2017 ranks India 40th out of 136 countries overall. The report ranks the price competitiveness of India's tourism sector 10th out of 136 countries. It mentions that India has quite good air transport (ranked 32nd), particularly, given the country's stage of development, and reasonable ground transport infrastructure (ranked 29th). The country also scores high on natural and cultural resources (ranked 9th). The number of tourist arrivals is directly proportional to the economic growth. India witnessed a grand total of 10.18 million Foreign Tourist Arrivals (FTA) with annual growth rate of 7.5 percent in 2017. It is the second largest foreign exchange earner in India recording estimated earnings of 180,379 crore in 2016-2017. India has experienced a 14 percent rise in foreign tourist arrival in 2017-18 compared to the last year; while the corresponding increase has been 20 percent, in terms of revenue growth. The country has earned about Rs. 1, 77,000 crore in 2017-18 in terms of foreign exchange earnings through tourism. [Indian Tourism Statistics 2017]

According to record of the World Travel and Tourism Council, tourism of India generated Rs. 15.24 lakh crore or 9.4 percent of the nation's GDP in 2017 and supported 41.622 million jobs which constitutes 8percent of its total employment [Indian Tourism Statistics 2017].

Literature Review

In the literature review, Towner, J et al (1991), has stressed on the importance of history in the context of tourism, examining the notable contribution of history to the understand the concept of tourism, particularly, emphasising on the ancient and medieval worlds. From the view of Malik (2014), it is known that India, with her enriched beauty is unambiguously one of the most viable candidates for promoting tourism. In his paper, he has focused on the changes in number of tourist arrivals from 1997 to 2012, increase in economic growth and the development of tourism. According to his study the number of tourists' arrival is directly proportional to the economic growth. Kaur & Sharma (2012) had focused in their paper on the growth and development of Indian tourism industry, mentioning that since last few years, Indian tourism industry has been growing at a rapid pace and it has vast potential for generating employment and earning large amount of foreign exchange. So it was imperative to study the economic growth and development of Indian tourism industry. Mir (2014) expressed in his paper the economic viability of the Indian tourism industry by employing secondary data taken from various national and international reports, journals, books, magazines and other pertinent literature of this discipline. Tourism has an inbuilt capacity that it could contribute remarkably and in minimum time duration in poverty alleviation through job creation and productive employment. According to Subash (2015), the travel & tourism industry has emerged as one of the largest and fastest growing economic sectors globally. The Indian tourism industry has emerged as one of the key drivers of growth among the services sector in India. Tourism in India is a sun rise industry, an employment generator, a significant source of foreign exchange for the country and an economic activity that helps local and host communities. Padmanabhan (2018) in his paper has studied to explore the scope for adventure tourism in India. The study also has mentioned the different types of adventure tourism present in India and involvement of both foreign and domestic tourists in it. From the view of Kakkar (2012) in his paper on Impact of Tourism on Indian Economy (2012), it is known that how India is emerging as a popular tourist destination in the world, driven by the focus on innovation and creating value for tourists. It aimed to change the attitude and behaviour towards foreign tourists by stressing on the aspect that a guest has been held in high esteem in India since ancient times. It also has examined

the impact of India's economic growth on tourism, contributors to economic growth, role of Tourism industry in India's GDP, Foreign versus Domestic Tourists. The paper has also explored that there has been a tremendous growth in tourism in India because of the policies of the government and support from all levels. Shankar (2015) has discussed on Impact of Heritage Tourism in India. Heritage Tourism is considered as one sector that shall propel growth, contribute foreign exchange, enhance employability and result in community development. Tourism, including both foreign and domestic visitors, is considered the second most important industry in India behind heritage. The paper of Upadhyay, Awasthi, Rawal (2017) was an attempt to make the feel that foreign tourist arrival is valuable in many aspects as they contribute into the economy of the country and encourage state governments as well as the local bodies to take care of the sites and monuments, as well local bodies. Apart from that, this study also has compared the foreign tourist arrivals of 4 years in a row i.e. from 2013 to 2016 as provided the earning details from foreign tourists' arrival during that period. In their paper, they also have said that tourism sector is an important sector in creating employment generation. The study has been undertaken to make an analysis of employability in tourism industry. It is a multi-segment industry showing positive economic effects in generation of National Income, expansion of employment opportunities, rising of tax revenues, generation of foreign exchange and transformation of regional economy.

Apart from the above, very few literature relating to the impact of tourism on economic development through its impact on urban development has been found. Moreover, the study on the growth of tourism related to gender, age, or mode of travel wise could be rarely found. So the motivation of this paper has been highlighted through the major objectives as stated below in next section.

Objectives of the Study

The main objective of this paper is therefore to study the impact of growth of tourism on economic development in India in recent period, during 2000-2016, with a view to analyse

- i. Trend in the growth of total Foreign Tourists Arrival (FTA) in India
- ii. Trend in the growth of mode wise distribution of FTA in India
- iii. Trend in gender wise growth rate of FTA in India.

- iv. Trend in the age wise growth rate of FTAs in India.
- v. the impact of growth of tourism on that of international trade, measured in terms of growth of foreign exchange earnings in India
- vi. the impact of tourism on the growth of urbanization, measured in terms of growth of total population in India.

Data Sources

Secondary data has been taken from various publications such as various newspapers, Statistical Handbooks, Indian Tourism Statistics at a glance 2017, Indian Tourism Statistics 2017 and also from the official websites of Ministry of Tourism, Government of India, and Employment News (www.employmentnews.gov.in).

Methodology

Graphical, as well as mathematical and statistical tools have been used as methodology, discussed separately below.

A. Graphical Tools:

- a. Line diagram shows a curve or a straight line to depict the relationship between two variables. Here it is used to show the trend in the growth of the number of foreign tourists' arrival (FTAs) in India during 2000-2016 (Giri & Banerjee, 2015).

B. Mathematical and Statistical Tools:

- a. As Mathematical Tool, Exponential Growth Rate Method, used for the period 2000-2016, is discussed below. It is used to study the trend of Exponential Growth Rate of FTA in India during this period, measured at four years interval.

Let, the exponential trend equation be $Y_t = ab^t$, with origin at 2008 and unit of t as 17 years.

Taking logarithm on both the sides, we get

or, $\log Y_t = \log a + t (\log b)$, where a and b are the parameters.

or, $\log Y_t = A + Bt \dots (1)$, where $A = \log a$ and $B = \log b$

The normal equations for (1) are,

$$\sum \log Y_t = nA + B\sum t$$

$$\sum t \log Y_t = A\sum t + B\sum t^2$$

On solving the above two equations, values of A and B are found.

Then, $a = \text{antilog } A$ and $b = \text{antilog } B$ Growth Rate = $(b \times 100) \%$

After putting these values in the equation $Y_t = ab^t$, the value of Y_t is obtained.

b) As Statistical Tool, Simple Correlation coefficient, also known as Pearson's Rank Correlation-Coefficient between two variables x and y (r_{xy}), used for the period 2000-2016, is discussed below. r_{xy} is called the product moment correlation coefficient. By symmetry, it is clear that $r_{xy} = r_{yx}$. It is used to study the impact of tourism (x) on economic development (y) of India, measured both in terms of growth of international trade and that of urbanisation during the said period.

Theoretical Background of Correlation-Coefficient:

Let the variable value pair (x_i, y_i) occur with frequency f_i ($i=1, 2, \dots, n$)

Then for a bi-variate frequency distribution, $r_{(xy)}$ can be defined as

$$r_{(xy)} = \frac{\text{Cov}(X, Y)}{\sqrt{V(X)} \times \sqrt{V(Y)}} \text{ , where } \text{Cov}(X, Y) = \sum (X - \bar{X})(Y - \bar{Y})$$

$$V(X) = \frac{1}{n} \sum (X - \bar{X})^2 \quad \text{and} \quad V(Y) = \frac{1}{n} \sum (Y - \bar{Y})^2$$

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i \quad \text{and} \quad \bar{Y} = \frac{1}{n} \sum_{i=1}^n Y_i$$

The points (x_i, y_i) can be represented in x - y plane to show what is called a scatter or dot diagram. This diagram is useful in giving an intuitive idea of the relationship between x and y but for its quantitative precise measure, r_{xy} is used, whose value lies between +1 and -1. (Das, 2013).

Growth of Tourism in India

Figure 1 depicts both the absolute growth as well as relative growth (growth rate) of FTAs in India. It is found that the foreign tourist arrival (in absolute numbers) has continued to grow from 2.64 million in 2000

to reach over 10 million in 2017. Again there is a positively sloped exponential trend line of FTAs in India, thus, showing a steady growth during 2000-2016.

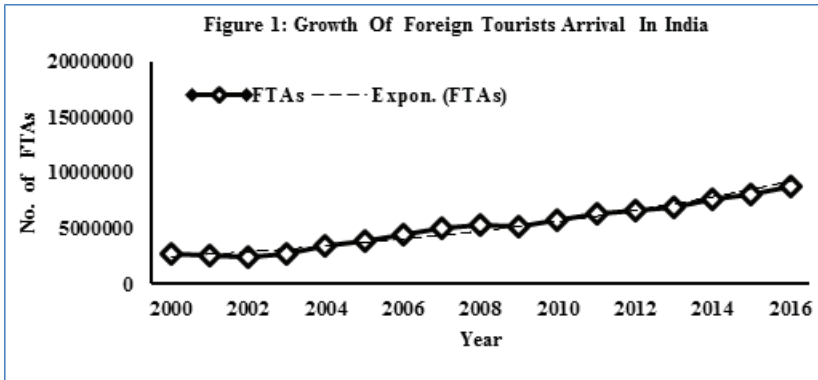


Figure 1: Growth of Foreign Tourists Arrival in India during (2000-2016)

Source: Ministry of Tourism in India

Moreover, if the trend in the growth of foreign tourist arrivals in India since 2000 to 2016 is considered, then, there is also a continuous growth, except 2001-02 and 2009 during the said period. This is because, during 2001-02, FTAs in India had registered a decline in its growth rate mainly due to 11th September Effect and global economic slowdown and 26/11 terrorist attack in Mumbai was also responsible for it in 2009.

Year	Exponential Growth Rate (in percentages)
2000-2004	6.1
2004-2008	11
2008-2012	6.4
2012-2016	7.2
2000-2016	6.0

Source: Ministry of Tourism in India

From Table 1, it is found that, during the period 2000-2016, the exponential growth rate is 6.0%, with other intervals growth rate fluctuating between 6% and 7.5%. At four years interval, the exponential growth rate become positive and it is very much high during 2004-2008 due to highly positive tourists arrival growth rate.

Next, the following Tables will show the share of the Foreign Tourists Arrival in India according to different distributions such as Mode of travel wise distribution, Gender wise distribution and finally Age wise distribution in the following five years interval, respectively.

First, Table 2 provides the mode of travel wise distribution of Foreign Tourists Arrival in India during 2000-2016. It is found from the Table1 that the absolute growth in terms of total number of FTAs in India has increased rapidly over these five years interval, together with a jump of nearly one lakh in the year 2016.

Table 2: FTAs in India according to Mode wise Distribution of Travel

Year	Total FTAs	Percentage Distribution of FTA by Mode of Travel		
		Air	Sea	Land
2000	2649378	98.5	0.0	1.5
2005	3918610	86.5	0.4	13.1
2010	5775692	91.8	0.7	7.5
2015	8027133	84.5	0.7	14.8
2016	8804411	84.1	0.9	15.0

Source: Indian Tourism Statistics 2017

Not only that, the percentage distribution of mode of their travel clearly show that maximum number of people as travellers from rest of the world have come to India through air transport during these five year interval, as it is the quickest and safety transport, with almost 100% through air (98.5%) in the millennium year 2000. But there is a gradual decrease in the percentage share of FTA through air, because of the rapid rise in the fare of this mode of transport in the consecutive five years period.

Next, it was followed by land transport preferred by FTA, as their mode of travel to India, whose percentage share has depicted a steady leap during 2000-2005 and again from during 2005-2010, as shown in Table 2.

Finally, sea becomes the last option in the mode of transport, with a slight rise in its percentage growth of FTA to India, starting from a zero position in the millennium year 2000, because it is a very time consuming mode. So, the share of sea in the percentage distribution of

FTA by mode of travel never exceeds more than one percentage during the period (2000-2016).

Table 3, now, gives the gender wise distribution of Foreign Tourists Arrival in India during 2000-2016. It is now clear from the above table that the total no. of FTAs in India irrespective of gender distribution is also increasing over the years in absolute numbers.

Table 3: FTAs in India according to Gender wise Distribution of Travel

Year	Total FTAs	Gender Wise Distribution of FTA (in percentage)	
		Male	Female
2000	2649378	61.9	38.1
2005	3918610	59.7	40.3
2010	5775692	59.3	40.7
2015	8027133	59.3	40.7
2016	8804411	59.4	40.6

Source: Indian Tourism Statistics 2017

But it is also clear from the above table that the gender distribution in FTAs in India is biased with a very slight rise in the gender ratio over the years. It may be due to the awakening of the concern of gender awareness, freedom of womenfolk in the society as an impact of globalisation of the country like India. Moreover, the percentage of male tourist arrival in India is more than that of the female one in the said period, with a very decreasing but very fluctuating trend during the said period starting from the millennium year. As against this, the female percentage of this distribution has shown a very slightly rising but also very much fluctuating trend from 2000 onwards. This may be due to the greater role and involvement of women in the society and also in the service sector on account of liberalisation of the economy of the country like India.

Table 4: FTAs in India according to according to Age Group Distribution of travel

Year	Total FTAs	Percentage Distribution of FTAs by Age-Group (in Years)						
		0-14	15-24	25-34	35-44	45-54	55-65	65 & above
2000	2649378	3.9	11.4	22.6	27.0	23.1	9.9	2.1

2005	3918610	8.6	9.6	18.8	21.3	19.5	13.0	9.2
2010	5775692	10.0	8.3	17.4	21.1	19.9	13.8	9.5
2015	8027133	9.4	8.5	19.2	21.2	20.0	13.8	7.9
2016	8804411	9.5	8.5	19.2	21.2	19.7	13.9	8.0

Source: Indian Tourism Statistics 2017

The above table (Table 4) provides the age wise distribution of FTAs in India during 2000-2016. The total number of FTAs in India irrespective of this distribution is very much fluctuating over the years during the said time periods. The percentage of FTAs in India at the age group 0-14 i.e, the younger section of the society, has shown more or less an increasing trend during the said period. This may be due to their frequent visit by their parents, due to official causes such as transfer of jobs or they also may be guided by psychological impacts such as eagerness or passion of travelling by their parents.

The percentages of the age groups between 15-24, 25-34, 35-44 and those of 45-54 has shown more or less either a decreasing trend or remained constant during the said period, may because of the involvement of either adolescent in education sector or middle-aged class in the working sector. Finally, 55-65 and 65 & above age groups, belonging to senior citizen class of the society have depicted a rapid increasing trend in their age group wise percentage distribution of FTA over the years during the said period, as a purpose of their enjoyment in their retirement period.

Impact of Growth of Tourism on economic development in India

This section studies the impact of tourism (x) on economic development (y) of India, measured both in terms of growth of international trade and that of urbanisation during the said period. For this, first, Correlation coefficient (r_{xy}) has been measured between i) the growth of FTAs (in numbers) (X) and that of foreign exchange earnings or FEEs (in crores) (Y) within India during 2000-2016. Secondly, Correlation coefficient (r_{xy}) is also measured between ii) the growth of FTAs (X) (in numbers) and the growth of the total number of population at 1981, 1991, 2001 and 2011 census years (in numbers) (Y).

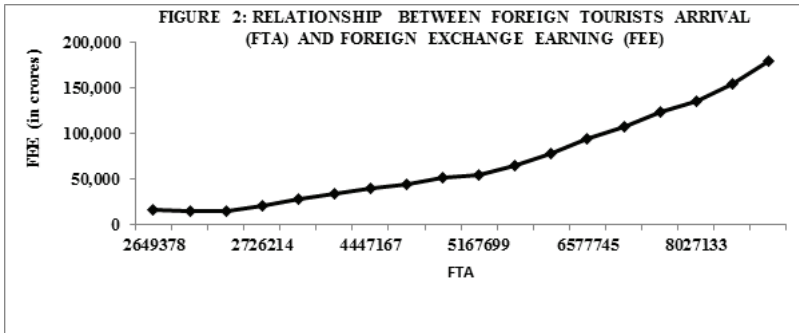


Figure 2: Relationship between Foreign Tourists Arrival (FTA) and Foreign Exchange Earnings (FEE)

Source: Indian Tourism Statistics 2017

For the first case, the Correlation Coefficient between these two variables (FTA and FEE) is found to be 0.975 [Appendix] which implies that these two are highly correlated. The same is again shown by the Figure 2, which depicts a very strong positive linear relationship between FTAs and FEEs. This also indicates that the rapid growth of FEEs in India has occurred with the gradual growth of FTAs within the country during the said period.

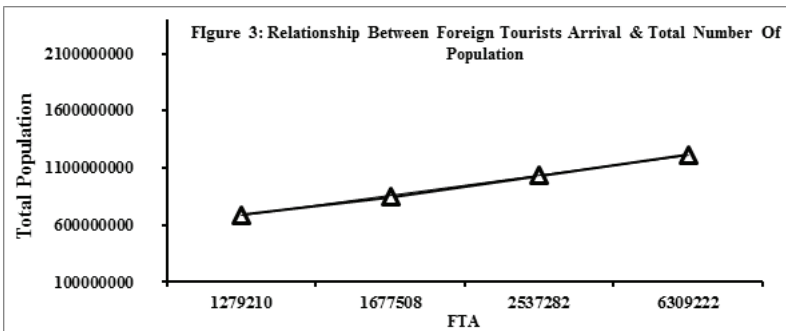


Figure 3: Relationship between Foreign Tourists Arrival (FTA) and Total population of the country

Source: Indian Tourism Statistics 2017; Census of India

In this case, also, a very strong positive linear relationship between FTAs and Total Population exists, as is found from the value of Correlation Coefficient between these two variables (0.903). Figure 3, too, signifies that these two are highly correlated; again, indicating that there is a rapid growth of total population in every census years, starting

from 1981, as one of the year on the onset of pre-liberalisation period till the latest census year as 2011, in India with the gradual growth of FTAs within the country during the said period.

Conclusion

It has been found from the above analysis that there is a positive, both absolute and relative, growth trend in foreign tourists' arrival within India during 2000-2016, accompanied by positive exponential growth trend, which becomes very much higher during 2004-2008, may be owing to the impact of adoption of second tourism policy in India in 2002. Most of the people prefer air as a quickest transport because of less time consuming, together with the growing importance of other modes such as sea, because of its low cost and particularly land with its better connectivity amongst other modes of transport. Moreover among total FTAs, it is also found that males outweighed the female counterparts to visit India, however, with the gradual rise in the share of female ones, because of gradual involvement of womenfolk, owing to the growth of gender awareness within the society. Mainly middle aged groups ranging between 30-50 years visit the tourists' places, either due to their service or for enjoyment purposes.

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Frankenstein: The Man and the Monster

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Abstract

Frankenstein the scientist in Shelley's *Frankenstein* creates a creature which he finds repulsive and which he rejects. The end of the novel is unhappy for both but it has endured in public imagination, and began a tradition of science fiction and moral allegory. It is still popular, mainly thanks to film and television adaptations but the name of the scientist is often wrongly used for his creation. There may be other reasons behind this confusion, besides the title of the novel, and these are explored below.

Keywords

Frankenstein, psychological effects, alter ego

In Mary Shelley's novel *Frankenstein* (1818), Victor Frankenstein the scientist creates new life. He never acknowledges it as such, preferring to call it and treating it as 'the monster'. He takes much trouble to create the being. He selects its body parts with as much care as he can with an eye to creating a Keatsian 'thing of beauty'.¹ Once he creates it, he is horrified at its appearance, and he rushes away. He goes on to completely neglect his creation – who must learn to navigate the world on its own and suffers rejection not only from his maker but also from society. Then Frankenstein chases his creation to take revenge on it. Here he refuses to name the creature, referring to it as a 'monster', a 'devil' and a 'fiend'.² He dies pursuing the unfortunate being who leaves after grieving over his dead body.

The novel has been hailed as not only an intriguing gothic horror novel, but also as a first successful attempt at science fiction.³ It was written in the Romantic age by the daughter of an Enlightenment philosopher, William Godwin, and a pioneering feminist, Mary Wollstonecraft, and wife of one of the greatest Romantic poets. Its Romantic and Enlightenment themes and ideas have both been

discussed.⁴ Biographical scholars have noted how Shelley left his wife, who wrote the novel, after their premature son was born, much in the fashion of how Victor Frankenstein abandoned his creation. Shelley used the pseudonym Victor while publishing a book of poems with his sister Elizabeth - in the novel Victor has an adopted sister called Elizabeth.⁵ Critics have noted how Frankenstein rejects his creation and needs a long period of mental and emotional recovery, much like a new mother's recovery from postpartum depression.⁶

One critic, Rossiter Johnson, raised an interesting point in 1908: many readers, even intelligent ones, call the monster Frankenstein though he is the maker, not the creation.⁷ In 'Frankenstein is the Name of the Doctor, not the Monster,' Thomas DiMichele agrees.⁸

A quick internet search confirms this. The online *New Indian Express* hails drones as a tremendous help in civil fields despite their disadvantages, in a 2018 article entitled 'Saviour or Frankenstein.'⁹ Obviously, the drones are compared to Frankenstein's creation, but it seems the reporter has conflated the two. Even international researchers (who should know better) make the same error. In an SHLC report on the problem of increasing urbanisation in Dhaka, the writer signs off, predicting that without civic regulation, 'the future Dhaka will become an ugly eight-foot Frankenstein.'¹⁰ Glen Tickle, however, asserts that it is not 'wrong to call the Monster "Frankenstein"'. His reason is that since Frankenstein has brought his creation to life, it is his child, and therefore has a right to be called by the surname Frankenstein.¹¹

Interestingly, Tickle traces the genesis of this confusion to a 1931 Universal Studio film poster, which had only the Creature's picture and the name of the film as Frankenstein, so viewers could be forgiven for thinking that Frankenstein was the name of the Creature.¹² However, we know from Rossiter Johnson that the maker and monster were confused before the poster more than twenty years before the film. David Lindsay in 'A Bridal Ornament' mentions 'the maker of poor Frankenstein' less than three decades after Shelley's novel was published.¹³ In fact, readers have persistently confused Frankenstein with his Creature. Why has this happened?

The resemblance between Frankenstein and his creation has been remarked upon by critics and readers. As Kaitlin Harris points out, 'Victor and his creation are more alike than different...'¹⁴ These include their

isolation, though in Frankenstein's case it is self-imposed.¹⁵ Frankenstein is struck with disgust after his creature is brought to life.¹⁶ Unhappily so is the creature as he sees himself after seeing other humans.¹⁷

There are differences between them, but these differences are even more interesting than the similarities. It is also quite intriguing to see a marked presence of water in the novel. There are lakes, rivers, ponds, waterfalls and brooks, besides glaciers, frozen waterbodies and ice-floes. All these are not unexpected in a Romantic novel, and Victor Frankenstein derives comfort from sailing on or looking into lakes.

This preponderance of water has been remarked upon by critics: 'Water provides a pivotal backdrop for understanding Victor's character...' as it moves Victor to display his emotions, foreshadows looming doom and provides 'motivation or refuge'. They add that frozen glaciers in the opening and final scenes of the novel symbolise 'his lack of character development'.¹⁸ However, water plays another function in the novel: it serves as a reflecting surface. A crucial scene in Chapter 12, shows the Creature 'terrified' when it sees itself in a 'transparent pool' or as he then calls it, 'the mirror'. When Frankenstein and the creature confront each other after he runs away from it on the day of its creation, it is in a 'sea of ice', surrounded by icy peaks, in Chapter 10. They argue, but finally come to an understanding: Frankenstein accepts the task of creating a female partner for the creature.

This meeting in an area composed of reflective surfaces serves to focus on the peculiar relationship between man and made. In some ways they are identical, as noted above. In other ways they are opposites. Frankenstein craves solitude, the creature is forced to accept it.¹⁹ Frankenstein is loved by many whereas the creature is universally abhorred. Frankenstein is aware of an unusually happy childhood and upbringing.²⁰ The creature is abandoned, hated and left to its own devices.²¹ There is a point to be remarked here, however. Frankenstein loses his mother, and this sets off the narrative trail of creation and destruction. It has already been noted by one critic how Frankenstein behaves like a new mother. Both maker and Creature suffer the same loss. Frankenstein and the creature react in similar ways: both 'gnash their teeth' and are obsessed with revenge.²² Frankenstein is disgusted at the external, at the sight of the creature while the creature is disgusted at the character of humans.²³ Regarding the last point, it is seen that although

they are similar in feelings, the radical opposition in their outlook can lead to only one conclusion: they are mirror images of each other. This is the explanation behind their relationship. They are similar and yet the inverse of each other, as reflected images are.

It becomes obvious now why Frankenstein and his monster are so often confused by generations of readers, these psychological clues and effects placed in the text by Mary Shelley are absorbed subliminally by them. This raises interesting questions: does Frankenstein's monster exist outside the protagonist's imagination? Or is he just an imagined shadow of the scientist's guilt-ridden mind, while the text serves as an ambiguous ancestral version of the Dr Jekyll and Mr Hyde theme of alter-egos? It is difficult to tell but it seems Shelley's *Frankenstein* has a more subtle effect on readers, and the wider public who may have heard of it second-hand or third hand, than has been hitherto realised.

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Gender Justice in India: From Substantive Syntactics to Progressive Pragmatics

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Abstract

Gender justice refers to the fair and equitable treatment of individuals of all genders in social, economic, political, and legal contexts. Still, women continue to be under-represented in decision-making roles that directly impact their lives, safety, and well-being. Progress towards equal power and equal rights for women remains elusive around the world. Globally, discriminatory laws, policies, and attitudes remain common and ingrained. In crisis settings, women often bear the brunt of violence, marginalization, and economic exclusion. Gender justice seeks to address historical and ongoing disparities and discrimination based on gender, striving for a more just and equal society where all individuals have equal rights, opportunities, and access to resources, regardless of their gender identity or expression. The issue of gender justice has been debated over for a long time and is still one of the biggest human rights challenges. Although gender equality is a fundamental human right and is essential for a peaceful and developed society, achieving gender equality is still an unfinished business. In India, deeply-rooted cultural institutions play a major role in perpetuating gender inequality. The Indian courts often act as activists for people and a profound Indian Constitution create hope for achieving gender justice. In the past few years, India is witnessing a rapid transition from women's-development to women-led development with the vision of a new India. To this end, the Government has adopted a multi-pronged approach to address issues of women on a life-cycle continuum basis encompassing educational, social, economic and political empowerment, so that they become equal partners in fast paced and sustainable national development.

Key Words

Gender, Justice, Inequality, Marginalization, Empowerment, Development

Introduction

The movements for gender justice in this period owed a great deal to the expansion of spaces where these demands could be articulated and debated; spaces that were opened up by international UN conferences in the 1990s on environment, human rights, population and women. In the new millennium, however, the project of gender justice has been critiqued as being unsuccessful for several reasons. On the one hand, there is, as mentioned before, a less favourable economic and political climate for pursuing equality projects per se. On the other hand, gender mainstreaming, which represents the main strategy for pursuing gender equality through development, has lost its trustworthiness as a strategy for social transformation. “What is clear is that from the very founding of women, gender and development the ‘women’s point of view’ was not singular but heterogeneous and multiple. This continue to constitute a challenge to the dominant Western feminist will to enforce a gynocentric philosophy and practice, which centres and magnifies patriarchal power and marginalizes other vertical social relations. It is in this context that the language of justice, rights and citizenship needs to be re-assessed by foregrounding the reality of power relations. This reminds us of the political nature of the project and focuses on the sites where struggles for equality are being contested. Contemporary discourses on gender justice have many different starting points: philosophical discussions of human agency, autonomy, rights and capabilities; political discussions involving democratisation and citizenship; and discussions in the field of law about judicial reform and practical matters of access to justice. Across these debates we find the same unresolved dilemmas: can absolute and universal standards be set for determining what is right or good in human social relations? How should the rights of the individual be offset against the needs of the family, the community, the ethnic ‘nation’ or the territorial state? What is the appropriate role for the state and the international community in promoting gender justice? Gender justice is often used with reference to emancipatory projects that promote women’s rights through legal changes and women’s interests in social and economic policy. However, the term is seldom given an accurate definition and is too often used interchangeably with notions of gender equality, gender equity, women’s empowerment, and women’s rights, which makes it difficult to pin down. Any concrete definition of gender justice is based on a specific political ideology, a set of convictions

about what is ‘right’ and ‘good’ in human relationships, and how these desirable outcomes may be attained. Conventions about women’s subordination to men and the family are often rooted in assumptions about what is ‘natural’ in human relationships. These perspectives on women’s rightful subordination are legitimated by socially and legally embedded views on propriety. It is not surprising, therefore, that concepts of gender justice that seek to enhance women’s autonomy or rights are contentious and provoke strong debates. But this is not the only reason they are controversial. A final area of focus in attaining gender equality is women’s economic and political empowerment. Though women comprise more than 50% of the world’s population, they only own 1% of the world’s wealth. Throughout the world, women and girls perform long hours of unpaid domestic work. In some places, women still lack rights to own land or to inherit property, obtain access to credit, earn income, or to move up in their workplace, free from job discrimination. At all levels, including at home and in the public arena, women are widely underrepresented as decision-makers. Globally, no country has fully attained gender equality. Scandinavian countries like Iceland, Norway, Finland, and Sweden lead the world in their progress toward closing the gender gap. In these countries, there is relatively equitable distribution of available income, resources, and opportunities for men and women. The greatest gender gaps are identified primarily in the Middle East, Africa, and South Asia. It is crucial that this message of approaching the post 2015 MDG formulations from a gender lens is understood adequately. Overwhelming evidence already tells us that despite decades of development interventions, it is women who continue to be the majority of the world’s poor. There is also evidence to show that the greatest barrier to progress on development goals has been gender inequality. The critical link between women’s empowerment and their equal access to education, work, health care and decision making to development outcomes is already well established. Such evidence and ground realities should be the driving force behind the framing of global development goals.

Justice, equality and empowerment: Issues that go beyond “smart” indicators

There is a common argument that issues of justice and equality cannot be measured, and that even if some measurement indicator can be worked out, they are neither “smart” enough to make scientific and

statistical sense nor tangible enough to determine impact. Being “smart” here means, of course, satisfying international development model requisites that an indicator should be specific, measurable, achievable in a cost effective way, relevant for the programmes, and available in a timely manner. This sounds like a very reasonable tool to proceed with in a development project. But in reality, applying this tool to every project does not bring about the desired goal. For decades we have been pushed to come up with “smart” results and indicators in social, legal and cultural program models which have all along been premised on scientific metrics which again look at parameters or measures of quantitative assessment. It is not a surprise therefore, to have less than “smart” indicators when we are trying to gauge a social outcome through a mathematical tool. For post 2015 MDGs and especially SDGs, it will be necessary to reformulate the way performance indicators are devised for programs on access to justice, equality of opportunities and empowerment of communities.. Not all sectors of development can be straight-jacketed into pure outcome or performance indicators. Process indicators are much better suited to picking up the differences and nuances of development in issues of justice, gender equality and inclusion of diversities. A lot more work has to be done in the Post 2015 development goals process to make a tangible link between pure development language and rights language. One way to go about this is to change the definitions of development and to give new meanings to concepts of rights, entitlements and empowerment. For developing effective indicators on equality and access to justice in the MDG/SDG framework we can look at CEDAW’s (Convention on the Elimination of All Forms of Discrimination against Women) definition of discrimination. Looking at CEDAW will help development outcomes to be based on the recognition of existing inequality and the cumulative effect of past discrimination. CEDAW prescribes a redistribution of opportunities and resources as part of equality measures under Article 4.1, which deals with Temporary Special Measures (TSM). As an indicator, among other things, MDGs and SDGs could use this framework to help countries identify how TSM can be incorporated in the law and find numbers of women in that country who have benefited from TSM and in what ways. This can be further disaggregated by bringing in intersectionality of class, age, education, religion, ethnicity, physical and mental ability, income, location and other realities.

Gender Justice and women empowerment in India

The idea of gender justice is the substantive recognition of equality in its ethical syntactics, but it remains in a vacuum unless and until it is manifested in pragmatics in the lives of the women and girls. The gender justice is the target to achieve full equality with equity among women and girls and men and boys in all spheres of human development. The gender justice is the result of men and women jointly defining and shaping the policies and structures on the anvil of equality in the civil society. Women empowerment is gaining momentum at a fast rate and why not? Nothing has been discovered so far which a woman cannot accomplish. From being a perfect homemaker to running huge businesses, women have the power to overcome every challenge. The Government of India has also taken a lot of steps to empower women. The launches of various schemes and measures have definitely helped women greatly to spark their talent and build their identity. Gone are the days when women needed permission even to step out of the house. In the 21st century, women are multitasking and excelling in managing their work-life balance. Honorable Prime Minister Narendra Modi once said that no country can progress if its women are not full partners in the development process. The Government of India has taken various steps towards women empowerment and safety. Initiatives like Beti Bachao, Beti Padhao, Stand up India, Mission Indradhanush and many more have added to the welfare of the women population in India. With each passing day, we are getting more and more of women entrepreneurs which is not limited to the urban areas but from villages also. Bharatiya Mahila Bank (BMB), in a merger with State Bank of India, empowers women of rural India by making them economically independent. Various other banking schemes like Udyogini Scheme, Mudra Yojana Scheme for Women, Annapurna Scheme, and many more are giving women wings to fly.

Touted as one of the largest programmes to have been conceived of by the Modi government, Beti Bachao Beti Padhao was launched on 22 January, 2015 from Panipat in Haryana to reverse the declining Child Sex Ratio and improve efficiency of welfare services for girls. Over the past three years, the programme has been on the receiving end of not just heavy criticism for its design and implementation, but also has been widely regarded as mere political posturing tool for the Modi government. While on one hand certain states like Haryana have seen

considerable improvement in sex ratio at birth numbers, much remains to be done in ensuring that this programme is a success in the long run. There are eight monitorable targets in the 'Guidelines for District Collectors' handbook under the programme that are supposed to be tracked regularly by officers at the district level. Once aggregated, each of these indicators is expected to reveal an accurate picture of the state of girls and women in the country. The need of the hour is to foster stronger leadership at the district level specially to coordinate the work of the three departments involved (Health, Education and Women and Child Development) in the programme and to encourage innovation in achieving targets. Another pertinent issue is the need for stricter monitoring mechanisms to be put in place to assess the tangible impact of the programme. The District Task Force- one of many committees chaired by the Deputy Commissioner who is expected to evaluate the programme on a quarterly basis is an effective tool if it integrates organizations from the civil society and involves Panchayati Raj functionaries like sarpanches in achieving the aims of the programme. This could also serve as a grievance redressal platform and improve inter-departmental coordination. Changing social norms that are deeply entrenched isn't easy and will take a continuous sustained effort to do so. What is heartening to see is the visibility this government has provided to the issue of women and gender discrimination. This marks a watershed moment and an opportunity to move beyond superficial, half-baked measures to root causes. Over the next few years, greater focus is required in providing employment opportunities and implementing school to work transition programmes for women. The deteriorating female labour force participation or the inadequate reflection of work done by women in statistical figures is bound to have major repercussions on the economy going forward. The bigger challenge to patriarchy will be a greater number of women joining the formal workforce over casual labour. Beti Bachao Beti Padhao was started with the right intentions, but needs more stringent monitoring and utilization of resources if it has to be a success. A true metric of success for the programme will be when women have greater agency in deciding the course of their lives from school through to adulthood. (1)

Gender Justice Law & Sensitization:

The people with a preference for homosexuality, lesbianism, gay, transgenderism, and queer (LGBTQ) and cross dressings are illegal in

many Muslim countries like Saudi Arab, UAE and a sizable section of Muslim community in India consider these orientations and punishable offensive with prison terms. Therefore, the issue of gender justice in Muslim Personal Law has not been attended sensitively, and it was always entwined with a controversial issue of Uniform Civil Code (UCC) that has deflected the larger issue of gender justice. The UCC has been floated as a plausible alternative to achieve the unachievable in the present circumstances. There is no attempt to decipher and define the contours of the UCC about marriage, divorce, maintenance, inheritance rights, matrimonial property rights and custody of children, etc. Presently, these are the contentious issues simmering in all the religious communities, and all communities consider their religious laws and practices inviolable and unimpeachable to the hilt. For example; the position of Hindu community is dicey and volatile on the dilution of HUF (Hindu Undivided Family) that brings them huge tax concessions and exemptions and other benefits. Therefore, there cannot be utopian UCC likely to be a launch pad for social reforms and gender justice in future. The women movements and organizations like AIDWA (All India Women's Democratic Association) have been spearheading the cause of equal rights and equal laws for the women and girls to ensure gender parity in all communities in India. AIDWA has supported the significant movement led by Mary Roy for women's inheritance rights of the Syrian Christian Women. However, a large section of the Christian clergy has started a campaign to demand that the Christian Personal Laws relating to marriage, divorce, and inheritance must be reformed while taking into global norms of gender justice. Among the Muslims, after the *Triple Talaq*, the practices of Halala and polygamy must also be addressed with greater vehemence and vitality. There are some legislations enacted like Domestic Violence Act, 2005, Prohibition of Dowry Act, 1961, and the Sexual Harassment of the Women at Workplace-Prevention, Prohibition and Redressal-Act, 2013 and other laws and judicial guidelines against sexual harassment; rape and incidental offences laid down in the matter of *Vishaka v. State of Rajasthan & Others* that have been appreciated through the lenses of gender equality. The SC had perceived sexual harassment in the workplace as a *social problem of considerable magnitude* based on discriminatory tendencies against women. The court stated that "Gender equality embraces protection from sexual harassment and the right to work with dignity, which is a universally recognized fundamental human right." In reality, it is the

Libidinal Perversion Gratification (LPG) mindset of the men folk that works against the women in the public space as well as on the internal walls. All these laws have been enacted under the mounting pressure, but there are many violations of these statutes than the compliance with their provisions. The implementation of these laws has become the biggest challenge in the wake of entrenched patriarchy in all the religious communities in India. The patriarchal mindset has seeped deep into the government and its instrumentalities resulting in the incremental incidences of crimes against women. Thus, it is time to implement these legislations without brooking an iota of discrimination and to establish India as a modern liberal democracy. (2)

Triple Talaq and Sabarimala issue: Modi government's introspection

The Triple *Talaq* verdict has created a new space for gender justice, and the court treated the *women's rights as human rights* under International Human Rights Law. Therefore, the court has recognized the Quranic injunctions on gender equality that Muslim women lacked for centuries. In the Holy Quran, the *Triple Talaq* is pronounced by a man with the word *Talaq* speaking thrice over the period of three months. The latest SC decision has established the supremacy of constitutional guarantees in upholding the gender equilibrium in human relationships within the religious structures including of Islam. Now, the time has come to reform the unjust and obsolete religious practices under the new laws across the communities while expanding the horizons of gender justice. Therefore, progressive codification of Muslim Law must be commenced while taking into primacy of the jurisprudence expounded by the Supreme Court, Constitution of India and the Holy Quran. The convergence of the right to religious freedom and gender equality poses intricate challenges within the realm of human rights. An eminent illustration of this intersection is found in the Sabarimala Temple situated in Kerala, India. This temple, devoted to Lord Ayyappa, historically prohibited women of menstruating age from entering its premises, citing entrenched religious customs and traditions. However, in a landmark ruling in 2018, the Supreme Court of India deemed this practice unconstitutional and a violation of women's right to equality. The Sabarimala case captivated widespread attention and ignited fervent debates, shedding light on the delicate equilibrium between religious practices and gender equality. It spurred contemplation on the boundaries and implications of the right to religious freedom

and its potential impact on gender equality. The analysis delves into the intricacies of the Sabarimala case, with the primary objective of offering a comprehensive analysis encompassing its legal, social, and cultural dimensions. Additionally, it explores the ramifications for religious practices, women's rights, and the broader discourse surrounding human rights. Ultimately, it aims to provide valuable insights to inform future actions and policy decisions. The Kerala High Court addressed a PIL filed by petitioners who alleged preferential treatment and a violation of the principle of equality. The Sabarimala verdict evoked diverse reactions from society, with varying perspectives on its significance. For many, the judgment delivered by the apex court represented a ground-breaking milestone in achieving gender equality and marked a crucial turning point in Indian legal history. It was perceived as a powerful blow against the foundations of patriarchy. Activists argued that the tradition of barring women from entering the temple lacked a rational basis and was rooted in outdated philosophies that no longer hold relevance in modern times. The verdict, which granted women aged between 10 and 50 the right to worship at Sabarimala, was seen as opening new horizons for the future of a progressive India. Supporters viewed it as a step towards inclusive practices and an affirmation of women's agency in expressing their faith. However, there were those who emphasized the importance of respecting traditions and believed that the judiciary should not intervene in matters of religious belief. They argued that the followers of Lord Ayyappa should adhere to the faith established by the Swami, who is revered as celibate and would be deemed impure if women within the age group of 10 to 50 were allowed inside the temple. According to this viewpoint, true devotees of Lord Ayyappa should abide by the norms laid down by the Kerala Hindu Places of Worship Act, 1965. These differing perspectives reflect the complex interplay between faith, tradition, gender equality, and the role of the judiciary in shaping religious practices. The Sabarimala verdict ignited a broader societal debate on the balance between religious customs and individual rights, highlighting the ongoing struggle to reconcile age-old traditions with evolving societal norms in contemporary India. The Sabarimala case highlights the inherent tension between religious freedom and gender equality. On one hand, religious practices and beliefs are deeply personal and hold immense significance for individuals and communities. The freedom to practice and propagate one's religion is a fundamental right that should be protected. On the other hand, gender equality is a core principle of modern societies and is enshrined in the

constitutions of many nations, including India. Resolving this tension requires a delicate balance between respecting religious autonomy and ensuring gender equality. It demands a nuanced understanding of the religious practices in question, their historical context, and their impact on women's rights. It also calls for a recognition that social norms and traditions evolve over time, and the interpretation of religious customs must adapt to contemporary values of equality and inclusivity. Ultimately, the Sabarimala case serves as a poignant reminder that the quest for gender equality and religious freedom is an ongoing journey. It calls for a nuanced understanding of the complexities involved and a collective effort to create a society where individuals can freely exercise their religious beliefs while ensuring that no one is marginalized or discriminated against based on their gender. (3)

Narendra Modi has clarified his position on both the Triple Talaq Bill as well as the movement for women's right to enter the Sabarimala temple. Though problematic on the face of it, here is a remarkable effort in the defense of the indefensible. While he classified the former as a tool for ensuring equal rights for Muslim women, he ended up contradicting himself when it came to talking about gender justice for women in the *Sanatan* faith. The Prime Minister categorically stated that the Sabarimala issue was one of tradition and was totally different from the Triple Talaq Bill which was a matter of gender equality. Last year, the Supreme Court in a historic judgment upheld the right of Hindu women of all age groups to worship at Lord Ayyappa's shrine. Incidentally, a year ago, the court also said that Triple Talaq, pronounced in one single sitting, was null and void. Lord Ayyappa's devotees believe the deity was celibate, because of which women's entry into the shrine is disrespectful, and violates the sanctity of the temple. Basis this argument, there has been a tradition where women of menstruating age are not allowed entry inside the Sabarimala temple. Since the Supreme Court judgement, multiple attempts to enter the *garbhagriha* by women's groups have been thwarted by the temple board. Ayyappa devotees from across the state have taken upon themselves to block the implementation of SC's judgment. Prime Minister Modi extended his subtle support to the citizen protests over for the tradition and the continuation of the ban on women. On similar lines, despite placing the issues of Sabarimala and Triple Talaq on two different pedestals, minority opinion in the Triple Talaq judgment that called for the state to make law on the matter held sway as the government obliged

with a bill in the parliament in real short time. However, what is more noteworthy that quietly, but resolutely, the PM is taking up gender issues and working towards gender justice as well. In the late 1980s, Rajiv Gandhi sided with the obscurantist's while dealing with the Shah Bano case and took a blatantly retrograde position. What the Congress government dithered over, NDA-2 has come clean on and taken a bold, unambiguous stand, which also needs to be considered as a concrete step towards the democratization of gender justice. Apart from an array of gender issues either boldly or obliquely, directly or indirectly touched upon by Prime Minister Modi, what is also remarkable is his readiness to double up as a reformer while being a politician.

Conclusion

Contemporaneous legislation, laws, treaties and conventions have unequivocally established equal rights for men and women as a global norm. In spite of all this, discrimination continues. It is a harsh reality that women have been ill-treated in every society for ages and India is no exception. The irony lies in fact that in our country where women are worshipped as *Shakti*, the atrocities are committed against her in all walks of life. If gender bias is identified in all its nuances and hues that would be a large step in dealing with this dilemma. It is not special treatment for women or for men that is called for, because such special treatment is not needed. Instead, what is needed is sensitivity to the ways in which unexamined attitudes about men and women lead to the unintended result of biased decision-making. Once this sensitivity is achieved, and it is reinforced by inquisitiveness, analysis and openness, then and only then will the litigants be able to explain their circumstances to a court that is both willing to learn and to judge to achieve a gender neutrality in its judicial system, which is both vital and important for the ultimate achievement of justice in its purest and highest form. Though acknowledging that the government is formulating women empowerment policies, it is not a one man-job; the entire humanity will have to join hands to achieve the objective.

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Final Solutions: Addressing Marginality and Religious Minority

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Mahesh Dattani is considered to be one of the most powerful contemporary Indian playwrights. He is a versatile theatre person on the plea that he is a writer, a director, an actor, a dancer and a teacher. He has his own theatre group, 'Playpen'. (Dattani, n.d.) He has directed the film "Mango Souffle". Besides, he has authored a film-script, "Ek Alag Mausam". He has also written radio-plays. Through his plays, Dattani speaks for the humanism and justice for the marginalised people like the gays, the lesbians, the hijaras, the minorities, the women and so on. In every sense, his plays are thought-provoking and they are far from being conventional. But, in no way, Dattani is a preacher and has no new dogmas to propagate.

The term "Marginality" has gained immense popularity in recent times. But, what is meant by marginality? It is better to admit that the notion of marginality is rather vague. Simply speaking, the term "Marginality" has close association with those who live on the margin of society. At length, it may be observed that marginalised people are those for whom the society pays no attention. The result is that the marginalised people often become the victims of exploitation from all corners. With the passage of time, many critics and researchers have been attempting to explore multiple dimensions of marginality. Attempts should also be made to provide with various definitions of marginality.

The term "Marginality" refers to the position of dissident intellectuals and social groups like the women, the lesbians, the gays, the blacks, the minorities, the physically challenged people the Dalits who see themselves at a remove from the normative assumptions and oppressive power-structures of main-stream society. The term "Marginality" also suggests a negative experience of alienation. The term is used in academic debate and activist politics to suggest a position of advantage from which the dominant society can be critiqued and disrupted. Here,

the difficulties are that all such individuals or groups have not the resources to speak from the margin.

The play Final Solutions is considered to be one of the finest compositions of Mahesh Dattani. It is a powerful indictment of the communal passions that threaten to split our country. Being a humanist, Dattani seeks to do away with the artificial division of cast, creed and religion from Indian Society. Through this play, Dattani wants to suggest that humanity should be the virtue of the modern world. The play was first performed at Guru Nanak Bhavan, Bangalore on 10th July, 1993 and directed by Mahesh Dattani and Preetam Koilpillai jointly. It was then performed at Tata Theatre, Mumbai on 11 December, 1993 directed by Alyque Padamsee. It should be categorically pointed out at the very outset that in the present play, the sole intention of Dattani seems to explore the theme of “Marginality”.

This drama speaks of two Muslim boys who take shelter during a communal Hindu-Muslim riot, in the home of a Hindu Family. Each member of the family the old grandmother, Hardika who is also shown in flashback as what she was a 15-years old girl-wife back in 1948, her now middle-aged son Ramnik Gandhi and his wife Aruna and Smita their daughter. All react variously to the overnight presence of the Muslim youths in their midst. Outside, there is the presence of the Chorus, a mob of individuals who alternately put on Hindu and Muslim masks. But, they are indistinguishable otherwise in their frenzy and instinct for blind and violent hatred; provide a pulsating backdrop to the tensions witnessed by Gandhi house hold. At the very outset, the spectators come across two classes viz. the majority and the minority. The class of majority is represented by the members of the Ghandhi family whereas Bobby and Javed stand for the class of minority. A conflict is inevitable between these two classes and ultimately this conflict will lead to the formation of the dramatic conflict of Final Solutions.

The destruction of the Babri Masjid and the subsequent violence, especially in Bombay and Gujrat, remain some of the most catastrophic incidents of communal violence in South Asia in the past twenty years, claiming the lives of at least nineteen hundred people and injuring more than fifty eight hundred others. Final Solutions was supposed to premiere in Bangalore during the first week of December, in 1992. In Karnataka, seventy three people were killed. There is no way of knowing if the play could have stopped these deaths in Karnataka. However, what is clear

is that Final Solutions creates awareness and generates dialogue among diverse groups of people. Directors of the play have taken advantage of this. In 1993 the play was performed in Bombay when the horrific riots caused by the mosque's destruction were still fresh in the minds of many of the play's audience members. Performances that have occurred after the Gujrat violence of 2002 bring a new layer of meaning to the play's text. The importance of studying the potentialities of Final Solutions to address religious communalism in the context of the Ayodhya Dispute is thus apparent. The above analysis enables the readers and the spectators to apprehend the fact that even in post-modern era communalism, bigotry and fanaticism tend to destroy the peaceful existence of the civilized human beings. It is a matter of serious concern as well. Through the exploration of such a burning issue, Dattani seeks to make this world a better and safer place for all people to live.

It should be noted clearly that Final Solutions is a stage play of Mahesh Dattani in three acts. In the first act, the play opens with the presence of the Mob in the open street. The house of Ramnik Gandhi becomes visible at the same time. Two Muslim youths seek shelter in Ramnik's household to protect themselves from the attack of the Hindu Mob. After initial hesitation, Ramnik opens the door and gives shelter to Bobby and Javed. All the characters of the play have been introduced in the first act. The second act begins with the entrance of Smita, Ramnik's daughter. With the passage of time, the action moves. The real identity of Bobby and Javed has already been established, Smita points out that Bobby is the fiancée of Tasneem and Javed is Tasneem's brother. In the final act, most of the characters excluding Aruna succeed to give up their own feelings of pride and prejudices. Efforts have been engaged to convey the message, "It is a curse to be less in number". Besides, light has been thrown on the problems of the Muslim in post independent India on the plea that they are yet considered as marginalised. It is better to have a quick look in the plot of the play Final Solutions.

Final Solutions opens with the image of five masked individuals dressed in black. Dattani has labelled this group of characters as "the Mob/Chorus". Each member of the Mob/Chorus has two masks: a Hindu mask and a Muslim one. The Mob/Chorus remains on top of a large crescent shaped ramp for most of the play. Beneath the ramp is the home of the Gandhis, a middle-class Hindu family, in present day Amargaon, Gujrat. The Gandhi family comprises of the elderly survivor

of the partition of India and Pakistan, Hardika, her son Ramnik, her daughter-in-law Aruna, and her granddaughter Smita. On another level of the stage is Daksha's room in 1948. Thus the play is divided into three spaces: the realm of the Mob/Chorus, the home of the Gandhi family, and the memory of Daksha. At various points in Final Solutions these three separate worlds interact and overlap with each other. It is important to note that the setting of this play also deals with the theme of marginality, of course, in an indirect way. The household of Ramnik may be interpreted as the "centre" whereas the open street may be considered as the "periphery". Bobby and Javed come from the street and they enter Ramnik's household. The assumption is that the marginalised people have been attempting to come from the "periphery" to the "centre", in order to raise their own voice.

With the passage of time, it is revealed that a chariot has been broken down in Karimbug of Amargaon during the RathYatra. As a consequence, several riots between the Hindus and the Muslims began. The people of both the communities blame each other for the riot. Besides, on the eve of this tension, the feelings of hatred and violence have come to the fore front. The communal violence between these groups brings back Hardika's memories of the partition and her life as a new bride in 1948. Her memories are expressed throughout the play through the character of Daksha who is shown reading from her diary. The Gandhi Family is safe within their home and although Smita is worried for the safety of her Muslim friend, Tasneem Ahmed, the family is having a relatively peaceful evening. This tranquillity is disrupted when Bobby and Javed, two young Muslim men, arrive at their doorstep begging to be let inside. The Mob/Chorus, who has donned their Hindu masks, is after Bobby and Javed and threatened to kill them. Despite the objections of Hardika and the deeply religious Aruna, Ramnik opens the door of his home thus protecting the young Muslims. The interactions that occur between the Gandhis and Bobby and Javed throughout the course of the night form the crux of the play. At this portion, there is a categorical message. The message is that if the marginalised people like Bobby and Javed are not treated properly, the peaceful existence of the majority may be threatened. The fear and scepticism of Hardika and Aruna may be cited as a glaring instance in point.

Hardika still harbours resentment against Muslims due to the events that had occurred in her life following the partition and thus protests

against Bobby and Javed's presence in her home. Through the character of Daksha, the audience is able to see slowly the two factors that are the source of the adult Hardika's animosity towards all Muslims. The first was the murder of her father in her home town of Hussainabad, which became a part of Pakistan during the partition. The second reason is the physical and mental abuse she had to endure when her husband Hari and her in-laws found out about her friendship with her Muslim neighbor Zarine. Her son Ramnik is a secular Hindu and much more hospitable to the boys. However, the audience later learns that Ramnik's kindness is partly driven by the guilt he feels over running the business his father acquired by cheating Zarine's family after the partition. Ramnik's wife Aruna is a deeply devout woman who feels extremely uncomfortable with Muslims sitting in her home and drinking water from her glasses. She believes that their touch is polluting. At this juncture, the readers come to learn regarding the honesty of Dattani as a playwright. On most of the occasions, it becomes categorical that under the coverage of so-called modesty, the Muslims are treated as untouchable by their Hindu counter parts. Living on the margin of society, the Muslims hardly succeed to be recognised as the part of the main-stream society.

Smita, Ramnik and Aruna's daughter is also very uncomfortable with Bobby and Javed's presence, but for a different reason. Prior to the actions of the play, Smita and Bobby had a brief romance with each other, which they later decided not to pursue. Now Bobby is engaged to Javed's sister and Smita's friend Tasneem. Smita also struggles with her relationship with her mother, whom she describes as "stifling" her with religious rituals. Bobby, whose real name is Babban, is a secular Muslim who tries to hide his religious identity. Javed, on the other hand, is a Muslim youth with a strong sense of identity. After becoming a victim of religious prejudice during his childhood, Javed has started working as a hired hoodlum who is paid to start riots. In fact, he was one of rioters who disrupted the RathYatra. Bobby has been trying to persuade Javed to give up his profession. To some extent, a conservative Hindu is seemingly responsible to make Javed a communal individual. Years ago, religious intolerance shown by that conservative Hindu placed Javed to the problem of "Identity Crisis". Being misguided by the fundamentalist, Javed has been transformed into a rioter. At this point, one may refer to the case of Siddhartha Dhar, a young Bengali man settled in London. Recently, being misguided by the fundamentalist he has joined ISIS, a terrorist organization. And like Javed,

Dhar has become an enemy of human civilization.

The play reaches its climax in the early hours of the morning. Suddenly Bobby enters Aruna's Pooja room and picks up the image of Krishna which is tiny enough to sit on his palm. The ensuing action is so powerful that it deserves an extended quotation:

Bobby (extends his hands and shows the image to everyone). See! See! I am touching God.

Chorus all (pounds thrice). we are not idol breakers!

Bobby. Your God! My flesh is holding him! Look, Javed! And He does not mind!

The Mob/Chorus pounds.

Bobby. He does not burn me to ashes! He does not cry out from the heavens saying he has been contaminated.

Chorus all: Don't break our pride!

Bobby. Look how he rests in my hands! He knows that I cannot harm him. He knows his strength. I don't believe in Him but He believes in me. He smiles! He smiles at our trivial pride and our trivial shame.

Chorus all: Don't break our pride! (Pounds thrice)

Bobby. See, Javed! He doesn't humiliate you. He doesn't cringe from my touch... he welcomes it! I hold Him who is sacred to them, but I do not commit sacrilege. (To Aruna.) You can bathe Him day and night, you can splash holy waters on Him but you cannot remove my touch from His form. You cannot remove my smell with sandal paste and attars and fragrant flowers because it belongs to a human being who believes, and tolerates, and respects what other human beings believe. This is the strongest fragrance in the world! (Dattani, 2000)

The action freezes. Bobby slowly and tenderly replaces the image in the pooja room. Aruna (breaks down). Oh! Is there nothing left that is sacred in this world? Bobby realises, "...If we understand and believe in one another, nothing can be destroyed." All on a sudden, looking at Hardika, Bobby says, "If you are willing to forget, I am willing to tolerate." (Dattani, 2000) This resolution is indeed one of the final solutions offered by the dramatist. It is clear that the fires of communal passion are ignited less by the drives and instincts of personal fate

than by hidden economic motivations fuelled by greed and the lust for power. It is a ray of hope that the utterances of Bobby speak of the ways of solutions that will ensure the up liftment of the marginalised people. Again, it is also hinted at that the coming of the marginalised people to the centre or their union with mainstream society is only a matter of time.

In the real sense, most of the plays of Dattani, witness a “twist”. Final Solutions cannot be an exception to this observation. After the departure of two Muslim boys, Ramnik refuses to go to his shop any longer. Ramnik says, “I don’t think I will be able to step into that shop again...When those boys came here, I thought I would... I hoped I would be able to ...set things right.” (Dattani, 2000) Truly speaking, after years of silence, Ramnik’s conscience of protest becomes too strong. He informs Hardika for the first time that her husband and her father-in-law had been instrumental in burning down a cloth store owned by a Muslim family to buy it in less than half its real price. The Muslims are not the only ones who have destroyed. Ramnik feels that he has no face to tell anyone all these. Ramnik tells Hardika, “So, it wasn’t that those people hated you. It wasn’t false pride or arrogance. (A Noor Jehan song can be heard very faintly.) It was anger.” (Dattani, 2000) The song plays for some time and stops as if the record has been smashed by a stone.

Hardika (crushed). Why didn’t you tell me? All these years.

Ramnik. You have to live with this shame only for a few years now. (Dattani, 2000) The awakening of Ramnik’s conscience is indeed a positive development. Through the process of self-analysis, Ramnik goes through the expected “metamorphosis”. The indications are that in the coming days the marginalised people may expect better treatment from society. The so-called conservative, Hardika is also in the process of reformation.

A few sentences should be written regarding the title of the play Final Solutions. The title of Dattani’s play is a reference to the euphemistic term “Die-Endlösung” (Volle, 2024) (Final Solution) that Nazis used to call their plan to exterminate the Jewish population of Europe. Padamsee clearly saw a connection between the ideologies of the Nazis and the Hindu rioters stating in his director’s note, “who was responsible for the humiliating state in Germany after World War-I? Blame it on the Jews! They had siphoned off all the money! Who is responsible for us

becoming a third-rate nation? Get rid of the minorities and Ram Rajya will return!” Yet the title *Final Solutions* is more than a remainder of the worst genocide based on religious identity that the world has been in past hundred years. The title makes the audience provoke to ask themselves, “Are there solutions to religious communalism” (Communalism, n. d.)? It is innovative on the part of Dattani that he succeeds to bring about the proximity between the Muslim and the Jews. Both the classes belong to the category of the minority. Employing his consciousness of history, Dattani put side by side the Muslims and the Jews to explore their agonies and exploitations at the back drop of the presentation of the theme of “marginality”.

There is no denying the fact that Dattani has transformed the Nazi notion of “Final Solution” into *Final Solutions*. In a convincing way, Dattani, conveys the message that universal tolerance and religious acceptance are not the possessions of any particular community of the world. They are rather the mode of transportation into the state of transcendentalism (Transcendentalism, 2024). A man should be recognised not by religion but by human dignity. Again, in this age of Globalisation the concept of marginality changes from time to time. The level of marginality changes as well. For instance, the Muslims are the minority and the Hindus are the majority in India. But, in Pakistan, the Muslims are majority whereas the Hindus belong to the category of the minority. Thus, the conditions and the status of the people living on the margin change from time to time and place to place. In the present play, Dattani becomes vocal regarding the terrible consequences of communalism, bigotry and fanaticism.

In a final analysis, it may be asserted that man has entered the 21st century. Man’s advancement in the world of science and technology is beyond imagination. But, despite being progressive, the regress of human civilisation will become only a matter of time if the problem of “communalism” exists. Years ago, on the floor of International Congress of Religion Swami Vivekananda, (Singh, 2023) a great humanist spoke of the foundation of human religion. Through his magnificent lectures, he pleaded for the end of all religious intolerance and sectarianism. In his first address, in this International Congress of Religion of Chicago, Vivekananda said, “I am proud to belong to a religion which has taught the world both tolerance and universal acceptance. We believe not only in universal toleration, but we accept all religion as true. I am proud to

belong to a nation which has sheltered the persecuted and the refugees of all religious and all nations of the earth” (Lokeswarananda, 2018). In a similar way, Mahesh Dattani speaks of a world where there will be no existence of communalism, bigotry and fanaticism. Everybody will live in the future world with perfect harmony and with the strong feeling of solidarity with each other. Being a visionary, Dattani hopes that in the ensuing days, there will be no notion of “marginality”. Everybody will live with honour and dignity. Through the plot of *Final Solutions*, Dattani makes a strong plea for the abolition of the distance between the “periphery” and the “centre” in the days to come.

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Empowering Women: The Rise of Self-Help Groups in India's Development Narrative

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Abstract

This paper examines the role of Self-Help Groups (SHGs) in empowering women and fostering economic growth in India. It highlights the historical evolution of SHGs, their impact on marginalized communities, and their contributions to women's empowerment. The paper emphasises the importance of addressing systemic barriers to achieve true gender equality.

Keywords:

Self-Help Groups (SHGs); historical evolution; women's empowerment

Introduction

Investing in enhancing the capabilities of women and empowering them to make independent choices is not only intrinsically valuable but also stands as the most effective means to foster economic growth and comprehensive development, as stated by the United Nations in 1995. The correlation between women's empowerment and societal progress has been a central focus in studies examining the holistic development of nations. Empowerment transcends mere political representation; it encompasses a multifaceted process encompassing personal, economic, social, and political dimensions, with personal empowerment serving as its nucleus. Women's empowerment emerges as an indispensable catalyst for fostering development. In light of the government's shortcomings in various welfare schemes, the introduction of Self-Help Groups (SHGs) has been pivotal. Among the array of initiatives implemented in India, the Self-Help Group Bank Linkage Programme (SBLP) stands out as a crucial step towards integrating the economically marginalized

into the formal banking sector while instilling habits of thrift and credit management. Self-Help Groups, informal collectives aimed at enhancing living standards, operate on principles of self-governance and peer oversight. Introduced in India with the overarching objective of poverty alleviation through women's development, SHGs have emerged as instrumental entities in tackling a myriad of challenges faced by their members and communities alike. Their contributions span a spectrum of activities, including but not limited to, the maintenance of local infrastructure such as roads and drainage systems, dissemination of information regarding welfare programs, facilitation of developmental initiatives like mid-day meal programs, informal oversight of Integrated Child Development Services community mobilisation efforts such as advocating for girls' education, and active participation in awareness campaigns.

Literature review

Self-help groups (SHGs) represent informal coalitions formed by individuals to collectively address shared obstacles. Rooted in a principle of reciprocal aid, SHGs thrive on members aiding one another. These groups operate with the overarching objective of harnessing collective assistance, solidarity, and shared responsibilities to maximize economic benefits. Utilizing a community-focused approach, women are encouraged to save, thus accumulating funds and gaining entry to formal credit channels (Shylendra 1998). The concept of collective liability effectively sidesteps the necessity for collateral, as members jointly assume responsibility for loan repayments, thereby reducing lenders' risks. This shared sense of accountability also fosters mutual oversight, thereby enhancing loan recovery rates (Stiglitz 1993). In summary, SHGs have proven effective in reaching underprivileged demographics, particularly women, facilitating their access to financial services such as savings and credit (National Bank, 1995).

Role of SHG's

Self-Help Groups (SHGs) are voluntary and compact associations formed to offer mutual assistance, aiming to achieve specific objectives (Katz and Bender, 1976). Falling within the realm of village banking, SHGs typically consist of 10 to 20 members. Initially, members pool their savings and lend among themselves, fostering group cohesion. Upon demonstrating disciplined financial practices and stability over

a probationary period of up to six months, SHGs become eligible for loans (Vijaykumar, 2013). The Self-Help Groups (SHGs)-Bank Linkage Program is emerging as a cost-efficient mechanism, effectively extending financial services to marginalized populations often overlooked by traditional banking institutions (Dr. A. Sundaram 2012).

Definition of SHG

The National Bank of Agriculture and Rural Development (NABARD) defines Self Help Groups as “a homogenous group of rural poor voluntarily formed to save whatever amount they can conveniently save out of their earnings and mutually agree to contribute and emergent credit needs”. Krishnamurthi (1996) defined Self-Help Groups as “organization formed by people for pooling their resources to help each other”. Rao (2002) said that SHGs are a “useful tool to help the poor meet their urgent credit needs”.

History of Self help Groups

Self-help groups (SHGs) made their debut within MYRADA's initiatives back in 1985. By the following year, around 300 SHGs had sprouted within MYRADA's projects. Many of these groups emerged as a response to the dissolution of large cooperatives previously organized by MYRADA. In these regions, a group of members approached MYRADA, advocating for the revival of the credit system. Typically comprising 15-20 individuals, they expressed reluctance to return their loans to the cooperative, citing domination by a select few. MYRADA staff suggested that the funds be returned to the members themselves, prompting the formation of smaller, more cohesive groups.

Recognizing the need for guidance, MYRADA staff embarked on systematic training sessions covering meeting organization, agenda setting, and minute-keeping. Analysis revealed that group cohesion stemmed from bonds of trust and mutual support, often aligned with economic homogeneity. While caste and creed occasionally played a role, affinity relationships and economic similarities were predominant, leading to the inclusion of diverse castes and creeds within several groups.

From the inception of SHGs in 1985 to their integration into the government's annual plans by 2000/01 (Government of India, 2000), significant strides were taken by entities such as the National Bank for Agriculture and Rural Development (NABARD), the Reserve Bank of India (RBI), leading NGOs, and multilateral agencies like IFAD.

The SHG strategy emerged as a vital component of the government's overarching poverty alleviation efforts, consistently featuring in annual plans since 2000.

From 1887-1992

NABARD concentrated on aiding NGOs in promoting SHGs and evaluating their effectiveness. In 1987, NABARD provided funding to MYRADA to kickstart SHGs, aiming to assess their viability in helping people save money and access loans. This decision was influenced by MYRADA's prior experience and the endorsement of a key leader within NABARD.

After observing positive outcomes, NABARD extended financial support to other NGOs in 1989 to replicate the model. Subsequently, in 1990, the Reserve Bank of India (RBI) sanctioned the idea of banks lending to SHGs. NABARD then formulated guidelines in 1992 to streamline the process, leading to the establishment of the SHG-Bank Linkage Programme. Since then, NABARD has continued to facilitate the growth of SHGs by providing financial assistance and imparting financial management skills.

From 1992 onwards - the SHG-Bank Linkage Programme

The SHG-Bank Linkage Programme started in 1992 with an initiative involving 500 groups. However, the concept of self-help groups had already been introduced in 1987 with support from NABARD. Since 1999, this programme has experienced rapid growth, thanks to backing from various government bodies, NGOs, and banks.

By 2006, India boasted approximately three million self-help groups, with around 1.6 million linked to banks, meaning they could access loans. However, there are more self-help groups than those connected to banks, as some manage without loans or face challenges accessing banking services.

These groups serve a broader purpose beyond just accessing funds from banks. They play a vital role in teaching financial management skills and driving community-led initiatives. They empower marginalized individuals, particularly those sidelined due to factors like caste, class, or gender.

While the SHG-Bank Linkage Programme is a significant aspect of the self-help group movement, it doesn't encompass the entire spectrum.

Many self-help groups operate independently, offering assistance to individuals and communities in diverse ways.

The Rise of Self-Help Groups in Rural India

In recent times, Self-Help Groups (SHGs) have gained traction as a vital means of collective effort in rural India, spurred on by the introduction of the SHG-Bank linkage program by NABARD in 1992. Currently, there are about 7.9 million SHGs nationwide, with over three-quarters being exclusively comprised of women (NABARD, 2015).

Initially designed to bridge the gap between the formal financial system and those excluded from it, SHGs have since been recognized for their broader developmental potential across various sectors. Developmental organizations and practitioners have actively worked towards harnessing the capabilities of SHGs in agriculture, natural resource management, and generating nonfarm employment opportunities.

In the agricultural realm, SHGs play a critical role in maximizing the contributions of small and marginal farmers, while also integrating women into agricultural activities. Additionally, they serve as a key mechanism for reforming agricultural extension services, with group mobilization seen as essential for creating a demand-driven extension system.

The majority of Indian farmers, constituting over 80 percent, are smallholders facing challenges such as limited resources and restricted access to credit and markets. Despite possessing advantages like utilizing family labor and local knowledge, they struggle with high transaction costs and face gender-specific hurdles. Women farmers, in particular, encounter difficulties accessing land, credit, and technical assistance.

Despite the recognition of the importance of agricultural extension services, they often fail to adequately address the needs of smallholders, especially women. Current policies stress the importance of creating demand-driven extension systems and organizing farmers into functional groups like SHGs and Farmer Interest Groups (FIGs) to facilitate technology dissemination and feedback mechanisms.

Collective action plays a crucial role in organizing small farmers, particularly in the context of agricultural market liberalization. Joint efforts, such as collective investments and cultivation, offer benefits like

risk-sharing and increased productivity. However, challenges like free-riding and work avoidance must be addressed through effective group management and ensuring socio-economic homogeneity.

The collective action aspect of SHGs is strengthened by joint liabilities among group members, encouraging mutual accountability and effectiveness. Initiatives like the Agricultural Technology Management Agency (ATMA) extension approach advocate for the formation of farmer interest groups to promote self-reliance and reduce reliance on government support

SHG Development in West Bengal

Self-help groups (SHGs) have a long history in West Bengal, dating back to grassroots movements and community initiatives. However, the formal promotion and institutionalisation of SHGs in the state began gaining momentum in the late 1990s and early 2000s. During this period, the state government, along with various NGOs and development agencies, initiated several programs and schemes to promote the formation and support of SHGs.

One significant milestone in the promotion of SHGs in West Bengal was the establishment of the Swarnajayanti Gram Swarozgar Yojana (SGSY) in 1999 by the central government. Under this program, financial assistance and support services were provided to rural poor, including the formation of SHGs, skill development, and access to credit and marketing facilities. The SGSY program played a crucial role in catalyzing the growth of SHGs across the state.

Additionally, the government of West Bengal launched its own initiatives to promote SHGs and community empowerment. These initiatives focused on various aspects, including women's empowerment, poverty alleviation, and rural development. Special emphasis was placed on providing training and capacity building support to SHG members, particularly women, to enhance their entrepreneurship skills and income-generating activities.

By the early 2000s, SHGs had become an integral part of the socio-economic landscape of West Bengal. They were actively engaged in various activities such as savings mobilization, micro-enterprise development, agriculture, handicrafts, and healthcare. SHGs also played a vital role in addressing social issues such as gender inequality, caste

discrimination, and environmental conservation.

Overall, while the exact start date of SHGs in West Bengal may vary depending on specific initiatives and programs, their formal promotion and widespread establishment began before 2006. Since then, SHGs have continued to evolve and grow, contributing significantly to community development, poverty reduction, and women's empowerment in the state.

Initiatives Promoting Self-Employment and Livelihood Development in West Bengal

Empowering Youth: The Swami Vivekananda Swanirbhar Karmasanthan Prakalpa (S.V.S.K.P.) scheme targets unemployed youth aged 18 to 45, with exceptions up to 50 under special circumstances. It aims to create self-employment opportunities, especially for marginalized groups like minorities and women. By providing bank financing and government subsidies of up to Rs. 90,000 for individuals and Rs. 2.1 lakh for groups, the scheme encourages entrepreneurship and self-reliance.

Supporting SHGs: The JAAGO initiative, managed by the Department of Self-Help Group & Self-Employment, offers annual revolving fund support of Rs. 5,000 per SHG. This funding aims to empower SHGs to access bank credit, with eligibility criteria including those with cash credit limits, graded groups, or those meeting specific conditions like maintaining a minimum account deposit.

Promoting Entrepreneurship: The District Sabala Mela serves as a platform for SHGs, entrepreneurs, artisans, and handicraft artists to showcase their talents and creations. This annual event in Darjeeling encourages entrepreneurship and livelihood creation, with significant sales recorded each year, such as Rs. 10,00,813 during the 2019 mela.

Enhancing Skills: The Training on Self-Employment and Livelihood Augmentation program focuses on skill development for unemployed youth and SHG members. By improving their skills and knowledge, the program aims to increase employment opportunities and enhance the quality of products offered by SHGs.

Empowering Women: India's Path to Progress

The emphasis on women's empowerment and its pivotal role in social and economic development is underscored by organizations like the

United Nations. Despite comprising half of the population, women in India, particularly in rural areas, face limited control over income and opportunities, contributing to persistent poverty and unemployment challenges. Efforts to address these issues through initiatives like the Swarn Jayanti Gram Swarozgar Yojana (SGSY) and the National Rural Livelihoods Mission (NRLM) have seen mixed success. Scholars offer varying definitions of women's empowerment, highlighting its dynamic and context-dependent nature. Ultimately, achieving women's empowerment requires tailored interventions that empower women to make choices across all aspects of life, from health and education to employment and political representation. However, measuring progress in women's empowerment remains a complex challenge due to its multifaceted nature and contextual variability.

Strengthening Women's Empowerment with Self-Help Groups

Self-Help Groups (SHGs) are groups of local women who come together to support each other financially. In Karnataka alone, there are over 1,95,585 of these groups, mostly made up of women. These groups help women in rural areas understand their importance in the economy, especially in starting their own businesses.

SHGs started in the early 1990s when banks were encouraged to lend money to these groups by the Reserve Bank of India. Typically, these groups start by saving and lending money among themselves. Once they show they can manage money well for six months, they can borrow more money from the bank.

SHGs get help from organisations like NGOs, banks, and government officials. They have meetings and training sessions on topics like healthcare and marketing.

But empowering women isn't just about money. It's also about changing social rules and traditions. Even though women can earn money through SHGs, they may still face problems controlling their own lives and resources, especially in societies where men have more power.

Women's empowerment is a changing process affected by laws, social rules, and culture. While learning to start businesses is important, we also need to change society to truly empower women.

In India, helping women start businesses is seen as important for

the country's growth and harmony. Women have done a lot for India's economy, but they still need better access to money, help making connections, and learning how to start businesses.

Challenges Faced by Women in India

Entrepreneurs in India encounter numerous obstacles rooted in cultural, social, and historical factors. Traditional cultural values often prioritize acceptance of one's fate over striving for material improvement, while social structures revolving around the caste system can further restrict opportunities. Additionally, the legacy of British colonialism, which favoured British business interests over local enterprises, and government policies post-independence, which historically leaned towards state control of business, have posed significant challenges for entrepreneurs (Dana, 2000; Sharma, 2003).

For women entrepreneurs in India, these barriers are compounded by gender-specific challenges. Traditional gender roles have limited women's participation in household, workplace, and economic activities. Moreover, women face systemic barriers to accessing resources such as food, transportation, education, technology, and financial support for entrepreneurial ventures (Beneria, 2003; Kabeer, 1996; Hymowitz, 1995).

It's increasingly recognised that women's status across social, legal, educational, and economic spheres are interconnected. Restrictions on women's social, legal, and educational rights can both stem from and perpetuate economic limitations. Therefore, reforms aimed at empowering women in business can have ripple effects, leading to improvements in their social status, access to resources, and overall economic position. This interconnectedness highlights the importance of holistic approaches to addressing gender inequality in India

Conclusion

The empowerment of women through initiatives like Self-Help Groups (SHGs) is not only crucial for their individual well-being but also for the overall development of societies and economies. By addressing systemic barriers and providing access to resources, SHGs play a vital role in fostering economic independence, social inclusion, and gender equality. However, true empowerment goes beyond economic measures; it involves challenging social norms, changing cultural attitudes, and

advocating for women's rights across all spheres of life. Therefore, it is imperative for governments, NGOs, and communities to continue supporting and expanding initiatives like SHGs while simultaneously addressing broader systemic issues that hinder women's empowerment.

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Impact Of Mahatma Gandhi National Rural Employment Guarantee Act On Rural Employment: A Study At Kheada Gram Panchayat, South 24 Parganas, West Bengal

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Abstract

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is a flagship scheme of the GOI that directly touches the lives of the rural poor and seeks to ensure inclusive growth. The program aims to increase the livelihood security of families in rural areas and to provide at least 100 days of guaranteed wage employment to each family whose adult members are willing to do unskilled manual work. The Act was introduced by the GOI in August 2005. It was an important legislation that reaffirms India's position as a welfare state. And the way this scheme has improved the livelihood of the rural people is exceptional and proves that there is no alternative to this scheme in India at the moment. Therefore, keeping this background in mind, the paper has tried to explore how this scheme has been able to reduce unemployment and enhance livelihood security in Kheada Gram Panchayat of South 24 Parganas District.

Keywords

GOI, MGNREGA, Flagshipscheme, Employment, Unskilled labour

Introduction:

After independence, two of the major problems (among many) have emerged as main obstacles to India's economic development, one is unemployment and the other is poverty. Both of these problems are currently intensifying in rural India, in fact the situation is getting worse day by day. Government of India is aware of these issues and has taken various steps to solve these problems. Various social

welfare programs have already been introduced in this regard; some of these programs have been partially successful while others have been discontinued due to major flaws in their implementation. Some notable national level social welfare programs implemented by the GOI to get rid of those major problems are NREP (National Rural Employment Program), RLEGP (Rural Landless Employment Guarantee Program), JRY (JawaharRozgarYojana), EAS (Employment Assurance Scheme), JGSY (Jawahar Gram SamridhiYojana), SGRY (SampoornaGrameenRozgarYojana) and NFFWP (National Food for Work Program), NREGA (National Rural Employment Guarantee Act) etc.

Table1: Major Social Welfare (employment generation) Programs in India

Year	Name of the Programs
1971-72	Crash Schemes for Rural Employment
1979	Training of Rural Youth for Self Employment
1980	Integrated Rural Development Program
1980	National Rural Employment Program
1983	Rural Landless Employment Guarantee
1993-1999	Employment Assurance Scheme
1999	Swarnajayanti Gram SwarozgarYojana
1999-2000	JawaharGrameenRozgarYojana
2001-2002	SampoornaGrameenRozgarYojana
2004	National Food for Work Program
2005	National Rural Employment Guarantee Act

Objectives of the study

The present study has been undertaken with the following objectives-

1. To explain the program, aims and significance of MGNREGA.
2. To discuss the evolution and features of MGNREGA.
3. To know how successful MGNREGA has been in bringing livelihood security to Kheada Gram Panchayat.
4. To see how successful MGNREGA has been in eradicating unemployment in Kheada Gram Panchayat.

Mahatma Gandhi National Rural Employment Guarantee Act

The National Rural Employment Guarantee Act was introduced in 2005 to address inequality and ensure intensive development by creating short-term productive employment for the marginalized. The program was notified on 7 September, 2005 and came into force in February, 2006 in Anantapur district of Andhra Pradesh. It was one of the biggest flagship-program of the Government of India that touches lives of the poor and promotes inclusive growth. The act aims at enhancing livelihood security of rural households by providing them at least one hundred days of guaranteed wage employment in a financial year to every adult member of a rural household who is willing to do unskilled manual work. When the Act was first introduced in the 200 most backward districts (first phase) of the country in February 2006, it was decided that after observing the popularity of the Act, it would be extended to the rest of the districts. But the following year, the Act was extended to 130 more districts (second phase), and within a year of its enactment, the act brought the entire country under its horizon, excluding districts with hundred percent urban populations. Later, after seeing the huge success of the program, it was renamed after Gandhiji to make the scheme more familiar and more reachable to the people and thus it became ***Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2009***. According to the official website of NREGA, the overall performance of the program was really good during the financial year 2018-19. It has provided employment to 6.95 Crore households till December 2019. Total number of job-card issued were 14.2 Crore. And, people belong to SCs and STs are significantly benefited by the scheme. And, significant improvements have been seen in women's participation too.

Aims of MGNREGA

MGNREGA is a revolutionary step taken by the Government of India to eradicate poverty from rural India and ensure inclusive growth through social protection, livelihood security and democratic empowerment. It is the largest self-targeting program in India. The primary aim of the Act (as per gazette document of NREGA, 2005) is to provide a minimum security to the rural households by providing right to work on demand i.e. at least one hundred days of guaranteed wage employment in a financial year to every adult member of a rural household who is willing

to do unskilled manual work. Other aims of the Act outlined by MoRD, India are:

- A. Providing social protection for the most vulnerable people living in rural India by offering them wage employment opportunities;
- B. Providing livelihood security to the poor by increasing income, creating sustainable wealth, ensuring safe drinking water, soil conservation and ensuring high productivity of land;
- C. Initiative on drought mitigation and Flood Management in Rural India;
- D. Empowerment of the socially disadvantaged, especially women, Scheduled Castes (SCs) and Scheduled Tribes (STs) through rights-based legislation;
- E. Strengthen decentralized and participatory planning through coordination of various poverty alleviating, livelihood security initiatives;
- F. Deepening democracy at the grass-root level by strengthening 'Panchayati Raj Institutions' (PRIs);
- G. Ensuring greater transparency and accountability in governance (**Source:** MGNREGA Hand Book and compilation of various articles).

Significance of MGNREGA

MGNREGA's goals are to achieve the objective as enunciated in the Article 41 of the Indian Constitution- 'giving citizens the right to work'. The Act is significant due to the following reasons-

- Although the previous wage employment programs didn't provide any guarantee of employment, this Act is the first ever law internationally, which guarantees wage employment on an unprecedented scale.
- It is a development initiative, chipping in with the essential public investment to create sustainable assets, without which the growth process in the most backward areas of rural India is not possible.
- The main component of MGNREGA is the provision of employment by the state to those people who are unable to find alternative

employment, providing a form of social safety net to the rural unemployed.

- In other wage employment schemes, anyone can be engaged as a labourer, but in MGNREGA, only job-card holders can be employed as labourers.
- Other wage employment programs have no time limit, but MGNREGA mandates employment within 15 days of application, and payment of wages also has to be paid within 15 days of employment (**Source:** MGNREGA Hand Book and articles).

Evolution of MGNREGA

The table given below provides the time line of MGNREGA and highlights the changes that have been made in the program from time to time during the course of the scheme

August 2005	February 2006 (First Phase)	April 2007 (Second Phase)	April 2008 (Third Phase)	February 2009	January 2010
NREGA was legalized by a legislation	Came into force and launched in 200 most backward district of the country	130 additional districts were included	The scheme is fully implemented in all rural districts of India	MOU signed with the postal department for wage transaction	NREGA renamed as MGNREGA

Source: Compiled from various Reports on MGNREGA

Features of MGNREGA

- I. Adult members of a rural households, willing to do unskilled manual work, can apply for registration in writing or orally to the local Gram panchayat.
- II. Gram Panchayat will issue a job card after due verification. The job card will contain photographs of all adult family members who are willing to work under MGNREGA and is free of cost.
- III. Jobcard should be issued within 15 days of application.

- IV. A job card holder may submit a written application for employment to the Gram Panchayat, mentioning the period for which the job is sought. Minimum days of employment shall be fifteen.
- V. The Gram Panchayat shall issue a dated receipt of the written application for employment, against which the guarantee of providing employment shall be effective within 15 days.
- VI. Employment shall be provided within 15 days of application for work; otherwise daily unemployment allowance shall be paid as per law. The state is bound for providing unemployment allowance.
- VII. Generally work should be provided within 5km radius of village. If the worksite is more than 5km away from home then an additional 10% of wages shall be paid to cover additional transportation and living expenses.
- VIII. Wages shall be paid in accordance with the Minimum Wages Act 1948 for agricultural labourers in the State, unless the Centre declares a rate of wages which shall not be less than Rupees 60/ per day. And, Equal wages will be paid to both men and women.
- IX. Wages to be paid as per piece rate or daily rate. Wages are to be disbursed on a weekly basis and in no case more than a fortnight.
- X. Panchayat Raj Institutions (PRIs) have a major role in planning and implementation.
- XI. At least one-third of the beneficiaries will be women who have registered and applied for work under the scheme (**Source:** MGNREGA Hand Book and compilation of various articles).

Scope of the Study: This study focuses on rural unemployment and migration issue in Kheada Gram Panchayat area of South 24 Parganas district, West Bengal (in this perspective, an attempt has been made to understand the current situation. The universe of study is the Sonarpur Block of Baruipur Sub-division under South 24 Parganas district. And the unit of study is the Kheada Gram Panchayat of Sonarpur Block. In this study, the investigator has decided to survey 100 households from Kheada Gram Panchayat of Sonarpur Block. And, this surveyed information will be used as primary data.

Kheada-ii Gram Panchayat

location: Kheada-II Gram Panchayat is a big area. As per Census report 2011, the total geographical area of the panchayat is 2460.03

hectares. There are ten villages under Kheada Gram Panchayat. And, NH12 National Highway is just 3km from this area.

Population: Kheada Gram Panchayat area is densely populated area. It has a total population of 32196 peoples (as per Census 2011); out of which male population is 16415 while female population is 15781. Besides, there are 18360 people belonging to Scheduled Caste; out of which the number of males is 10320 and the number of females is 8040, and 2685 people belonging to Scheduled Tribes; out of which the number of males is 1132 and the number of females is 1553.

Livelihood: Majority of the population in the study area are mainly engaged in fishing and agriculture. The total agricultural land in this area is 78 acres. The number of agriculturists in the area is 11081, fisherman 14488, labourers 3342, traders 1798, servicemen 595 and the number of persons engaged in other occupations is 892.

Unemployment: There are 11655 working males and 11678 working females in the study area. Among the working-males, 7459 are engaged in various occupations. On the other hand, 9226 working-females are engaged in domestic wok. And, 4750 people are unemployed in terms of total working population excluding children (Data provided by Kheada Gram Panchayat and Census 2011)

An Account of Unemployment in Kheada Grampanchayat Area

Study Area at a Glance: State- West Bengal → District- South 24 Parganas → Sub-Division- Baruipur → Block- Sonarpur → Gram Panchayat- Kheada Gram Panchayat

Research Methodology: The study area is Kheada Gram Panchayats in South 24 Parganas District, West Bengal. It is a 'Quantitative Research Study' which is conducted through Semi-structured questionnaire. And, it followed the descriptive method of research design to examine the changes in the lives of rural people through MGNREGA. And for data collection, the scholar has used both primary and secondary data collection method. Primary data is collected through field interview. And field interview was conducted on the basis of structured questionnaire. In order to collect secondary data, various sources like journals, official website of MGNREGA, Census Report and official records of Kheada Gram Panchayat was given priority by the scholar. And, the statistical analysis of the study is prepared by applying 'Convenience Random Sampling' method.

Review of Literature

Narayan Chandra Nayak, Pulak Mishra, Bhagirath Behera and Runa Sen Chatterjee, in their article, titled as “What Determines Labour Force Participation in MGNREGA? An Investigation in Odisha”, published in 2021, made an assessment of the impact of the integration of rural development schemes with the Mahatma Gandhi National Rural Employment Guarantee Act based on a sample preliminary survey in Odisha. The results suggest that integrated schemes consisting of several interconnected income-generating projects with improved livelihoods are ideal interventions. Beneficiary households benefited in terms of an increase in their average annual income, savings and wages. It was suggested that creating awareness is key to achieve better provision of benefits while eliminating clientelism and elite capture.

Krishna Singh and Soumendra Kishore Dutta (2019), in their article, titled as “Female Participation in NREGA Program: A Complete Study of Two Backward Districts in West Bengal, India” attempted to analyze women’s participation in the National Rural Employment Guarantee Scheme in West Bengal. The study found that there is wide variation in the level of participation of women across the surveyed districts of West Bengal. It was found that women, in one study district, have a higher level of participation whereas in the other study district, their participation is very less. The study found that - income from other sources; family size, women’s education level, and religion were significantly associated with women’s participation decisions.

Anita Rajan (2016), a psychologist, tried to present different aspect of the Act (MGNREGA) and its implementation in her book- ‘MGNREGA and Women Empowerment’. The study explained us how the program provided a steady source of income and livelihood security for the vulnerable and marginalized section of the society. The study also highlighted the satisfactory women participation in MGNREGA as compared to other national-level scheme. And the author has made a wonderful statement in the third chapter of this book. In the third chapter, she explained modernity and showed how modernity touches rural women through MGNREGA. She argued that modernity is not merely an advancement of society; it is not dressing you modern but, it is about strong values and attitude related to the individual thought process. That means, a person having strong values and attitude will be considered modern irrespective of his external appearance. Therefore,

only providing employment to rural women is not modernity or will not going to empower them enormously but giving them equal chance, equal wage and equal respect, so that they could come out and ensure their participation in their own development activities will be considered as real modernity.

Performance of MGNREGA in Kheada Gram Panchayat: Analysis, Findings and Interpretation

In this discussible part, an attempt has been made to analyse and interpret the exact findings based on the data obtained by conducting direct field work on employment and livelihood security at the Kheada Gram Panchayat of Sonarpur Block in South 24 Parganas. The collected data has been analyzed by coding and tabulating. Simple percentage test applied to analyze the data regarding the changes brought by MGNREGA in the lives of rural poor of the Kheada gram panchayat in South 24 Parganas district with the intention to reach a logical conclusion.

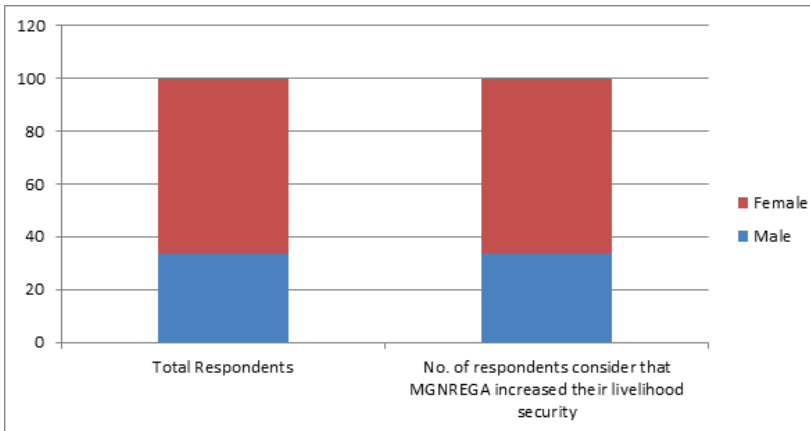
Distribution of the respondents in terms of livelihood security of people after working under MGNREGA

Livelihood security is a very vital issue. People need security of livelihood for a tension-free life. People are much more tension-free if they have a source of livelihood throughout the year. And, schemes like MGNREGA have been introduced to increase the livelihood security of people in rural areas and to ensure an improved quality of life. And, in this context, distribution of the respondents in terms of livelihood security after working under MGNREGA is important to understand.

Table 1: Distribution of the respondents in terms of livelihood security of people after working under MGNREGA

Source: Field Survey

DISTRIBUTION OF THE RESPONDENTS (In terms of livelihood security of people under MGNREGA)		
Kheada Gram Panchayat		
	Male	Female
Total Respondents	65	35
	100	
Number of people consider that MGNREGA increased their Livelihood security	65	35



Source: Field Survey

The field survey data given in Table no. 1 and the graphs constructed on the basis of that data show that all persons interviewed in the study area acknowledged that MGNREGA has ensured them livelihood security. Most of the population in India is rural and most of them are agriculturists. These agricultural people are used to be unemployed for three consecutive months every year. In such a situation, the rural people are left with no work, and therefore the 100 days guaranteed wage employment in MGNREGA has helped them financially.

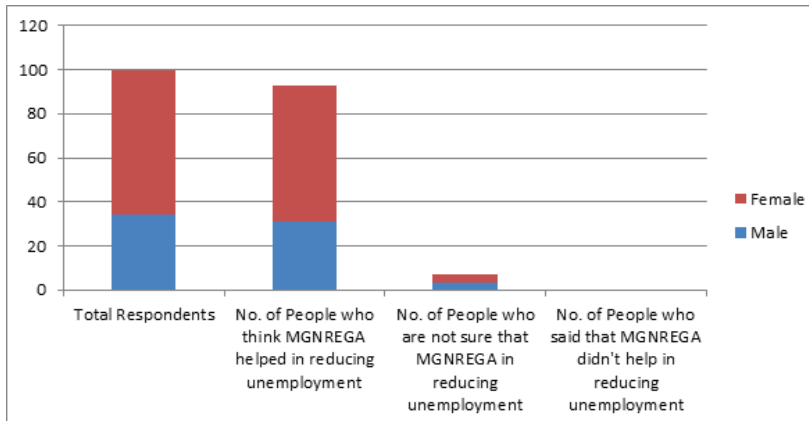
Distribution of the workers/respondents in terms of views on the role of MGNREGA in eradicating unemployment

Unemployment is a major problem. The whole world is grappling with this problem. Unemployment is a phenomenon that occurs when a person actively searching for employment is unable to find work. Unemployment represents the number of people in the work force who want to work but don't have a job. It is generally stated as a percentage and calculated by dividing the number of people who are unemployed by the total workforce. The workforce made up of those people who want to work. It excludes people who are retired, disabled, and those who have ability to do any work but currently not looking for a position. Unemployment affects not just the person himself but also his family and in the long run the society where he or she lives. It brings with it despair, unhappiness and anguish. It forces people to live their lives in a way that they don't wish at any means. Now, what we will analyze is how

effective MGNREGA has been in reducing unemployment in Kheada Gram Panchayat area, located under district of South 24 Parganas. So, let us try to understand the matter clearly by presenting the data obtained from the field survey and the diagram based on it given below.

Table 2: Distribution of the respondents in terms of views on the role of MGNREGA in eradicating unemployment

DISTRIBUTION OF THE RESPONDENTS (In terms of views on the role of MGNREGA in eradicating unemployment)					
KHEADADA GRAM PANCHAYAT					
Parameters	Male	%	Female	%	100
Number of people who think MGNREGA helped in reducing unemployment	31	91.17	62	93.93	93
Number of people who are not sure that MGNREGA helped in reducing unemployment	3	8.82	4	6.06	7
Number of people who said that MGNREGA didn't help in reducing unemployment	0	0	0	0	0
Total Respondents	34	100.0	66	100.0	100



The field survey data given in Table no. 2 and the graphs constructed on the basis of that data show that 93 respondents out of 100 respondents of Kheada Gram Panchayat think that MGNREGA has helped in reducing unemployment in their Gram Panchayat. Again, 7 out of 100 respondents were not sure whether MGNREGA has helped to reduce

unemployment in their Gram Panchayat. Most importantly, none of the 100 respondents as well as the worker in the Kheada Gram Panchayat feels that MGNREGA has not helped in reducing unemployment. In terms of percentage, it appears that 93.93 per cent of female respondents and 91.17 per cent of male respondents are confident about the success of MGNREGA. On the other hand, 8.82 per cent male and 6.06 per cent female are not sure about the success of MGNREGA. Therefore, it is clearly understood that MGNREGA has been successful in reducing unemployment.

Conclusion

MGNREGA is India's largest rural employment generation program since independence. The program not only secures 100 days of employment but also provides a minimum income for each adult member of each household in the village at the same time. It also deals with some other aspects like environmental protection, social security, development of rural infrastructure, empowerment of women, promotion of gender equality, wealth creation and mitigating migration. In this way, the act serves as an important tool not only for employment generation but also for all forms of rural development in India. From the above discussion, it is clear that the objective of strengthening rural livelihood security by guaranteeing employment to rural people of Kheada Gram Panchayat area has been well met under MGNREGA. However, MGNREGA has faced many challenges. There is no doubt that employment has been created through this program but the number of working days, as promised in the Act, has not been found satisfactory. Despite some flaws in the implementation of the MGNREGA Act, it has served as a panacea for the long-suffering rural development. The best contribution is that it ensures 100 days working guarantee.

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Exploring the Evolution of Tourism in Darjeeling: From Colonial Origins to Sustainable Rural Tourism and Development

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Abstract

This study examines tourism activity in the hilly region of Darjeeling and its evolution from a colonial sanctuary to sustainable rural tourism and its development. It also explores the historical progression of tourism in the region, concentrating on the socio-economic transitions, cultural ecology and geographical settlement. The paper features the rise of rural tourism and ecotourism as a substitute model for sustainable development, focussing on the philosophical foundation and ability to harmonise the conservation of the environment with economic growth. It also explores the role of rural tourism in harnessing rural communities' natural and cultural legacy for economic growth, social equity, and environmental stewardship. The research focuses on homestay tourism, which allows guests to immerse themselves in rural life while supporting local communities with alternate income sources. Homestay tourism boosts conservation initiatives and cultural preservation and is crucial in tackling rural poverty. The study contributes to a holistic understanding of tourist dynamics in mountainous areas, offering insights for policymakers, practitioners, and local communities seeking to harness tourism's potential for sustainable development while minimising negative impacts.

Introduction

Tourism has always been part of the human experience, from basic survival journeys to religious pilgrimages and trade expeditions; however, modern tourism as we know it only truly boomed after the Industrial Revolution. Commercial airlines further fueled this growth, creating a global industry that generates jobs, foreign exchange, and cultural connections. Today, tourism stands as a major economic and

social force, rapidly evolving within the service sector(Theobald2012). A layman defines tourism as ‘the business of providing services to tourists.’ Dictionaries go a bit beyond that, and the Oxford English Reference Dictionary defines tourism as “the organisation and separation of... holidays, especially as a commercial enterprise”, and a tourist is described as a “person making a visit on tour as a holiday: a traveller, especially abroad.” A broader definition is obtainable in the World Tourism Organization’s manual, which describes the term as “people travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business or other purposes”(World Tourism Organization 1995).

Tourism in a broad sense has existed for a long time in the Himalayas in the form of pilgrimage to Hindu sanctuaries that are located high up in the mountains. With the arrival of British in the in the 19th century, summer resorts, the so-called Hill Stations, were established. Modern tourism activities in the Eastern Himalayan region, such as trekking, mountaineering climbing, sightseeing, geological and anthropological excursions, white-water rafting, flora and fauna studies, explorations into history, legends and religion, linguistic and phonological investigations havebeen introduced, except for a few exceptions, only in the last few decades(Dozey1922). Tourism in mountainous regions acts as a key economic lifeline, bringing promises of revenue streams, employment opportunities, and a chance to address regional inequities. The case of Darjeeling epitomises this paradigm, where the roots of its development extend back to the era of the East India Company and subsequent British colonial attempts in India. Recognizing the promise of the region as a restorative getaway, the British pioneered the transformation of Darjeeling into a prosperous tourist destination, originally catering to the demands of their military and civil personnel.

However, the evolution of tourism in Darjeeling extends far beyond its colonial origins. Through a multifaceted lens covering cultural ecology, spatial settlement patterns, and socio-political developments, the region’s tourism story unfolds across three diverse perspectives. Firstly, Darjeeling’s cold climate and attractive scenery represented the British lifestyle, rendering it important for British settlers in India. Secondly, the development of tourism stimulated the change of Darjeeling’s once-singular town into a multifunctional environment,

powered by a varied array of interrelated activities. Thirdly, under the backdrop of modernity and the independence movement, tourism in Darjeeling saw major transformations, reflecting evolving societal norms and ambitions.

Formal organization and systematization of tourism in Darjeeling manifested with the foundation of the West Bengal Tourism Development Corporation in November 1975. Yet, the expansion of tourism was not without restraints, as indicated by restrictions on the entry of foreign people between 1962 and 1985, underlining the complexity of managing tourism in a fast-shifting socio-political setting.

In the middle of all this, ecotourism grew a lot, encompassing concepts of environmental guardianship, cultural preservation, and community engagement. Defined by experts such as Hector Ceballos-Lascurain and Rosemary Black, ecotourism embodies a holistic approach to tourism, emphasizing the necessity of sustainable practices and meaningful relationships with natural and cultural heritage.

Moreover, rural tourism has evolved as a transformative force, utilising the calm beauty of rural settings to stimulate economic, cultural, and social development. Through efforts that unearth rural life, promote local handicrafts, and drive infrastructural development, rural tourism has become a catalyst for sustainable growth, empowering local communities and safeguarding indigenous history. Central to the idea of rural tourism is the concept of homestay tourism, which offers travellers an authentic rural experience while providing a source of income for local communities. By fostering cultural interaction and environmental conservation, homestay tourism embraces the concepts of responsible tourism, contributing to the holistic development of rural communities. In light of these trends, this research aims to analyse the diverse dynamics of tourism in hilly places, with Darjeeling providing as a compelling case study. By examining the historical evolution, conceptual frameworks, and practical implications of ecotourism, rural tourism, and homestay tourism, this study aims to offer valuable insights for policymakers, practitioners, and local communities striving to harness the transformative potential of tourism for sustainable development.

Tourism in mountains is crucial as it promises cash flows, economic prospects, local employment, and corrects regional imbalances. There is

no question that the development of Darjeeling mostly took place thanks to the East India Company and, subsequently, as a result of the British colonial settlement in India. It was the British who first discovered that the region could be developed into a healthy resort or a sanatorium.

There is a significant history associated with Darjeeling and its development. Tourism in the Darjeeling region was originally founded by the East India Company to service the demands of their military and civil personnel. Eventually, following proper functional evolution, Darjeeling tourism presently serves practically everyone, locally, nationally, and worldwide. This progression can be viewed from three perspective points. Firstly, from the aspect of cultural ecology, Darjeeling, with its cool weather, was originally the embodiment of the British lifestyle and, thus, was viewed as a requirement for Britishers to dwell in India. Secondly, tourism can be analysed from the perspective of geographical settlement; with an array of interrelated activities, the hills have developed from a single-functional settlement into a multi-functional type of habitation. Thirdly, from the aspect of changing functions, including the process of modernization along with the independence movement.

Tourism in the Darjeeling region was organised and systematised only after the creation of the West Bengal Tourism Development Corporation in November 1975. Between 1962 and 1985, the entry of foreign nationals was restricted, and only a handful of foreigners were allowed to reach the highlands (Subba, T.B., 1989).

Ecotourism

Hector Ceballos-Lascurain (1987) defined ecotourism as an experience of “travelling to relatively undisturbed places with the specific purpose of studying, admiring, and enjoying the environment and its natural plants and animals, as well as any extant cultural manifestations present in these areas.” However, his definition is constrained to a narrow understanding of ecotourism, extending only to the aim of going and the region travelled.

Similarly, according to the World Tourism Organisation, “tourism that involves travelling to relatively undisturbed natural areas with the specified object of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural aspects

(both of the past and the present) found in the areas.”Even though this definition presents a narrow understanding of ecotourism, it does include the impacts on the region visited as an important part of ecotourism(McIntyre and Hetherington 1993, p. 23).

The effort that takes place in tranquil and beautiful rural regions, acting as a significant tool for rural planning and sustainable rural development, is referred to as rural tourism (Liu 2006). Rural tourism has recently reformed into a new tourism activity contributing to society’s economic, cultural, and social benefits. It has been able to preserve the values and beliefs, protect the environment, create employment opportunities, reduce unemployment, boost local handicrafts, increase the income and capital of stakeholders and local people, stimulate the production of organic food and infrastructural development, and provide possibilities for sustainable and economic development in rural areas.

Rural Tourism

“Rural tourism is a form of nature-based tourism that uncovers rural life, culture, art, and heritage at rural locations, thereby favouring the local communities socially and economically”. The expanding rural tourism has not only emerged as a prospective industry but also as a form of recreational venture for the urban inhabitants, taking them from the hustle and bustle of rapid metropolitan life. This modern concept of rural tourism stretches back to not more than a decade. It is an endeavour to connect the urban visitor with rural Darjeeling, empowering it socially, culturally, and economically (Kannegieser 2015).

Rural tourism has become a source of revenue and employment prospects for local people in rural areas, exploiting the existing natural resources. Its primary focus is on the active participation of tourists in rural life. The development of rural tourism depends on the active involvement of homestay owners, stakeholders, and local rural people(Wilson and Venes 2001). Perceiving the function of the local communities in sustainable rural tourism development, it becomes necessary to win the local communities’ support (Spencer & Nsiah 2013).

Sustainable rural tourism not only incorporates environmental conservation but also extends to economic development and

social fairness (Mathew 2009). To this end, cultural and heritage attractions such as handicrafts and cultural amenities also play a key role in rural tourist development. With the augmentation of rural tourism, there is an increase in employment prospects, property value, connection to nature, and eventually sustainable socio-economic growth. Rural tourism boosts economic growth at the local level, leading to balanced regional development. Rural tourism leads to sustainable development if it can respond to the requirements of tourists and the local community without sacrificing the demands of future generations. Rural tourism delivers benefits locally, increases conservation, fosters development, etc. (Dowling 1997).

Homestay Tourism

A homestay is a private house or community giving housing and amenities to paying guests. Therefore, the Homestay Regulation has approved it as run (managed) by an individual or community (Timilsina 2012).

The “Home Stay endeavours to attract tourists from posh and crowded urban areas to the rural locality full of sublime natural surroundings, along with clean, comfortable, and budget-friendly accommodation and food. Thus, the tourist gets to experience a unique rural experience and interact with the host family. It offers the chance to encounter fresh and unexploited regions, which has helped the government to popularise new tourism destinations and create alternative forms of income to the rural folks (Gangotia 2013). Homestay tourism also plays a part in lessening the gap in the balance of payments, producing higher tax income, giving rise to the economic development of the nation, creating employment possibilities, and providing an excellent source of earning foreign currency (Budhathoki 2013).

By commoditizing both nature and culture, homestay tourism develops commercial value with the desire of visitors. This provides financial reward to the local indigenous community for conservation of the environment and their culture. Through this notion, tourism can be regarded a component of development, providing more emphasis to strategies of extending good benefits and lowering negative consequences (Ashley 2000).

When we talk about the eradication of rural poverty, homestay tourism plays a crucial role in combining the activities of tourism

such as trekking, cultural tourism, agro-tourism, health tourism, and ecotourism. Tourism must constantly conserve culture and promote it so as to employ local resources and people to promote the economy of an area. Homestay tourism will serve as a major tool for the development of rural communities in every aspect, including the economic, cultural, social, and environmental spheres. Even with the influence of tourist development in a given location on the sustenance of the inhabitants of that area, it does confer certain negative impacts as well (Devkota 2010).

Results

The study explores the growth of tourism in Darjeeling, tracing its journey from colonial retreat to a catalyst for sustainable rural development. The region's tourism genesis can be traced back to the East India Company's realisation of its potential as a quiet sanctuary for British military and civil workers. However, the growth of tourism in Darjeeling transcends colonial origins and extends across cultural ecology, geographical settlement patterns, and socio-political transformations. The West Bengal Tourism Development Corporation was founded in 1975, marking a critical point in the region's tourism governance. The advent of ecotourism and rural tourism signifies a shift towards sustainable development, emphasising environmental conservation, cultural preservation, and community interaction. Ecotourism promotes sustainable practices and meaningful relationships with natural and cultural heritage. Rural tourism has evolved as a powerful force driving economic, cultural, and social growth in Darjeeling, exploiting the region's natural beauty and indigenous traditions. Homestay tourism is central to this approach, fostering cultural interchange and environmental guardianship and contributing to the holistic development of rural communities.

Conclusion

Examining tourism in Darjeeling reveals a complex journey of change, from its colonial roots to its emergence as a stronghold of sustainable rural development. Originally planned as a retreat for British colonial personnel, Darjeeling's tourism scene has seen fundamental alterations driven by cultural, geological, and socio-political variables. The formation of the West Bengal Tourism Development Corporation in 1975 was a crucial milestone in the institutional organisation of tourism in Darjeeling. However, problems such as restrictions on foreign nationals' admission emphasised the complexities of managing tourism

in a fast-changing socio-political climate. The emergence of ecotourism and rural tourism marks a paradigmatic shift towards sustainable development approaches, favouring environmental conservation, cultural preservation, and community engagement. Ecotourism, with its emphasis on sustainable activities and meaningful encounters with natural and cultural heritage, illustrates a holistic approach to tourism. Rural tourism has evolved as a vital engine for economic, cultural, and social empowerment in Darjeeling, exploiting the region's tranquil surroundings and traditional traditions. At the heart of this concept lies homestay tourism, promoting authentic cultural exchanges and environmental guardianship while strengthening rural economies.

In conclusion, the history of tourism in Darjeeling symbolises the transforming power of sustainable tourism approaches. By embracing ecotourism, rural tourism, and homestay tourism, Darjeeling has engaged tourism's potential for holistic development while limiting adverse outcomes. As other mountainous regions struggle with similar challenges, the insights extracted from Darjeeling's experience offer valuable lessons for policymakers, practitioners, and local communities worldwide, seeking to foster sustainable tourism practices and maximise the benefits of tourism for all stakeholders involved.

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Gorkhaland Movement – An Overview

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Abstract

The following article is a historical study about the origin of the Gorkhaland Movement. A brief study has been done on the development of the movement in the post-independence period. This century old demand laced with separatist feel is one of the on-going movements in the country for complete statehood. The recently formed states of Telangana, and not so long back states of Jharkhand, Chhattisgarh, and Uttaranchal (now Uttarakhand) have further ignited sparks of sub-nationalist feel among the hill people of Gorkhaland.

Keywords

Gorkhaland Movement; historical study; post-independence period

Introduction

A country's geo-political position is a very decisive factor to be considered in its foreign policy with stress being more on its immediate neighbours. Likewise, India shares its boundaries with countries like Pakistan, China, Nepal, Bangladesh, Myanmar, Bhutan and a very small yet a significant boundary with Afghanistan. Hence the foreign policy makers of each of these countries must consider the contours of geography, history, international relations before deciding upon the respective direction of the country's bilateral, trilateral, or multilateral relations without losing their sovereignty. Also, in its domestic sphere the strategic position of certain territories call for a greater understanding and control of the policy makers of the government. In this context mention maybe of the ongoing movement for a separate state of Gorkhaland. The Gorkhaland Movement is an ethnic linguistic cultural movement of the Nepali speaking people who are striving to establish themselves as Indian Gorkhas. Gorkhaland is a demand raised by the Nepali – speaking people of Darjeeling hills and the adjoining areas suffering

from an identity crisis to carve out a separate state from their current state of West Bengal. The demand for a separate state of Gorkhaland dates to the early 1900s when the Hillmen's Association gave petition to the then British Government for a separate administrative system in the proposed region. This proposed region includes the districts of Darjeeling, Kalimpong, along with Jalpaiguri, Alipurduar and some Coochbehar Districts. This demand is being raised by the inhabitants of the proposed state. These inhabitants include the Gorkhas, Nepalis, Lepchas, Bhutias, Tamangs, Sherpas, Khas Parbatiyas. The movement has an anti-national and secessionist element which strikes a severe blow to the federal character of the country. Also violent spurts have also disturbed the socio-economic activities in the region.

How did Darjeeling come into being

The British East India Company played a proactive role in giving Darjeeling its current shape. Darjeeling or Dorje-Ling (Land of Thunderbolt) was part of the kingdom of Sikkim. Gorkhas captured parts of North-East and Darjeeling by 1780s. By the Treaty of Sagauli (1815), between British and Gorkhas) the British East India company annexed these territories from Gorkha and with the Treaty of Titalia (1817, between British and Sikkim) the company re-instated these territories back to Sikkim. In 1835 through a Deed of Grant The British East India company took possession of Darjeeling from Sikkim. With the Treaty of Sinchula (1864, between British and Bhutan) the British added Dooars and Kalimpong to Darjeeling. Hence Darjeeling came into being. The region saw spurt in population basically because of two reasons, the upcoming tea industry, and the urge to exploit the hitherto virgin hills of the region.

Strategic importance of the region

For both the central and the state government the strategic location of the proposed state brings forth security questions for the country as a whole. The proposed region of Darjeeling has Nepal to its left, Bhutan to its right, Bangladesh in its south and is in close proximity to China. This stretch of land is popularly known as "Chicken's Neck". It is a small piece of land serving as the only corridor of communication with Sikkim and the entire of North East India. The opaque borders in the regions has made it more vulnerable due to the influx of migrants from Nepal and Bangladesh. Trafficking in women and children is another brewing

problem. Also, any instance of disturbance in the region would in turn disturb the security grid of the region.

Overview

Darjeeling and the adjoining hills have seen a century long agitation for complete statehood. While deputations, demonstrations, petitions have come a long way violent uprising, murder, killing of common people, burning of houses have left behind its ugly scars. The people of Darjeeling and the adjacent hill areas for years, have been suffering from power shortage, proper communicational facilities, lack of drinking water, lack of higher educational facilities. The youth of the region due to lack of proper employment facility has started taking drugs. The tea industry is also badly hit due to the closure of many tea estates and locals lost their jobs. Felling of trees in the region to support timber industry has destabilized the ecology of the place. Increase in soil erosion, landslides has worsened the situation. All these taken together has adversely affected the socio-economic conditions of the locals inhabiting the region. Frequent strikes, violent demonstrations in the region badly hit the tourism sector. These causal factors and along with cultural differences and linguistic heterogeneity with the plains of West Bengal and shaped the demand for statehood.

The States Reorganization Committee in the post-independence period (1956) however could not give shape to the aspirations of the hill people's demand. This further alienated the hill people as they were refused statehood though they fulfilled all criterion for the same. Within the period between 1977-1981 the West Bengal government passed a resolution for creation of an autonomous district council consisting of Darjeeling and the adjoining areas. The period also saw the formation of Gorkha National Liberation Front (GNLF) under the leadership of Subhash Ghisingh to pursue the demand for a separate Gorkha homeland. This was an important milestone in the history of the movement. The GNLF under the charismatic leadership of Ghisingh set the ball rolling for a greater demand no less than complete statehood. The late 1980s saw a violent agitation under GNLF to materialise their demand. Finally a tripartite agreement was signed between the GNLF, the then central and state governments the Darjeeling Gorkha Hill Council (DGHC) was created under the chairmanship of Ghisingh. In return the GNLF dropped their demand for statehood.

Thus came to an end a two year long period of violence. The DGHC was a semi-autonomous body entrusted with the task of social, educational, economic and cultural of the hill areas of Darjeeling District. It was a sub-federal arrangement under the state government of West Bengal. However the DGHC could not bring about desired development in the region due to structural problems and financial crunch. Ghisingh took up the cause of demanding for Sixth Schedule status to be accorded to Darjeeling. This would pave the way for creation of autonomous district councils in the region with greater executive, legislative and financial emergency. However the demands did not take shape. Ghisingh started loosing his mass support and the malfunctioning of the DGHC further brought down the popularity of the GNLF.

A section of GNLF broke away and formed the Gorkha Jan Mukti Morcha (GJMM) under the leadership of Bimal Gurung in 2006-2007. Most of the cadres of GNLF joined the GJMM. This gave a fresh start to the demand for a separate state. In the meanwhile creation of three more states of Jharkhand (from Bihar), Chhattisgarh (from Madhya Pradesh), and Uttarakhand (from Uttar Pradesh) set aspirations for a separate entity within the Indian union. The Gorkhaland Territorial Administration (GTA) replaced the DGHC in 2011. The GTA was autonomous self-governing body with administrative, executive and financial powers. It was established to expedite the socio, economic, educational, infrastructural development in the region. The GTA was established along the lines of Sixth Schedule of the constitution which gives recognizes self-rule of the tribal communities in the North East of India.

The agitation took an ugly turn in 2010 when Madan Tamang, president of Akhil Bharatiya Gorkha League was hacked to death in broad daylight. He was a supporter of peaceful means of agitation and was an opponent of GJMM. His murder led to shutdown of Darjeeling and the adjoining hills. The indefinite closure of the hills struck a severe blow to the economy of the region. In spite of accusations of murder the GJMM cadres the won three seats in the Assembly elections of the state in 2011. The introduction of Bengali language in the schools of West Bengal further agitated the people. In addition to this the creation of separate Development Boards for different group components of the movement was an interesting attempt to downsize the movement as whole. However political intervention on the part of the state like

constitutional recognition of Nepali language, regional autonomy proposals, Sixth Schedule status, sub state level autonomous district councils has helped in de-escalating tensions in the region.

The following years saw the same fate of the GJMM with Gurung losing power. Binoy Thapa with his deputy Anit Thapa now led the GTA and tried to restore peace and bring development in the region. The CAA and NRC bill of 2019 added a new fear among the Nepali speaking population of the region. The twin problems of Gorkha identity and citizenship on one hand and Nepali or foreigner identity created much tension in the region. The Indo-Nepal Peace Treaty signed in 1950 gives reciprocal rights to its citizens living in both countries. This had already created some confusion about the identity of the Indian Gorkhas and the Nepali citizens. In a situation if the bill materializes there could be violence, demonstrations in a bigger magnitude. The government should therefore think on humanitarian grounds before executing its plan. Also fighting the Covid 19 outbreak, the economy of the region was badly hit. Income from tourism sector and other commercial activities saw a steep decline that left a deep impact on the minds. The pandemic again brought forward lack of medical facilities, a proper government hospital in the region, lack medical practitioners in the region. The region now serves as a melting pot of socio-economic-cultural-political aspirations. Both the locals and the central administration try to avoid ugly standoff and try to adopt more diplomatic and peaceful ways.

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**Section
Commerce**

Fair Value Accounting–Concept And Application

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Abstract

Ministry of Corporate Affairs (MCA), Govt. of India, by its notification dated 16.02.2015, in exercise of the powers conferred by section 133 read with section 469 of the Companies Act, 2013 in consultation with the NACAS, introduced a new accounting standard rules which has converged Indian Accounting Standards in the line of IFRSs (i.e. Ind ASs). MCA has notified 39 Ind. ASs to date including a separate Ind AS on Fair Value Measurement (Ind AS 113). Companies (Indian Accounting Standards) Rules, 2015 and its subsequent amendments stipulate the adoption and applicability of Ind ASs in Indian corporate financial reporting in a phased manner mandatorily from the financial year 2016-17. Therefore, in India, financial statements for the year ended 31st March, 2017 were the first that some specified companies already prepared by adopting Ind ASs as well as applying fair value measurement with a transition date of 1st April, 2015. The undertaken paper is a humble endeavour to focus on the core concept of fair value, the development of accounting standards on fair value and the application of fair value concept in the financial statements of the Indian corporate entities. The undertaken study also aims to shed light on the rationale for switching from asset and liability valuation methodologies to fair value measurement.

Keywords

Accounting Standards, Ind AS, IFRS, MCA, Historical Cost, Fair Value.

Introduction

Bases of accounting procedure as well as valuation techniques and measurement procedures of assets and liabilities of business entities are highly important issues for all times. On the other hand, at which the value of assets and liabilities of an entity should be presented in its financial

statements is also a debatable issue in modern accounting procedures. Therefore, basis of measurement of assets and liabilities for presenting in financial statements is considered as a fundamental issue in the world of accounting. In order to bring the Indian corporate financial reporting system closer to compliance with the International Financial Reporting Standards (IFRSs), it is now imperative to investigate the acceptability and implications of using the fair value concept. During the past few decades, significant numbers of research studies have been carried out all over the globe establishing the superiority of the Fair Value (FV) Concept over the Historical Cost (HC) Concept for presenting assets and liabilities of an entity in its financial statements. International accounting bodies (e.g. IASB, FASB) have also given stronger emphasis on switching over the accounting system from Historical Cost Accounting (HCA) to Fair Value Accounting (FVA) System.

In the year 1975, the International Accounting Standard Committee (IASC) came out with an International Accounting Standard (IAS) on *Valuation of Inventory (IAS 2)* in which the concept of fair value, for the first time, was brought before the accounting world. In the later course of time, the application of the fair value concept had been expanded by the IASC into the IASs on Property, Plant and Equipment; Revenues; Employees Benefits; Accounting and Reporting by Retirement Benefits Plan; Impairment of Assets; Financial Instruments: Recognition and Measurement; Intangible Assets, etc. Moreover, a worldwide essentiality has been agreed upon to switch over homogeneous system of accounting and corporate financial reporting all over the world. Consequently, the majority of nations' accounting and financial reporting systems are merging within the framework that is outlined by international accounting bodies.

Rationale for Switching Valuation Methodology for Accounting Purposes

It is universally agreed upon that the financial information of an entity as exhibited through HCA basis reveals past values, not the current values of the transactions. Assets and liabilities that appeared in the Balance Sheet prepared on HCA basis exhibit their acquisition values only, not the current values. On the other hand, financial results ascertained through the Income Statement prepared on HCA basis represent past profit or loss only. Thus, the information contained in financial statements prepared under HCA basis represents historical values only,

instead of current values. But various users of financial statements need current values of the items shown in the financial statements for their decision-making purposes. The concept of fair value is the outcome of the great valuation debate worldwide, which came up during 1960s as an attempt to find out an alternative to HCA. The accounting world started trying one-after-one alternative methods to replace HCA, such as CPP Method, CCA Method, Replacement Cost Method, Net Realizable Value Method, Net Present Value Method, Exit Price Method, Deprival Value Method etc. Finally, the accounting world has come up with FV Method, which mostly is the market price, but not always so. The wide-reaching movement was initiated in the United States by the FASB, and subsequent international focus was brought by the IASC, aiming to replace historical cost by a current value basis for the measurement of a company's income and valuation of its assets and liabilities with the notion of fair value. The concept of fair value is broader and can be applied more generally than that of market value indeed, where there is no quoted market price available on an active market, the valuation is determined by the exchange value agreed by two independent parties, by the market price of an item with similar characteristics or by the net present value estimate of future cash flows.

Global Application of Fair Value Concept

In the year 2006, the first complete set of standards on fair value measurement was placed by the Financial Accounting Standards Board (FASB), United States of America (USA), before the world by issuing Statement of Financial Accounting Standards No. 157 (*SFAS-157*) on '*Fair Value Measurements*' which was effective from the fiscal year 2008. The International Accounting Standard Board (IASB) agreed to consider the SFAS-157 issued by the FASB as the starting point for its subsequent action regarding the introduction of global standards on fair value measurement. The late 1990s and the early 2000s witnessed a shift from using local, country-specific accounting concepts to the adoption of a globally accepted set of accounting standards. In 2001, globally acceptable sets of accounting standards in the form of International Financial Reporting Standards (IFRSs) issued by the IASB by replacing the older version of global accounting standards, International Accounting Standards (IASs). On 1st January, 2012, the IASB finally issued a separate set of complete accounting standards on fair value measurement in the form of International Financial Reporting

Standard 13 on *Fair Value Measurement (IFRS 13)*, which was effective for the annual periods beginning on or after 1st January 2013, which :(a) defines fair value;(b) sets out a single IFRS framework for measuring fair value; and(c) requires disclosures about fair value measurements.

IFRSs, which include FV accounting, are already used in most parts of the world including the European Union, Russia, Australia, Hong Kong, Malaysia, Singapore, Pakistan, Chile, South Africa, Pakistan etc. Thus, most of the countries in the world have already adopted or stepped forward to adopt the fair value method, by replacing the historical cost method, in their accounting system.

Concept of Fair Value

‘Fair Value’ is defined in different IASs as issued by the IASC as, “*the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm’s length transaction.*” This definition of fair value has two ends. As per this definition, fair value can either be ‘entry price’ (*i.e.* from the point of view of the buyer) or ‘exit price’ (*i.e.* from the point of view of the seller).

The FASB, USA, issued *SFAS-157 on Fair Value Measurements* in 2006, which was effective from the fiscal year 2008, where fair value is defined as “*the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.*” The definition of fair value as per FASB has one end only. As per this definition, the fair value represents ‘exit price’ (*i.e.* from the point of view of the seller) only. Accordingly, fair value is the value of assets and liabilities that appear in the financial statements at their respective current values in an orderly transaction between market participants at the measurement date. However, SFAS–157 provides a hierarchy of three levels of input data for determining the fair value of an asset or liability, such as Input Levels 1, 2, and 3, where value other than market price is also allowed under some circumstances.

The definition of fair value given in SFAS - 157 differs from the definition given in earlier IASs in three conceptual aspects, which are stated below :

- a. The definition of fair value given in SFAS - 157 is explicitly the exit (selling) price; whereas such definition given in IASs may be the exit price or the entry (buying) price as well.

- b. The definition of fair value given in SFAS - 157 explicitly refers to market participants; whereas such definition asserted in IASs refers to knowledgeable, willing parties in an arm's length transaction.
- c. For liabilities, the definition of fair value in SFAS - 157 rests on the notion that the liability is transferred (the liability to the counterparty continues; it is not settled with the counterparty); whereas the definition of liabilities in IASs refers to the amount at which a liability could be settled between knowledgeable, willing parties in an arm's length transaction.

Introduction of Global Standard on Fair Value

On 1st January, 2012, the IASB issued a separate standard on fair value in the form of International Financial Reporting Standard 13 on *Fair Value Measurement* (IFRS 13) that was effective for the annual periods beginning on or after 1st January 2013, which : (a) defines fair value; (b) sets out in a single IFRS framework for measuring fair value; and (c) requires disclosures about fair value measurements.

The IASB defines 'fair value' in the context of IFRS 13 on Fair Value Measurement as "*the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.*" (*Foundation, IFRS 13 Fair Value Measurement, 2012*)

Analyzing the definition of fair value as enumerated in IFRS 13, the following points can be extracted :

1. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.
2. '*The price that would be received to sell an asset or paid to transfer a liability*' represents the 'exit price' only.
3. '*Market participants*' are the prospective buyers and sellers who are knowledgeable, able to transact for the asset and liability and willing to transact for the asset and liability.
4. '*Orderly transaction*' refers to the normal transaction between market participants, which implies that it is not a forced transaction like sale due to the liquidation of the company.
5. '*An orderly transaction between market participants*' implies a market in which transactions for the asset or liability take place with

sufficient frequency and volume to provide pricing information of that asset or liability to the prospective buyer and seller on an ongoing basis.

6. The 'principal market' refers to the market having highest volume and level of activity for the asset or liability.
7. 'Most advantageous market' refers to the market that maximizes the amount that would be received to sell the asset and that minimizes the amount that would be paid to transfer the liability, after taking into account transaction costs and transport costs.
8. The transaction to sell the asset or to transfer the liability is a hypothetical transaction on the measurement date assumed from the perspective of the market participant who holds the asset or owes the liability (*Foundation, IFRS 13 Fair Value Measurement, 2012*).

Introduction of Indian Standard on Fair Value

Finally, MCA, Govt. of India, by its notification dated 16th February 2015, in the exercise of the powers conferred by section 133 read with section 469 of the Companies Act, 2013 in consultation with the NACAS, introduced a new accounting standard rules which are converged Indian Accounting Standards in the line of IFRS termed as 'Ind AS'. The Ind ASs are basically standards that have been harmonized with the IFRS to make reporting system of Indian companies more globally accessible and acceptable. The Indian standard setters have examined individual IFRS and modified the same as per requirements, wherever necessary, to suit Indian conditions. Adoption of Ind AS is challenging but rewarding as well, since it is likely to result in improved comparability, transparency and quality of financial statements. One fundamental change in Ind AS is the significant increase in focus on FV Accounting. Since Indian companies have a far wider global reach now as compared to earlier, the need to converge reporting standards with international standards was felt, which has led to the introduction of Ind AS. Companies (Indian Accounting Standards) Rules, 2015 and its subsequent amendments stipulate the adoption and applicability of Ind AS in a phased manner mandatorily from the financial year 2016-17. MCA till date notified 39 converged Indian Accounting Standards in line of IFRS (*i.e.* Ind. ASs) which include a separate and AS on fair value, *Ind AS 113 on Fair Value Measurement*. Ind AS 113 was issued by the ICAI and notified by

the MCA to address the issue of fair value measurement in the Indian context.

As this Ind AS is mostly in line with IFRS, the concept of fair value as per Ind AS 113 is more or less the same as that of IFRS 13. Accordingly, Ind AS 113 also defines fair value, sets out a single Ind AS framework for measuring fair value and requires disclosures about fair value measurements. In the context of Ind AS 113 issued by the ICAI, the same definition of fair value is considered as is enumerated in IFRS 13.

Although Ind AS 113 does not function in isolation, but it acts as a companion standard to other Ind ASs. Ind AS 113 applies when another Ind AS requires or permits fair value measurements or disclosures about fair value measurements.

Fair Value Hierarchy as prescribed by Ind. AS 113

According to Ind AS 113, the best measure of fair value is the price in an active market. However, the fair value hierarchy provides three tiers of measurement techniques which are written below :

1. *Level 1 Inputs:* Quoted price in the active market for identical assets or liabilities.
2. *Level 2 Inputs:* (a) Quoted price for similar assets or liabilities in the active market; (b) Quoted price for identical or similar assets or liabilities in markets that are not active; (c) Inputs other than quoted prices that are observable for the assets or liabilities, *e.g.* interest rates and yield curves observable at commonly quoted intervals, implied volatilities, credit spreads; (d) Market-corroborated inputs.
3. *Level 3 Inputs:* No active market – unobservable inputs for the assets or liabilities.

The fair value hierarchy gives the highest priority to quoted prices in active markets for identical assets or liabilities (*i.e.* Level 1 Inputs) and gives the lowest priority to unobservable inputs (*i.e.* Level 3 Inputs) (ICAI, 2015).

Valuation Techniques as per Ind AS 113

According to the Ind AS 113, an entity should use valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximizing the use of relevant observable inputs and minimizing the use of unobservable inputs. The

objective of using a valuation technique is to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants and the measurement date under current market conditions.

As suggested by this standard, three widely used valuation techniques are :

- a. Market Approach:** It refers to the market data of comparable assets and liabilities. Under this approach, prices and other relevant information generated by market transactions involving identical or comparable (*i.e.* similar) assets, liabilities, or a group of assets and liabilities (*e.g.* a business) are to be used for valuation of those assets and liabilities.
- b. Cost Approach:** It refers to the current replacement costs of assets. It reflects the amount that would be required currently to replace the service capacity of an asset (*i.e.* current replacement cost).
- c. Income Approach:** It refers to the present values of future incomes from assets. Under this approach, future amounts (*i.e.* cash flows or income and expenses) from an asset are to be converted to a single current (*i.e.* discounted) amount, reflecting current market expectations about those future amounts.

In some cases, a single valuation technique will be appropriate; whereas in others, multiple valuation techniques will be appropriate.

Application of Ind. AS 113 on Fair Value

After the enactment of the Companies Act, 2013, a new format of the presentation of financial statements was introduced under Schedule III. Section 129 of the Companies Act, 2013 requires that the financial statements shall be in the form or forms as may be provided for different class or classes of companies in Schedule III. Section 129 (1) of the Companies Act, 2013 requires that the financial statements of a company shall comply with the accounting standards notified under Section 133. Companies (Indian Accounting Standards) Rules, 2015 stipulate the adoption and applicability of Ind AS in a phased manner mandatorily from the financial year 2016-17.

Target Adoption Schedule of Ind ASs

The roadmap regarding the adoption of Ind AS is based on a company's listing status and net worth. Ind ASs are applicable to both consolidated

and stand-alone financial statements. MCA has so far notified a phase-wise convergence to Ind ASs from earlier accounting standards, which are stated below :

Phase I :Voluntarily adoption of Ind ASs for the financial year 2015-16 :

Any company may prepare its financial statements for the financial year 2015-16 either following Ind ASs or following previous GAAPs. But while preparing financial statements for the year 2015-16 (*i.e.* for the year ended 31.03.2016), comparative figures for the preceding accounting year (*i.e.* as on 31.03.2015) are also to be disclosed following the same AS Rule.

Phase II :Mandatory adoption of Ind ASsfrom the financial year 2016-17 :

Following companies must prepare their financial statements strictly following Ind AS Rules, 2015 on and from 01.04.2016 (*i.e.* from the financial year 2016-17) :

- a. Companies whose equity or debt securities are listed or in the process of listing on a stock exchange (other than SME Exchange) in India or abroad and having a net worth of Rs. 500 crores or more;
OR
- b. Companies whose equity or debt securities are not listed having a net worth of Rs. 500 crores or more;
OR
- c. Holding, subsidiary, joint venture or associate companies of the above two classes of companies.

Note : While calculating ‘Net Worth’ for the purpose, net worth for the immediately preceding three financial years is to be considered.

Phase III: Mandatory adoption of Ind ASsfrom the financial year 2017-18 :

Following companies must prepare their first financial statements strictly following Ind AS Rules, 2015 on and from 01.04.2017 (*i.e.* from the financial year 2017-18):

- a. Companies whose equity or debt securities are listed or in the process of listing on a stock exchange (other than SME Exchange) in India or abroad and having a net worth of less than Rs. 500 crores;

OR

- b. Unlisted companies having a net worth of Rs. 250 Crores or more but less than Rs. 500 crores;

OR

- c. Holding, subsidiary, joint venture or associate companies of the above two classes of companies.

Phase IV: Mandatory adoption of Ind ASs from the financial year 2018-19 :

Mandatory adoption of Ind ASs with effect from 01.04.2018 (*i.e.* from the financial year 2018-19) to all Banks, Non-Banking Financial Companies (NBFCs) and Insurance Companies whose Net Worth is Rs. 500 crores or more :

Phase V: Mandatory adoption of Ind ASs from the financial year 2019-20 :

Mandatory adoption of Ind ASs with effect from 1st April 2019 (*i.e.* from the financial year 2019-20) to all NBFCs whose net worth is Rs. 250 crores or more but less than Rs. 500 crores.

Therefore, in India, all listed companies (other than Banking companies, Insurance companies and NBFCs) and unlisted companies (other than Banking companies, Insurance companies and NBFCs) having net worth of Rs. 250 crores or more must prepare their financial statements from the financial year 2017-18 onwards following Ind AS Rules, 2015 and its subsequent amendments based on fair value concept. Adoption of Ind ASs would be challenging but at the same time would be rewarding as well, since it is likely to result in improved comparability, transparency and quality of financial statements. One fundamental change in Ind AS is the significant increase in focus on Fair Value Accounting.

Overview of the Application of Fair Value Accounting in India

Ind AS 113 addresses how to measure fair value of assets and liabilities, but does not stipulate when fair value can or should be used. Ind AS 113 does not function in isolation, but it acts as a companion standard to other Ind ASs. Accordingly, Ind AS 113 applies when another Ind AS requires or permits fair value measurements. The

key principle is that fair value is the ‘exit price’ from the perspective of market participants who hold the asset or owe the liability at the measurement date. It is based on the perspective of market participants rather than the entity itself, so that fair value is not affected by an entity’s intentions towards the asset, liability or equity item that is being fair valued.

A fair value measurement requires the management of a business entity to determine the following four things:

1. The particular asset or liability that is the subject of the measurement (consistent with its unit of account).
2. The highest and best use for a non-financial asset.
3. The principal (or most advantageous) market.
4. The valuation technique (as specified in Ind AS 113, Para B2).

Specific measurement techniques, hierarchy, guidance, and disclosure requirements are categorically stated in Ind AS 113 for measuring assets and liabilities. But there may be some possibilities of manipulation in valuing assets and liabilities for which there exists no principal market or advantageous market, *i.e.* where unobservable inputs (*i.e.* Level 3 Inputs) are used for measuring assets and liabilities. It will be highly interesting to watch how disclosures are given by the Indian companies regarding valuation procedure, while valuing assets or liabilities on the basis of level 3 inputs. On the other hand, there may be substantial differences in the valuation of assets, profitability, balance sheet ratios, etc. between under HCA system and FVA system, especially in the case of financial institutions, as they mainly possess financial assets; although for valuing financial assets, quoted prices are available in the principal markets or in the advantageous markets. For many of the non-financial assets, principal market for their fair valuation may not be available. This research study aims to assess/judge the impact of application of fair value measurement on Indian corporate reporting system.

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Importance of Micro Finance in Financial Services of India

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Abstract

Microfinance is a source of financial services for entrepreneurs and small businesses lacking access to banking and related services. The two main mechanisms for the delivery of financial services to such clients are: (1) relationship-based banking for individual entrepreneurs and small businesses; and (2) group-based models, where several entrepreneurs come together to apply for loans and other services as a group. This paper attempts to study the role and significance of Micro Finance in India, focusing on the SWOT analysis as well as performance of MFIs in India

Keywords

Microfinance; MFIs; SHGs; role; opportunities; challenges; India

1. Introduction

Microfinance is a source of financial services for entrepreneurs and small businesses lacking access to banking and related services. The two main mechanisms for the delivery of financial services to such clients are: (1) relationship-based banking for individual entrepreneurs and small businesses; and (2) group-based models, where several entrepreneurs come together to apply for loans and other services as a group.

For some, microfinance is a movement whose object is “a world in which as many poor and near-poor households as possible have permanent access to an appropriate range of high quality financial services, including not just credit but also savings, insurance, and fund transfers.” Moreover, its involvement has shown to lead to a downward trend in income inequality (Dhar, 2007).

Microfinance is a broad category of services, which includes microcredit, which is also one of the aspects of microfinance

and hence the two are often confused. Microcredit is provision of credit services to poor clients (Ajay, 2002).

Thus, Microfinance can be defined as any activity that includes the provision of financial services such as credit, savings and insurance to low income individuals who fall just above the nationally defined poverty line, and also those who fall just below this poverty line with the goal of creating social values. A large variety of actors provide microfinance in India using a range of methods (Devaraja, 2011).

1.1 Significance of the Microfinance in India

In developing economies and particularly in rural areas, many activities that would be classified in the developed world as financial are not monetized, because money is not used to carry them out.

Microfinance, thus is emerging as a powerful instrument for poverty alleviation in the new economy. In India, Microfinance scene is dominated by Self Help Group (SHGs)- Bank Linkage Programme as a cost effective mechanism for providing financial services to the “Unreached Poor” which has been successful not only in meeting financial needs of the rural poor women but also strengthen collective self help capacities of the poor, leading to their empowerment. The micro-finance scene in India is therefore dominated by Self Help Groups (SHGs) - Banks linkage program for over a decade now. As the formal banking system already has a vast branch network in rural areas, it was perhaps wise to find ways and means to improve the access of rural poor to the existing banking network (Bobaro & Mahanta, 2000).

So it is better to agree with Noble Laureate, eminent economist, Prof. Mohammad Yunus, founder of Grameen Bank that “conventional banks look for the rich but microfinance look for the absolute poor”.

2. Objectives

The objectives of this paper is to study

- i. The need and significance of micro-financing in India
- ii. To assess the role of microfinance in India with respect to both its economic role as well as social role in the economic development of the country
- iii. To study the opportunities and challenges of micro-financing compared to those structured financing by Banks & Financial institutions.

- iv. To study an overview of MFIs in India focusing on the assessment of the top 10 MFIs, with respect to their performance in loan disbursement, borrowers and net worth.

3. Role of Microfinance in India

This section helps us to understand how beneficial the micro financing institutions are to the developing countries with respect to both their economic role and social responsibility to the nation. The goals for MFIs should be:

- To improve the quality of life of the poor by providing access to financial and support services;
- To be a viable financial institution developing sustainable communities;
- To mobilize resources in order to provide financial and support services to the poor, particularly women, for viable productive income generation enterprises enabling them to reduce their poverty;
- Learn and evaluate what helps people to move out of poverty faster;
- To create opportunities for self employment for the underprivileged;
- To train rural poor in simple skills and enable them to utilize the available resources and contribute to employment and income generation in rural areas.

3.1 Role of Microfinance in economic development

Microfinance plays vital role in **economic development** through following ways-

Job Creation: A business that starts and operates because of microfinance aid can create jobs in equal number as those created by multi-national corporations. Most of the microfinance lenders provide loans to borrowers who reside in some of the remote and most deprived areas of the world.

Financial Stability: It is one of the greatest roles that microfinance has played by providing financial stability to people which contributed to local economics in substantial extent. Small loans have offered an opportunity to create extra income, so that people can pay for their extreme necessities.

Global Poverty: The supporters of microfinance believe that offering financial stability to poor and low income families through small loans may break the poverty cycle for future generations. **Poor Access to Credit Markets:** It is the key reason why most of the economics cannot expand. However, microfinance can provide economic interventions, which help to improve an access to financial technologies (Wrenn, 2005).

3.1.1 Economic role of Micro finance in Economic Development of India

The microfinance sector consistently focuses on understanding the needs of the poor and on devising better ways of delivering services in line with their requirements, developing the most efficient and effective mechanisms to deliver finance to the poor. Thus **Micro finance** acts as instrument or a tool to fill up demand supply gap between the “resource” and the “source”.

3.2 Role of Gender bias in microfinance

Microfinance generally agrees that women should be the primary focus of service delivery. As 90% of the evidence shows that they are less likely to default on their loans than men. As Industry data from 2006 for 704 MFIs reaching 52 million borrowers includes MFIs reveals that about 99.3% female clients and MFIs using individual lending were 51% female clients (Wrenn, 2005). Microfinance’s emphasis on female-oriented lending is therefore a subject of controversy, as it is claimed that microfinance improves the status of women through an alleviation of poverty (Mahanta et al., 2012).

3.3 Role of Microfinance in Empowerment of Women

The role of Micro finance in contributing towards woman Empowerment includes the following broad four categories-

- A. Economic empowerment
- B. Social empowerment
- C. Political empowerment
- D. Educational, skill and training empowerment

A. In Economic Empowerment: - Roles include-

- Enhancement of the women’s contribution to household’s income as a result of credit access
- Helps in employment generation

- Helps in understanding the banks transactions
- Improves easy access and control of resources by women

B. In Social Empowerment: - Roles includes-

- Helps women to gain confidence
- Helps to gain respect in family
- Increase the role of women in household decision making
- Improves the ability of women to freely interact with the numbers of group and outsiders
- Increases the mobility of women inside and outside the locality

C. In political Empowerment: - Roles includes-

- Increases the participation of women in local bodies, municipalities, panchayats, municipal corporation etc
- Increases the number of women in decision making power of local government
- Increases the number of women participation in protest and political campaigns as well as in public opinion and campaigns.

D. In Education, Skill and Training Empowerment:- Roles includes:-

- Improves the literacy level of family members
- Creates awareness about children education, particularly, girls
- Imparts training on income generating activities with a view to help in gaining knowledge of maintaining records of financial transactions.

4. Opportunities and Challenges of Micro Finance in India

Microfinance produces many benefits for poverty stricken, or low-income households. One of the benefits is that it is very accessible. Banks today simply won't extend loans to those with little to no assets, and generally don't engage in small size loans typically associated with microfinance. There are also many challenges within microfinance initiatives which may be social or financial.

5. Overview of Micro financing Institutions in India: -

Micro Finance Institutions, also known as MFIs, a microfinance institution is an organization that offers financial services to low income populations (Dhar, 2007).

An Increasing number of microfinance institutions (MFIs) are seeking non-banking finance company (NBFC) status from RBI to get wide access to funding, including bank finance.

Exemptions granted to NBFCs engaged in microfinance activities.

The Task Force on Supportive Policy and Regulatory Framework for Microfinance set up by NABARD in 1999 provided various recommendations. Accordingly, it was decided to exempt NBFCs which are engaged in micro financing activities, licensed under Section 8 of the Companies Act, 2013, and which do not accept public deposits, from the purview of Sections 45-IA (registration), 45-IB (maintenance of liquid assets) and 45-IC (transfer of profits to the Reserve Fund) of the RBI Act, 1934 (Mahanta et al, 2012).

The reason for existence of separate institutions i.e. MFIs for offering microfinance are as follows:

- * High transaction cost – generally micro credits fall below the break-even point of providing loans by banks.
- * Absence of collaterals – the poor usually are not in a state to offer collaterals to secure the credit.
- * Loans are generally taken for very short duration periods.
- * Higher frequency of repayment of installments and higher rate of default.

Non-Banking Financial Companies (NBFCs), Co-operative societies, Section-25 companies, Societies and Trusts, all such institutions operating in microfinance sector constitute MFIs and together they account for about 42 percent of the microfinance sector in terms of loan portfolio. The MFI channel is dominated by NBFCs which cover more than 80 percent of the total loan portfolio through the MFI channel (09_chapter2.pdf).

5.1 Types of microfinance institutions Microfinance institutions can be classified into three major categories, namely:

- Village Savings and Loans Associations/Village Banks:
- Cooperatives (Savings and Credit Cooperative Societies (saccos) & Multi Purpose Cooperatives)
- Micro Deposit Taking Institutions (MDIS)

5.1.1 Provision of Services in Micro-Finance

A multi dimensional activities are performed or services offered by MFIs are discussed below.

- a. **Micro credit** It is a small amount of money loaned to a client by a bank or other institution. Micro credit can be offered, often without collateral, to an individual or through group lending.
- b. **Micro savings** These are deposit services that allow one to save small amounts of money for future use. Often without minimum balance requirements, these savings accounts allow households to save in order to meet unexpected expenses and plan for future expenses.
- c. **Remittances** These are transfer of funds from people in one place to people in another, usually across borders to family and friends. Compared with other sources of capital that can fluctuate depending on the political or economic climate, remittances are a relatively steady source of funds.
- d. **Product Design** In this case MFIs have to decide what products to offer to clients. For marketing purposes, MFI's sometimes prefer the basket cover, since it can make the policies sound comprehensive, but whether that is the right approach for the low-income market is a question (Motwani, 2005).

5.2 Channels of Microfinance in India

Generally, in India microfinance operates through three channels

1. SHG- Bank Linkage Model
2. Micro finance Institutions Linkage Model
3. NGOs-Bank Linkage Model

SHG-Bank Linkage Model: This model involves Self Help Groups (SHGs) which are financed directly by the Commercial Banks (Public Sector and Private Sector), Regional Rural Banks (RRBs) or Co-operative Banks.

MFI-Bank Linkage Model: This model covers financing of Microfinance Institutions (MFIs) by banking agencies for on-lending to SHGs and other small borrowers covered under microfinance sector.

NGOs-Bank Linkage Model:-Under this model NGOs promote the linkage between banks and SHGs for savings and credit. (Mahanta et al., 2012)

5.2.1 MFIs & SHG-Bank linkage programme in India

In a joint fact-finding study on microfinance conducted by the Reserve Bank of India and a few major banks, the following observations were made:

Some of the microfinance institutions (MFIs) financed by banks or acting as their intermediaries or partners appear to be focusing on relatively better banked areas, including areas covered by the SHG-Bank linkage programme.

Many MFIs supported by banks were not engaging themselves in capacity building and empowerment of the groups to the desired extent. The MFIs were disbursing loans to the newly formed groups within 10–15 days of their formation, in contrast to the practice obtaining in the SHG – Bank linkage programme, which takes about six to seven months for group formation and nurturing (Mahanta et al., 2012).

However, the below are the top 10 microfinance companies in India (Table1) are estimated to account for almost 74 per cent of the total loans outstanding.

Table 1: List of top 10 microfinance companies in India

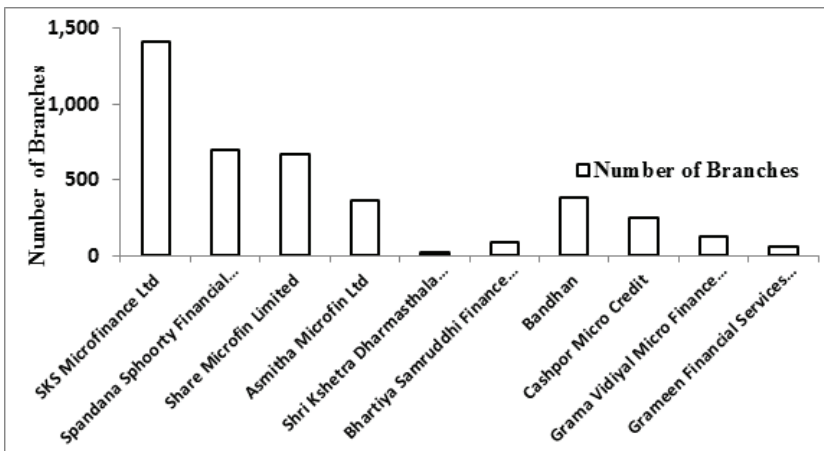
Serial No.	Name	Headquarter	Legal Status	Lending Model
1.	SKS Microfinance Ltd	Secunderabad, Andhra Pradesh	Pvt. Ltd. Company (NBFC)	JLG
2.	Spandana Sphoorty Financial Ltd	Hyderabad, Andhra Pradesh	Pvt. Ltd. Company (NBFC)	JLG, Individual
3.	Share Microfin Limited	Hyderabad, Andhra Pradesh	Pvt. Ltd. Company (NBFC)	JLG, Individual
4.	Asmitha Microfin Ltd	Hyderabad, Andhra Pradesh	Pvt. Ltd. Company (NBFC)	JLG, Individual
5.	Shri Kshetra Dharmasthala Rural Development Project	Dharmasthala, Karnataka	Trust	SHG
6.	Bhartiya Samruddhi Finance Limited	Hyderabad, Andhra Pradesh	Pvt. Ltd. Company (NBFC)	Diversified
7.	Bandhan	Kolkata, West Bengal	Society	JLG
8.	Cashpor Micro Credit	Varanasi, Uttar Pradesh	Section 25 Company	JLG
9.	Grama Vidiyal Micro Finance Pvt Ltd	Tiruchirappalli, Tamil Nadu	Pvt. Ltd. Company (NBFC)	JLG
10.	Grameen Financial Services Pvt Ltd	Bangalore, Karnataka	Pvt. Ltd. Company (NBFC)	JLG

Source:<http://business.mapsofindia.com/finance/top-microfinance-companies-inindia.html#sthash.U0nX3QEv.dpuf>.

5.3.1 Performance of the top 10 microfinance companies in India

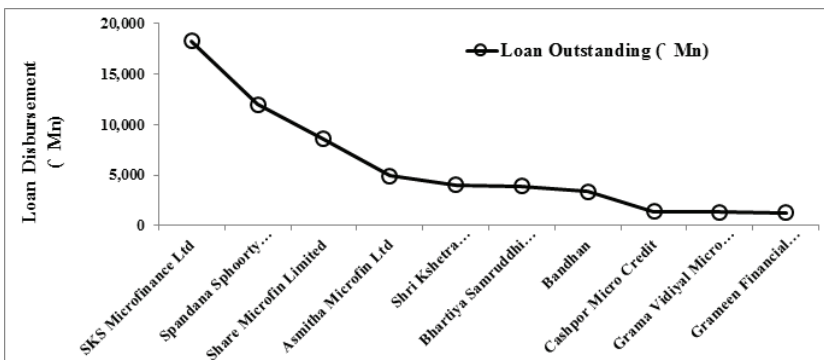
Figure 1 reveals that SKS Microfinance Ltd.(SKSMPL) has the highest number of branches in India as it is the India’s largest microfinance institution as per CRISIL rating in 2009. Its registered office is in Secundrabad in Andhra Pradesh. After obtaining the non-banking financial company (NBFC) license from the RBI in January 2006, SKSMPL took over the operations of SKS. The company’s microfinance operations are spread over 15 stated and one union territory as on September 30, 2008.

Figure 1: Number of branches of the top 10 MFIs in India



Source:<http://business.mapsofindia.com/finance/top-microfinance-companies-inindia.html#sthash.U0nX3QEv.dpuf>.

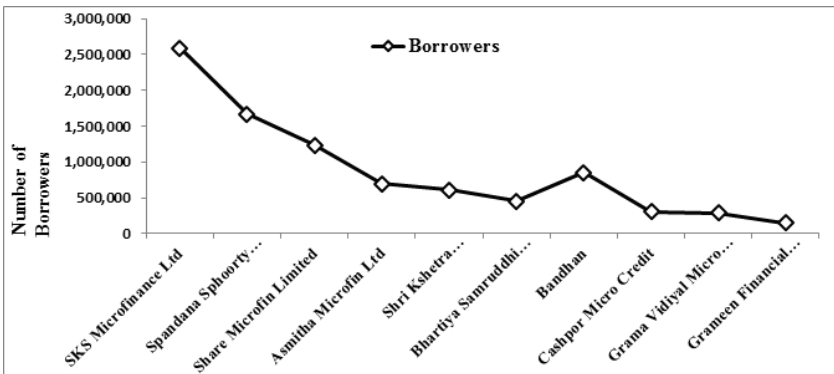
Figure 2: Loan disbursement of branches of the top 10 MFIs in India



Source:<http://business.mapsofindia.com/finance/top-microfinance-companies-inindia.html#sthash.U0nX3QEv.dpuf>.

Figure 2 reveals that SKS Microfinance Ltd.(SKSMPL) has also emerged as the only loan outstanding company in case of the loan disbursement in India, as per CRISIL rating in 2009. The company follows the group lending model, which closely resembles Bangladesh-based Grameen Bank’s model. While group loans have tenure of 50 weeks, individual loans bear a term of 12-24 months. SKSMPL charges an interest rate of 23.6% on a declining method basis in Andhra Pradesh and Karnataka and 28% in other states (Mahanta et al., 2012).

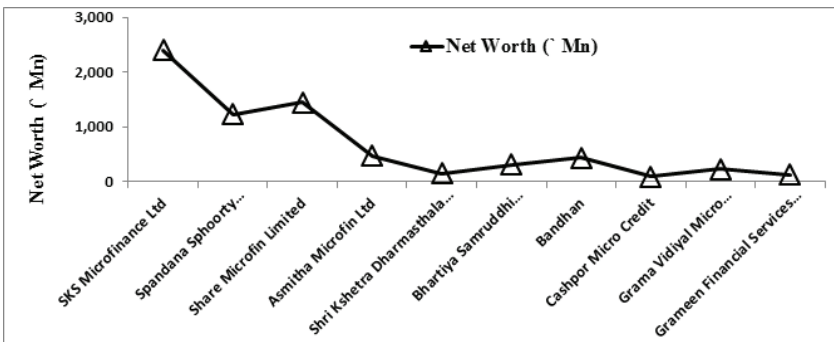
Figure 3: Number of borrowers of the top 10 MFIs in India



Source:<http://business.mapsofindia.com/finance/top-microfinance-companies-inindia.html#sthash.U0nX3QEv.dpuf>.

Figure 3 reveals SKS Microfinance Ltd.(SKSMPL) has also emerged as the only company facing the highest number of borrowers in case of the loan disbursement in India, as per CRISIL rating in 2009.

Figure 4: Net worth (in million) of the top 10 MFIs in India



Source:<http://business.mapsofindia.com/finance/top-microfinance-companies-inindia.html#sthash.U0nX3QEv.dpuf>.

Figure 4 reveals SKS Microfinance Ltd.(SKSMPL) has also emerged as the only company enjoying the highest net worth(in million) in case of the loan disbursement in India, as per CRISIL rating in 2009.

6. Conclusion

Within India, the micro finance revolution in western and southern India has received most attention, both in media as well as academic research. Recently, microfinance has come under fire in the state of Andhra Pradesh due to allegations of MFIs using coercive recollection practices and charging usurious interest rates. These charges resulted in the state government's passing of the Andhra Pradesh Microfinance Ordinance on October 15, 2010. The Ordinance requires MFIs to register with the state government and gives the state government the power, suo moto, to shut down MFI activity (Mahanta et al, 2012).

7. References:

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