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Performance analysis of AODV based congestion control protocols in MANET

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- I. Introduction
- II. Congestion in Manet
- III. Protocols Related to Congestion Based on AODV
- IV. Simulation and Results
- V. Conclusion

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Keywords

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Abstract:

MANETs are highly deployable, dynamic and self-configurable because of which routing is an extremely challenging task in them. AODV routing protocol used for routing purposes in MANETs is an on-demand routing protocol which do not support congestion control as it is not congestion adaptive. This paper discusses two congestion control protocols based on AODV in MANETs. Many authors have proposed protocols based on AODV which are congestion adaptive and deal with the congestion over the network. AODV-I and EDAODV are two congestion control protocols which deals with the congestion reactively. These two protocols are simulated on NS2 by varying the size of data packets. The analysis of these protocols is done with AODV by calculating the values for four performance metrics, namely, throughput, packet delivery ratio (PDR), routing overhead and end-to-end delay.

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I. Introduction

Ad-hoc Network is defined as the collection of two or more wireless devices which communicate with each other directly and does not require the help of any centralized administrator. These networks are generally referred to as MANETs (Mobile Ad-hoc Networks) [1]. The word 'ad hoc' can be described as 'unorganised' or 'improvised', i.e. the nodes over the network are not organised in any particular fashion and so are free to move anywhere over the network and hence depicts the situation of the dynamic network. The ad hoc mode directly connects nodes [2]. Each node in MANET operates not only as a terminal but also as a router that has the function of routing. Ad-hoc On-Demand Distance Vector (AODV) is a routing protocol which generates routes among nodes only when source node desires and maintains them as long as they are required by the source. It uses the concept of sequence numbers in order to ensure that the routes are fresh. It is self-starting and loop-free [4]. The most important applications where ad-hoc networks are used include rescue mission team, military,

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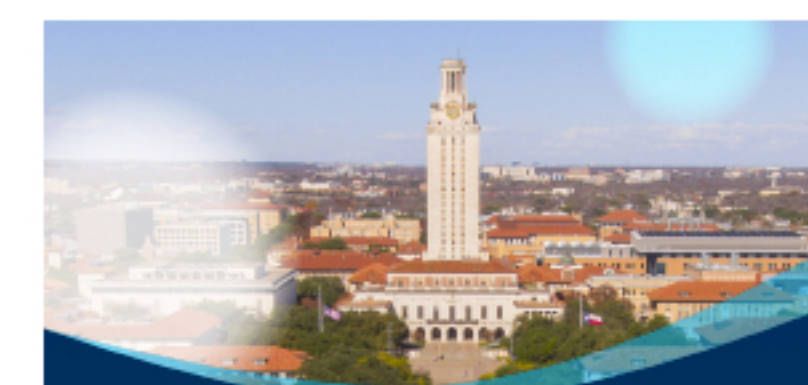
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Study of optical properties of $\text{BaMn}_{1-x}\text{Cr}_x\text{O}_3$ ($x=0.0, 0.1, 0.2, 0.3, 0.4, 0.5$) manganites using microwave synthesis method


AIP Conference Proceedings **1675**, 030068 (2015); <https://doi.org/10.1063/1.4929284>Reena Rani^{a)} and Kamlesh Yadav[Hide Affiliations](#) [View Contributors](#)Center for Physical and Mathematical Sciences, [Central University of Punjab](#), Bathinda-151001, India^{a)}Presenting author, E-mail: reenakamboj@gmail.com PDF[ABSTRACT](#)[CITED BY](#)[TOOLS](#)[SHARE](#)[METRICS](#)

ABSTRACT

Barium manganite (BaMnO_3), a perovskite based material, has been studied extensively. BaMnO_3 properties can be changed by doping different elements at manganese (Mn) lattice site. We have prepared BaMnO_3 and $\text{BaMn}_{1-x}\text{Cr}_x\text{O}_3$ ($x=0.1, 0.2, 0.3, 0.4, 0.5$) by Microwave Synthesizer. Data obtained from Fourier Transform Infrared Spectroscopy (FTIR) that the band gap of pure BaMnO_3 is less as compare to the Cr doped BaMnO_3 . It is also clear from the FTIR that the band gap decreased with increasing the concentration of chromium. Broaden peak at 3201 cm^{-1} correspond to the stretching vibration of hydroxyl group (OH or H_2O). The peaks appear on $724, 863$ and 974 cm^{-1} is corresponding to the stretching vibration of metal oxide (M-O) bonds in the BaMnO_3 . BaMnO_3 have applications in memory storage devices.

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Optical and dielectric properties of $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (AE=Cr, Fe, Co, and Zn; $x=0, 0.1$) nanoparticles synthesized by sol-gel technique

AIP Conference Proceedings 1675, 030070 (2015); <https://doi.org/10.1063/1.4929286>

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- Sol-gel process
- Dielectric properties
- Multiferroics
- Fourier transform spectroscopy
- Ferroelectric materials
- Ferromagnetism
- Nanoparticles
- Magnetic hysteresis
- Data storage and retrieval

ABSTRACT

BiMnO_3 is a multiferroic material which means that it shows both the ferroelectricity and ferromagnetism. Present study deals about the study of optical and dielectric properties of BiMnO_3 and doped BiMnO_3 . The magnetic and non magnetic ions are introduced as dopants in place of Mn sublattice, $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn). We have synthesized nanoparticles of BiMnO_3 and $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn) by sol-gel technique. Optical properties have been studied by using FTIR (Fourier Transform Infrared) spectroscopy. FTIR (Fourier Transform Infrared Spectroscopy) analysis showed that there is an increase in the band gap of $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn) than pure BiMnO_3 for the samples synthesized by sol-gel technique. The increase in band gap on doping is due to the radius to charge ratio. Ferroelectric hysteresis loop confirms the presence of ferroelectricity in BiMnO_3 . From the ferroelectric hysteresis loop the parameters like coercivity, saturation polarization and remanant polarization has been calculated. Nanoparticles of BiMnO_3 have applications in memory storage devices.

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Effect of nickel oxide nanoparticles on dielectric and optical properties of nematic liquid crystal

AIP Conference Proceedings 1675, 030065 (2015); <https://doi.org/10.1063/1.4929281>

Gaurav Jamwal^{1, a)}, Jai Prakash^{1, b)}, Achu Chandran², Jitendra Gangwar², A. K. Srivastava², and A. M. Biradar²

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- Dielectric properties
- Electrooptical effects
- Nematic liquid crystals
- Transition metal oxides
- Nanoparticles

ABSTRACT

In the present paper, we have studied the improvement in dielectric and optical properties of nematic liquid crystal (NLC) by doping of nickel oxide (NiO) nanoparticles. We have observed the dielectric and optical properties of pure and doped cells in order to understand the influence of NiO nanoparticles in the pure NLC. The experimental results have been analyzed through dielectric spectroscopic and optical textural methods. Detailed studies of dielectric parameters such as dielectric permittivity, dielectric loss and dielectric loss factor as a function of frequency with temperature were carried out. It has been observed that on doping the nanoparticles in NLC, the value of dielectric parameters (dielectric permittivity, dielectric loss and dielectric loss factor) decreases. The impedance and resistance of both pure and nanoparticles doped NLC cells were studied and found that for doped NLC, these parameter have low value. In addition to this, optical textures of the pure and doped samples have also been observed with a polarizing optical microscope at room temperature. All the results *i.e.* related to the investigation of dielectric and electro-optic properties have been explained by using existing theory of NLC.

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- Data storage and retrieval

ABSTRACT

BiMnO_3 is a multiferroic material which means that it shows both the ferroelectricity and ferromagnetism. Present study deals about the study of optical and dielectric properties of BiMnO_3 and doped BiMnO_3 . The magnetic and non magnetic ions are introduced as dopants in place of Mn sublattice $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn). We have synthesized nanoparticles of BiMnO_3 and $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn) by sol-gel technique. Optical properties have been studied by using FTIR (Fourier Transform Infrared) spectroscopy. FTIR (Fourier Transform Infrared Spectroscopy) analysis showed that there is an increase in the band gap of $\text{BiMn}_{1-x}\text{AE}_x\text{O}_3$ (where $x=0.1$ and AE= Cr, Fe, Co, and Zn) than pure BiMnO_3 for the samples synthesized by sol-gel technique. The increase in band gap on doping is due to the radius to charge ratio. Ferroelectric hysteresis loop confirms the presence of ferroelectricity in BiMnO_3 . From the ferroelectric hysteresis loop the parameters like coercivity, saturation polarization and remanant polarization has been calculated. Nanoparticles of BiMnO_3 have applications in memory storage devices.

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

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- First-principle calculations
- Materials properties

ABSTRACT

We have performed first principles calculations to find out the effect of mechanical strain on the electronic properties of zig-zag edged nano ribbons of β -phosphorene. It is found that electronic band-gap get opened-up to 2.61 eV by passivation of the edges of ribbons.

Similarly, the mechanical strength is found to be increase from 1.75 GPa to 2.65 GPa on going from unpassivated nano ribbons to passivated ones along with the 2% increase in ultimate tensile strain. The band-gap value of passivated ribbon gets decreased to 0.43 eV on applying strain up to which the ribbon does not break. These tunable properties of β -phosphorene with passivation with H-atom and applying mechanical strain offer its use in tunable nano electronics.

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PANCHAYATS' ROLE IN MGNREGA AND FINANCIAL INCLUSION

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Oxidative Stress Events and Neuronal Dysfunction in Alzheimer's Disease: Focus on APE1/Ref-1-Mediated Survival Strategies

Navrattan Kaur, Bibekananda Sarkar, Sunil Mittal,
Monisha Dhiman, Gulio Tagliatalata,
Regino J. Perez-Polo, and Anil K. Mantha

Abstract

Alzheimer's disease (AD) is an important public health problem which affects millions of people worldwide. The major pathological hallmarks associated with AD are the accumulation of amyloid beta (A β) in senile plaques and neurofibrillary tangles (NFT) made up of hyperphosphorylated tau proteins. New findings suggest that oligomeric A β is a more toxic species than fibrillar A β relevant to AD pathology. Although the molecular mechanism(s) underlying the disease is not identified completely, various factors have been implicated in the development of AD. Accumulating evidences point towards the role of oxidative stress and mitochondrial dysfunction in the pathogenesis of AD and recognise them as an early event in AD development. Ageing is considered the greatest risk factor for AD and is linked to oxidative stress which causes accumulation of somatic mutations in mitochondrial DNA (mtDNA) over time and leads to genome

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Oxidative Stress Events and Neuronal Dysfunction in Alzheimer's Disease: Focus on APE1/Ref-1-Mediated Survival Strategies

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





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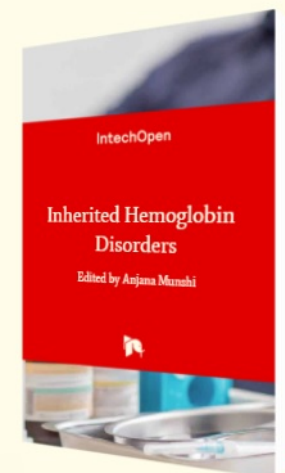
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The book, *Inherited Hemoglobin Disorders*, describes the genetic defects of hemoglobins, disease complications, and therapeutic strategies. This book has two

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Modifiers of γ -Globin Gene Expression and Treatment of β -Thalassemia

Anjana Munshi, Sneha Dadeech, M. Sai Babu and Preeti Khetarpal

Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/61441>

Abstract

Beta thalassemia (β -thalassemia) is an autosomal recessive genetic disease with many genes involved. It is a heterogeneous disorder caused by variations in the inactivation mechanism of the Beta-globin (β -globin) genes. Despite seemingly similar genotypes, the patients with Beta-thalassemia have a remarkable variability in anaemia, growth development, and hepatosplenomegaly and transfusion requirements. The genetic factors may differ in each race or ethnic group for therapy and prevention. Despite remarkable successes in the treatment of Beta-thalassemia in the past decades, it is still the leading cause of death and premature disability in developed and developing countries. Possible factors that influence the severity of anaemia in thalassemia may be inherited or non-inherited. The inherited factors include the type of β -thalassemia, coinheritance of alpha thalassemia (α -thalassemia) and factors that stimulate fetal hemoglobin (HbF) production. In this chapter, respective contributions of known modifiers and also the pharmaceutical agents currently in use and under clinical trials for regulating the globin gene expression will be discussed.

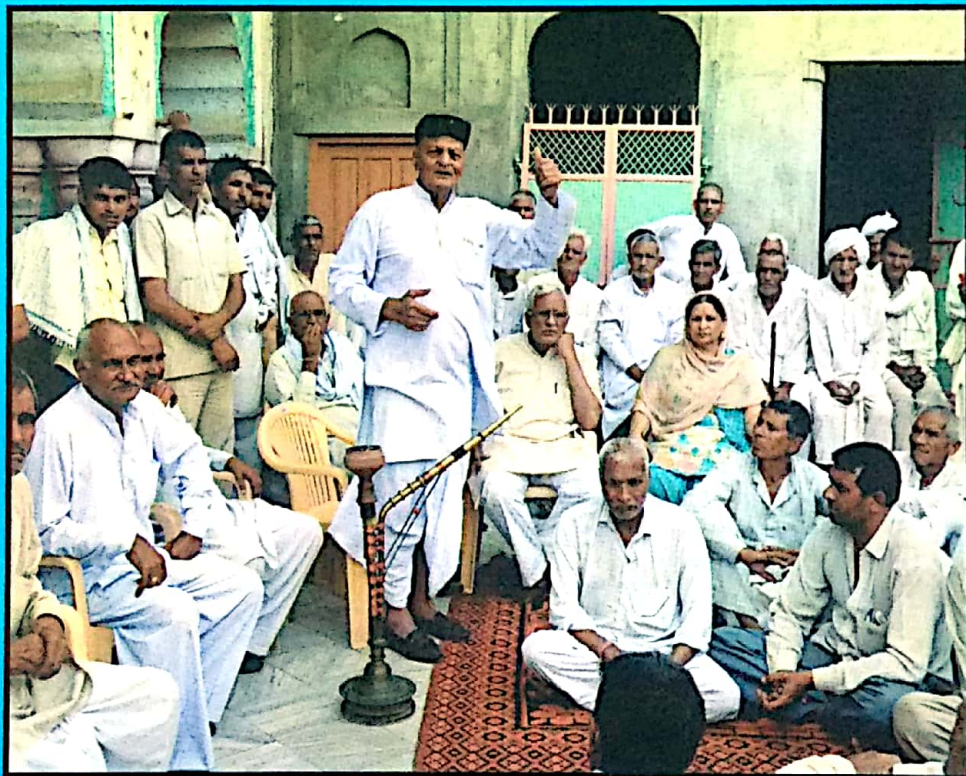
Keywords: Hemoglobinopathies, gamma globin, fetal hemoglobin, modifier genes, drug discovery

1. Introduction

1.1. General introduction

The thalassemias are the commonest monogenic disorders in the world, and globally it is estimated that there are 270 million carriers, of which 80 million are carriers of β -thalassemia. β -thalassemia is widespread in the Mediterranean, Southeast Asian, African, and Middle East populations. The mean prevalence of this disease in India is 3.3%. It has become much more common recently in northern and central Europe, including Germany, due to immigration [1–

PANCHAYATS' ROLE IN MGNREGA AND FINANCIAL INCLUSION



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Linking MGNREGA with PRIs for Inclusive Development in India

Naresh Singla

Introduction

The enactment of Panchayati Raj Act along with the incorporation of 73rd and 74th Amendments in the Constitution paved the way for *Gram Panchayats* to take decisions at grass root level. Recently, the central government has decided to give the responsibility to *Panchayats* to implement various central funding schemes including Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA). The 73rd Amendment to the Constitution was made in 1992 in order to rejuvenate the rural local bodies by giving them constitutional status, allocating powers and functions, making provisions for finances, ensuring regular elections and providing reservations of seats for SCs, STs, women and weaker sections so as to ensure their participation in the political process at all levels. This amendment has also provided reservation for chairpersons at all levels of local bodies to ensure their effective role in decision making (Teja et al. 2013; Government of India 2011). Another leap in this direction was the 74th Amendment Act of the Constitution in 1992, which was aimed at creation of local framework of institutions that would act as local governments (Hamid 2004).

The purpose of assigning the responsibility to *Gram Panchayats* to implement MNREGA is to deepen democracy at the grass-root level and strengthen the Panchayati Raj Institutions (PRIs). MGNREGA launched initially in 200 most backward districts of India is perhaps the

largest and most ambitious social security and public works programme in the world (Government of India 2012; Government of India 2013). The Act was subsequently extended all over India in two phases with the exception of districts that have a hundred percent urban population. The programme aims at enhancing livelihood security of the rural poor by providing at least 100 days of guaranteed employment in a financial year to every household, whose adult members are voluntarily willing to do unskilled manual work. The main aim of the Act is to create durable assets and strengthen the livelihood resource base of the rural poor (Government of India 2013). While market-oriented reforms are necessary for faster economic growth and larger public resources; they do not, on their own, guarantee participatory and equitable growth. The social programmes such as the MGNREGA, far from detracting from economic reforms, complement them in an essential way (Government of India 2012). Therefore, it becomes essential to study the socio-economic viability of such programmes and their impact on marginalised sections of the society.

MGNREGA provides an authoritative, legal right and opportunity to realise the goals of the 73rd Amendment of the Constitution. The Act formally states the Panchayats at the three levels as "principal authorities for planning and implementation of the schemes made under this Act" and this provision is supported by sufficient guaranteed resources. Panchayats are more than instruments for effective implementation of MGNREGA as these have an inherent value in realising the expected outcome of enhanced livelihood security for the rural poor. Panchayati Raj Institutions (PRIs) are entrusted with the roles and responsibilities in the implementation of MGNREGA such as receiving the application for registration, registering households, issuing job cards, receiving applications for work, allotting work within fifteen days of submitting the applications, conducting periodical surveys to assess demand for work, etc. (Government of India 2012-13). However, in practice, bureaucratic implementation of MGNREGA has bypassed the PRIs which were intended to play an important role in planning and executing MGNREGA to respond to the local needs of the people. As a result, several problems ranging from

corruption to poor planning and the arbitrary management of the schemes have cropped up and crippled the viable measure to provide sustenance to the rural poor (Mohanty 2009). Therefore, evaluation of performance of MGNREGA can throw some light on the role PRIs and bureaucratic interference.

The role of PRIs in implementation of MGNREGA can be seen from the exercise of its duties in some of the above mentioned roles and responsibilities. Failure to deliver by PRIs will somehow affect the functioning of MGNREGA. It is in this context that an attempt has been made to study the functioning of MGNREGA and its role in inclusive development in India by studying pattern of employment, assets created, work demanded, fund utilisation under MGNREGA, etc. An attempt has also been made to study possible roles that need to be undertaken by PRIs to further improve functioning of MGNREGA. Following this introductory section, the second section reviews some of the studies on the role of PRIs in functioning of MGNREGA. It also reviews some of the other studies which have only explained the role of MGNREGA in providing work opportunities to the rural poor. Section three of the study describes the performance of MGNREGA at the national level along with comparison of some of the indicators at the state level. The last section of the paper concludes the findings and suggests some recommendations to further strengthen MGNREGA.

Review of Relevant Studies

Several studies in India have analysed the outreach and benefits of MGNREGA by using both field based primary surveys and data available on website of MGNREGA. One such study on MGNREGA has found that MGNREGA has the potential to address both sustenance of income and enhance the social welfare of households in rural areas and thus, in a way can help the democratic process to evolve (Shariff 2009). Another study has also pointed out that significant benefits have already started accruing (especially in respect of women's participation) through better access to local employment, at minimum wages, with relatively decent and safe work conditions (Khera and Nayak 2009). Study by Shariff (2009) also concluded that MGNREGA has facilitated women's empowerment by providing them

opportunities for enhanced participation and cash earnings. Further, direct transfer of wages into workers' bank accounts induced a substantial protection against embezzlement, provided that banking norms are adhered to and that workers are able to manage their own accounts (Adhikari and Bhatia 2010). In Andhra Pradesh, the scheme has brought down migration from rural to urban areas from about 27 percent to only 7 percent (Kareemulla et. al. 2009).

There also existed wide variations amongst the states not only in the level of decentralisation, but also in the capacity to implement such a large scheme and lack of convergence amongst relevant government departments and functionaries (Shariff 2009). Although the scheme provides opportunity for 100 days of wage guarantee in Andhra Pradesh, the actual average employment was estimated to be for 25 days only per household (Kareemulla et. al. 2009). The social audits conducted in Andhra Pradesh under the MGNREGA have achieved much less than advertised and ignored many important aspects of implementation of the scheme. The social audit process has a long way to go before it can claim to have contributed to transparency, empowerment and good governance (Gopal 2009). As per Ghuman and Dua (2008), performance of MGNREGA in Hoshiarpur district of Punjab was not encouraging as the annual average days of employment per household was nearly one-fourth of the minimum 100 days employment. Nevertheless, the authors opined that the employment and earnings under MGNREGA should only be treated as additional avenues for the beneficiaries. Corruption, poor planning and arbitrary management of the scheme has crippled MGNREGA to provide sustenance to the poor (Mohanty 2009). Low performance in Punjab was observed in terms of number of households which got employment, person-days of employment created, low allocation of funds by the state, delays in completion of works and under-utilisation of allocated funds during last three years. Moreover, around three-fourth share of person-days created was cornered by SC families, the share of female workers in person-days employment was still low but is rising (24.61 percent in 2008-09, 26.29 percent in 2009-10 and 37.22 percent in 2010-11) (Gill et al. 2012).

Results and Discussion

National level

1. Employment Pattern

MGNREGA was implemented in 2006-07 in 200 districts of India. Subsequently, the number of districts increased to 300 in 2007-08, 615 in 2008-09 and 619 in 2009-10. During 2010-11, all 626 districts of India were covered under MGNREGA. The number of job cards issued increased from 3.78 crore in 2006-07 to 12.39 crore in 2011-12. Thus, the number of households provided with employment under MGNREGA increased from 2.10 crore to 5.04 crore. MGNREGA created about 90.5 crore person-days of work and it sharply increased as more number of districts were covered under MGNREGA. Thus, with a coverage of 619 districts, 283.59 crore person-days of work were created. However, during 2010-11 the demand for work under MGNREGA declined as only 257.15 crore person-days of work could be created, which further declined to 216.34 during 2011-12. During 2006-07, MGNREGA created 22.95 crore person-days of work for SCs, which subsequently increased with more coverage of districts in subsequent years. During 2009-10, the employment provided to SCs was of the order of 86.45 crore person-days of work. Although in 2010-11 onwards, all 626 districts were covered under MGNREGA, employment generated for SCs decreased to 78.76 crore persons in 2010-11 and 47.70 crore persons in 2011-12. Thus, the share of SCs in total employment generation declined from 25 percent to 22 percent during 2011-12. The situation was even worse in case of STs. MGNREGA created 32.98 crore persons of work for STs in 2006-07, which increased to 58.74 crore persons in 2009-10 in commensurate with coverage of more districts. The employment created for STs declined to 53.62 crore persons in 2010-11 to 39.59 crore persons in 2011-12. The share of STs in total employment generation declined from 36 percent in 2006-07 to 18 percent in 2010-11. Thus, the analysis shows that work participation for marginalised groups like SCs/STs has declined under MGNREGA during last couple of years.

Women participation under MGNREGA continuously increased from 2006-07 to 2009-10 as 36.40 crore person-days of work was created for

women in 2006-07 which increased to 136.40 crore persons during 2009-10. However, women participation under MGNREGA declined thereafter. The work created for women was of the order of 122.74 crore persons which further declined to 103.81. This mainly occurred because the total demand for work fell after 2009-10. This was the reason that although women participation declined under MGNREGA but participation of women in MGNREGA was quite stable at 48 percent since 2008-09. The average employment provided to each household under MGNREGA was 43 days during 2006-07 which increased to 54 days during 2009-10. Thereafter, the employment provided to each household decreased to 47 in 2010-11 and 43 in 2011-12. Thus, the above analysis reveals that work demanded under MGNREGA from the Gram Panchayats and participation of marginalised groups such as SCs, STs and women decreased during last few years (Table-1).

Table-1
Employment under MGNREGA

Parameters	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Number of districts covered	200	330	615	619	626	626
Job cards issued (in crore)	3.78	6.48	10.01	11.25	11.98	12.39
Employment provided to households (in crore)	2.10	3.39	4.51	5.26	5.49	5.04
Person-days (in crore)						
Total	90.5	143.59	216.32	283.59	257.15	216.34
SCs	22.95	39.36	63.36	86.45	78.76	47.70
(Percentage of SCs)	25	27	29	30	31	22
STs	32.98	42.07	55.02	58.74	53.62	39.59
(Percentage of STs)	36	29	25	21	21	18
Women	36.40	61.15	103.57	136.40	122.74	103.81
(Percentage of women)	40	43	48	48	48	48
Person-days per household	43	42	48	54	47	43

Source: www.nrega.nic.in

2 Budgetary Outlays and Expenditure

Table 2 shows the budgetary outlay and expenditure under MGNREGA.

Table-2
Budgetary Outlay and Expenditure under MGNREGA

Parameters	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	CAGR (Percent)
Budget outlay (in crore rupees)	11300	12000	300000	39100	40100	40000	25.32
Expenditure (in crore rupees)	8823.35	15856.89	27250.10	37905.23	39377.27	38034.70	34.46
Percentage of funds utilised	73	82	73	76	73	78	-
Expenditure on wages (in crore rupees)	5842.37	10738.47	18200.03	25579.32	25686.53	24860.91	33.82
Percentage expenditure on wages	66	68	67	70	68	69	-

Source: Government of India 2013.

It shows that budgetary outlay was 11,300 crore rupees during 2006-07, which increased to 12,000 crore rupees during 2007-08 as the number of districts covered also increased from 200 to 330 during this period. Subsequently, budgetary outlay increased to 30,000 crore rupees during 2008-09 and 39,100 crore rupees during 2009-10 as the number of districts covered under MGNREGA increased to 615 during 2008-09, which further increased to 619 during 2009-10. During 2010-11, the budgetary outlay was 40,100 crore rupees and all the districts across all states were covered under MGNREGA. The expenditure under MGNREGA also kept on increasing in commensurate with the increase in budgetary outlay. The expenditure has increased from 8823.35 crore rupees to 38034.70 crore rupees during 2006-07 to 2011-12 at CAGR of 34.46 percent. Thus, although the percentage of the available funds utilised increased from 73 percent to 78 percent, still about 22 percent of the funds available for utilisation under MGNREGA remain unutilised. This led to subsequent reduction of budgetary outlay for MGNREGA to 29,387 crore rupees by the Government of India. The expenditure on wages was 5842.37 crore rupees during 2006-07, which was about 66 percent of the total expenditure meant for MGNREGA. It increased to 24,860.91 crore rupees during 2011-12. Thus, about 69 percent of the total expenditure meant for MGNREGA was paid as wages. The above analysis clearly depicts poor implementation of the programme. Since MGNREGA is a centrally sponsored scheme, its implementation is entirely executed by the respective state governments. The state governments have to claim the allocated resources by planning MGNREGA work related activities and turning them into projects. The state governments are unable to implement MGNREGA efficiently at the grassroot levels due to shortage of administrative and implementing staff. Sometimes, interparty political differentials also led to poor implementation of the scheme as party in power in the concerned state was different from the ruling party at the centre (Shariff 2009).

3 Works Undertaken under MGNREGA

Table-3 shows the works undertaken and their completion under MGNREGA. The table shows that total works undertaken under MGNREGA increased from 8.35 lakh in 2006-07 to 82.51 lakh in 2011-12

with a CAGR of 53.9 percent. The works completed under MGNREGA also witnessed an increase from 3.87 lakh in 2006-07 to 25.90 lakh in 2010-11, which decreased to 18.56 lakh in 2011-12. Thus, the CAGR in works completed under MGNREGA was 40.5 percent during 2006-07 and 2011-12. The growth in works taken up under MGNREGA was more than the growth in completion of works. It was also evident that proportion of the works completed to total works undertaken declined sharply from 46.35 percent to 22.49 percent.

Table-3
Works Undertaken and Completed under MGNREGA

Particulars	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	CAGR (Percent)
Total works undertaken (in lakh)	8.35	17.88	27.75	46.17	50.99	82.51	53.9
Works completed (in lakh)	3.87	8.22	12.14	22.59	25.90	18.56	40.5
Percentage of works completed to total works undertaken	46.35	45.97	43.75	48.93	50.79	22.49	-

Source: Government of India (2013).

More than 50 percent of the activities carried out under MGNREGA were related to water conservation in rural areas. Inter and intra connecting of rural areas was another task performed under MGNREGA in order to provide all weather access, including culverts and roads within a village, wherever necessary. MGNREGA also focused on provision to provide irrigation facilities to the land owned by SCs/STs and other BPL and IAY beneficiaries. Land development was another activity performed under MGNREGA. The scope of works under MGNREGA was then expanded to include construction of Bharat Nirman Rajiv Gandhi Seva Kendra (BNRGSK) at the Gram Panchayat and Block level to strengthen the infrastructure at the Gram Panchayat and the Programme Office level to enable an efficient implementation of MGNREGA and to provide space for greater and more transparent interactions with the people (Table-4). The table clearly reveals that there is not much change in composition of the activities carried out under MGNREGA. Over the past few years, state

governments are constantly demanding inclusion of new works under MGNREGA, which would create positive synergy between MGNREGA and agriculture and allied livelihoods. Now, the government is likely to make it mandatory that 60 percent of works undertaken in a district under MGNREGA should be linked to agriculture to give a boost to agricultural growth through labour-intensive work in order to create productive assets linked to agriculture and allied sectors.

Table-4

Different Types of Work Undertaken under MGNREGA (in lakh)

Activities	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Water conservation	4.51 (54)	8.73 (49)	12.79 (49)	23.43 (51)	24.26 (48)	44.09 (53)
Rural Connectivity	1.80 (21)	3.08 (17)	5.03 (18)	7.64 (17)	9.31 (18)	17.87 (22)
Provision of Irrigation facility to land owned by SC/ST/ BPL and IAY beneficiaries	0.81 (10)	2.63 (15)	5.67 (20)	7.73 (17)	9.15 (18)	9.52 (12)
Land Development	0.89 (11)	2.88 (16)	3.98 (15)	6.38 (14)	7.04 (14)	7.69 (9)
Rajiv Gandhi Seva Kendra	-	-	-	-	0.17 (0.33)	0.28 (0.34)
Any other activity	0.34 (4)	0.56 (3)	0.28 (1)	0.98 (2)	1.06 (2)	3.06 (4)

Source: Government of India(2013).

Note: Figures in parentheses are percentage to the total works taken up under MGNREGA.

State Level Analysis

Table- 5 shows the relative performance of MGNREGA during 2010-11 among different states. The proportion of HHs demanding employment to HHs issued job cards shows that demand for work is highest across all north-eastern states compared to all other states. In states such as Mizoram and Nagaland, ratio of HHs demanded work to HHs issued job cards was 100 per cent, while for states such as Manipur, Tripura, Meghalaya, Arunachal Pradesh and Sikkim, it was 98.3 percent, 95.3 percent, 89.8 percent, 89 percent and 77 percent respectively.

State-Wise Performance of MGNREGA (2010-11)

State	Percentage HHs demanded employment to HHs issued job card	Percentage of HHs demanding employment to total rural HHs	Average employment days per HH	Percentage of HHs completed 100 days of employment	Percentage of women person days	Percentage of SCs and STs employed	Work completion rate
Andhra Pradesh	51.71	43.56	54	15.56	57.05	40.34	83.74
Arunachal Pradesh	88.98	75.71	23	0.40	33.26	90.30	-
Assam	41.37	33.35	26	2.52	26.51	38.25	62.10
Bihar	36.52	28.25	34	5.96	28.50	47.53	56.04
Chhattisgarh	63.55	56.94	45	7.42	48.63	51.08	86.07
Gujarat	27.74	16.20	45	6.16	44.23	55.72	76.49
Haryana	40.75	7.80	36	3.82	35.62	48.93	91.24
Himachal Pradesh	42.55	34.06	49	4.93	48.25	40.77	85.68
Jammu & Kashmir	49.68	32.03	43	12.10	7.47	32.28	39.58
Jharkhand	50.73	42.06	42	6.59	33.47	55.53	45.22
Karnataka	45.61	30.38	49	5.45	46.01	25.51	83.61
Kerala	40.69	28.59	41	5.73	90.39	19.32	75.88
Madhya Pradesh	39.05	40.12	50	10.51	44.40	62.79	63.67
Maharashtra	7.78	3.44	44	6.22	45.88	47.57	22.50
Manipur	98.28	100	68	25.01	35.07	73.22	4.0

State	Percentage HHs demanded employment to HHs issued job card	Percentage of HHs demanding employment to total rural HHs	Average employment days per HH	Percentage of HHs completed 100 days of employment	Percentage of women person days	Percentage of SCs and STs employed	Work completion rate
Meghalaya	89.78	83.03	58	5.48	43.92	94.89	62.65
Mizoram	100.00	100	97	77.22	33.93	99.84	38.54
Nagaland	100.00	100	95	54.23	35.02	100.00	6.05
Odisha	33.69	25.09	49	10.06	39.40	53.68	62.66
Punjab	33.93	8.30	27	1.88	33.84	78.33	77.20
Rajasthan	66.38	64.84	52	8.05	68.34	48.78	28.45
Sikkim	76.66	60.46	85	45.56	46.68	51.93	68.85
Tripura	67.63	52.15	54	22.18	82.59	59.90	98.56
Tamil Nadu	95.30	90.40	67	14.61	38.55	61.39	97.58
Uttar Pradesh	50.42	25.62	52	9.12	21.42	56.06	86.67
Uttaranchal	55.66	38.06	42	4.69	40.30	30.61	54.35
West Bengal	46.70	36.28	31	2.09	33.69	50.33	89.05
India	46.53	33.08	47	9.98	47.73	51.47	76.03

Source: www.nrega.nic.in

It was the least in states such as Maharashtra followed by Gujarat, Odisha, Punjab, Bihar, Madhya Pradesh in that order. Further, ratio of HHs demanding employment under MGNREGA to total rural HHs again indicates that scheme is highly popular in N-E states such as Manipur, Mizoram and Nagaland, where all the rural HHs demanded work under MGNREGA. In Tripura, Meghalaya and Arunachal Pradesh, about 90 percent, 83 percent and 76 percent of the rural HHs demanded work under MGNREGA. Rajasthan, Sikkim, Chattishgarh, Tamil Nadu, Andhra Pradesh etc. also have higher ratio of HHs demanding work under MGNREGA to total rural HHs than that at national level (33 percent). The proportion of rural HHs demanding work under MGNREGA was least in Maharashtra (3.44 percent) followed by Haryana (7.8 percent), Punjab (8.3 percent) and Gujarat (16.2 percent). The proportion of rural HHs demanding work under MGNREGA was lower in states such as Odisha (25 percent), Uttar Pradesh (26 percent), Bihar (28 percent), Kerala (28.6 percent) etc. than that at national level (33 percent).

The average employment days per HH were also highest in most of the N-E states with the exception of Assam and Arunachal Pradesh, Tamil Nadu, Andhra Pradesh, Rajasthan and Uttar Pradesh etc. Madhya Pradesh, Himachal Pradesh, Karnataka and Odisha also have higher average employment days per HHs against 47 at national level. The average employment days per HH were least in case of Arunachal Pradesh followed by Assam, Punjab, West Bengal, Bihar and Haryana in that order. The proportion of HHs completing 100 days of employment was highest in Mizoram (77 percent), Nagaland (54 percent), Sikkim (46 percent), Manipur (25 percent) and Tamil Nadu (22 percent) etc. compared to about 10 percent at national level, while it was least in states such as Arunachal Pradesh, Punjab, West Bengal, Assam and Haryana etc. in that order. The proportion of person-days generated for women in total person-days was the highest in Kerala (90 percent) followed by Tamil Nadu (86 percent), Rajasthan (68 percent) and Andhra Pradesh (57 percent) as against 47.8 percent at national level. The share of employment days generated for women was the least in Jammu & Kashmir (7.5 percent) followed by Uttar Pradesh (26.5 percent), Assam, Bihar (26.5 percent), Arunachal Pradesh (28.5 percent),

etc. Further, it can also be seen that all workers under MGNREGA in Nagaland and Mizoram belonged to SC and ST categories, while proportion of SC and ST workers was also much higher in states such as Arunachal Pradesh, Punjab, Manipur, Madhya Pradesh, Tripura, Tamil Nadu and Uttar Pradesh in that order. The states such as Kerala, Karnataka, Uttaranchal, Jammu & Kashmir, Assam, etc. have employed least proportion of SCs and STs under MGNREGA in that order. The work completion rate under MGNREGA was found highest in Tamil Nadu (98.6percent), followed by Tripura (97.6 percent), Haryana (91.2 percent), West Bengal, Uttar Pradesh (86.7 percent), Chhattisgarh (86 percent) etc. Himachal Pradesh, Andhra Pradesh, Karnataka, Punjab and Gujarat also have higher work completion rates than that at national level (76 percent). On the other hand, states such Manipur and Nagaland have work completion rate of only 4 percent and 6 percent respectively, while the states such as Maharashtra, Rajasthan, Mizoram, Jammu & Kashmir, Jharkhand, and Uttaranchal also had lower completion rates than the national level. Thus, it can be concluded that there existed wide variations in performance of MGNREGA across the different states.

Conclusions and Policy Suggestions

The study has concluded that MGNREGA, initially implemented in 200 districts of the country in 2006-07 has been able to expand across all districts of the country since 2010-11 and subsequently, the number of job cards issued also increased over the period. But, employment provided to marginalised sections of the society such as SCs, STs and women has started decreasing, which is a major cause of concern as with the exclusion of these marginalised sections inclusive development cannot take place. It is here that PRIs, particularly *Gram Panchyats* and *Gram Sabhas* will have to play an active role by enrolling marginalised sections of the society and making them aware of the scheme. In order to improve fund utilisation under MGNREGA, there should be proper coordination between centre and state relations and state governments must put administrative and implementing staff at ground level. Also, there is not much change of work composition under MGNREGA during last five years. Hence, there is need to create a positive synergy between MGNREGA works and those related with

agricultural and allied activities so as to create productive assets which will help raise agricultural growth and productivity. Government of India is also planning to make mandatory that 60 percent of work undertaken in a district under MGNREGA should be linked to agriculture. Though training is provided to the elected Panchayat members and Gram Sabha members, yet there is need to provide proper training about MGNREGA scheme to some of the stakeholders such as social audit committee members, grievance committee members, vigilance monitoring committee members, government functionaries like *Panchayat Secretaries, Sahayaks* and *Gram Rozgar Sewak* by organising training programmes at district, block and even at Panchayats level (CRRID 2009).

There also existed inter-state variations in performance of MGNREGA. States such as Tamil Nadu, Tripura (except women enrolment ratio), Andhra Pradesh (except for enrolment of SCs and STs) performed reasonably well while states such as Bihar, Maharashtra and Assam failed to deliver in respect of all the indicators studied. The success and failure to deliver is usually attributed to poor planning, arbitrary management and bureaucratic implementation of the scheme, besides the poor set up of the PRIs particularly at grass root level. Thus, empowering the PRIs will not only help to effective implementation of the MGNREGA, but also help to strengthen PRIs at grass root level.

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Investigation of collar properties on data-acquisition scheme for acoustic logging-while-drilling

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ABSTRACT

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ABSTRACT

We have used the wavenumber integration, velocity-time semblance, and dispersion methods to investigate the influence of collar properties including velocities, density, and attenuation on acoustic logging-while-drilling wavefields. We have found that when the velocities of the collar wave and the P-wave of the formation are similar, they interfere. However, the interference disappears when the velocity difference increases. Having a collar with large velocities (especially large shear velocity) and density makes the direct P-velocity determination possible in a fast formation even without isolators. For a slow formation, the interference of the collar flexural wave with the formation flexural and leaky P-waves is slight for a dipole tool when collar velocities are large. For this case, the S velocity can be determined by the flexural formation wave at low frequency (approximately 2 kHz). Based on these observations, we propose that the measurement of the P- and S-velocities can be easier if the collar is made of an advanced composite material that has high compressional and shear velocities as well as density. This is a direct and easy change to implement and a new idea for an acoustic logging-while-drilling tool design.

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Anil Bhat and S.P. Singh

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ਪੰਜਾਬੀ ਦੀ ਉਚੇਰੀ ਸਿੱਖਿਆ : ਸਮੱਸਿਆਵਾਂ, ਸਮਾਧਾਨ ਅਤੇ ਸੰਭਾਵਨਾਵਾਂ

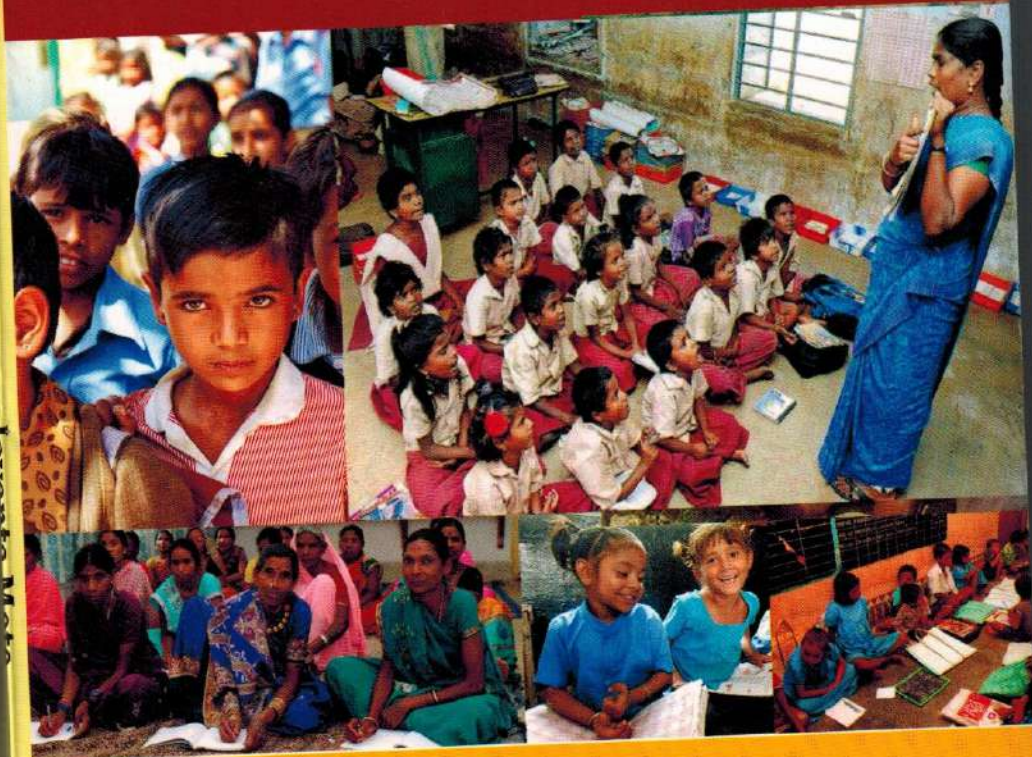
- ਡਾ. ਰਮਨਪ੍ਰੀਤ ਕੌਰ

ਬੰਧਤ ਸਮੂਹ ਮਾਨਵੀ ਵਰਤਾਰੇ ਵੀ ਆਪਣੀ ਇਸ ਜੀਵੰਤਤਾ ਨੂੰ ਕਾਇਮ ਰੱਖਣ ਲਈ ਨਿਤ ਨਵੀਆਂ ਚੁਣੌਤੀਆਂ ਦੇ ਰੂਪ ਵਿਚ ਵੱਖ ਵੱਖ ਸਮੱਸਿਆਵਾਂ ਦਾ ਸਾਹਮਣਾ ਕਰ ਰਹੇ ਹਨ।

ਇਹ ਸੱਚ ਹੈ ਕਿ ਮਾਨਵੀ ਜੀਵਨ ਵਿਚ ਹਰੇਕ ਪਲ ਨਵੀਆਂ ਚੁਣੌਤੀਆਂ ਲੈ ਕੇ ਆਉਂਦਾ ਹੈ। ਪਰ ਕਦੇ ਕਦੇ ਵਿਰਾਸਤ ਦੇ ਵਰਤਾਰੇ ਵਰਤਮਾਨ ਲਈ ਬਹੁਤ ਸਾਰੀਆਂ ਸਮੱਸਿਆਵਾਂ ਦੀ ਸੰਗਤ ਦੇ ਨਾਲ ਨਾਲ ਨਵੀਆਂ ਸੰਭਾਵਨਾਵਾਂ ਵੀ ਲੈ ਕੇ ਆਉਂਦੇ ਹਨ। ਅਜਿਹਾ ਉਸ ਵਕਤ ਵਾਪਰਦਾ ਹੈ ਜਦੋਂ ਮਾਨਵੀ ਸਮਾਜ ਵਿਚ ਕ੍ਰਾਂਤੀਕਾਰੀ ਪਰਿਵਰਤਨ ਆਉਂਦੇ ਹਨ। ਇਸ ਪ੍ਰਕਾਰ ਦੇ ਪਰਿਵਰਤਨ ਨਾ ਕੇਵਲ ਮਾਨਵੀ ਸਮਾਜਾਂ ਦੇ ਮੁਹਾਂਦਰੇ ਨੂੰ ਬਦਲਦੇ ਹਨ, ਬਲਕਿ ਇਹਨਾਂ ਸਮਾਜਾਂ ਦੇ ਬੁਨਿਆਦੀ ਆਧਾਰਾਂ ਨੂੰ ਵੀ ਨਵੀਂ ਦਿਖ ਪ੍ਰਦਾਨ ਕਰਦੇ ਹਨ। ਹਰੇਕ ਮਾਨਵੀ ਸਮਾਜ ਅਜਿਹੇ ਪਰਿਵਰਤਨਾਂ ਵਿਚੋਂ ਕਈ ਦਫ਼ਾ ਗੁਜ਼ਰਿਆ ਹੈ। ਵੀਹਵੀਂ ਸਦੀ ਦੀ ਉਦਯੋਗਿਕ ਵਿਰਾਸਤ ਨੇ ਜਿੱਥੇ ਸਾਨੂੰ ਵੱਡੇ ਪੱਧਰ ਦੀ ਪਦਾਰਥਕ ਪ੍ਰਗਤੀ ਪ੍ਰਦਾਨ ਕੀਤੀ ਹੈ, ਉੱਥੇ ਸਾਡੇ ਸਾਹਮਣੇ ਬਹੁਤ ਸਾਰੀਆਂ ਨਵੀਆਂ ਸਮੱਸਿਆਵਾਂ ਵੀ ਚੁਣੌਤੀਆਂ ਦੇ ਰੂਪ ਵਿਚ ਖੜ੍ਹੀਆਂ ਕੀਤੀਆਂ ਹਨ। ਵੀਹਵੀਂ ਸਦੀ ਦੇ ਅੰਤਿਮ ਦਹਾਕੇ ਵਿਚ ਕੰਪਿਊਟਰ ਸੈਟੇਲਾਇਟ ਅਤੇ ਸੰਚਾਰ ਤਕਨਾਲੋਜੀ ਨੇ ਅਤੀ ਆਧੁਨਿਕ ਸਰੂਪ ਧਾਰਨ ਕਰਨਾ ਸ਼ੁਰੂ ਕੀਤਾ। ਇਸੇ ਦਹਾਕੇ ਦੇ ਆਰੰਭ ਵਿਚ ਵਿਸ਼ਵ ਰਾਜਨੀਤੀ ਜੋ ਪਹਿਲਾਂ ਤਿੰਨ ਧਰੁਵੀ ਸੀ, ਇਸਦਾ ਇਕ-ਧਰੁਵੀਕਰਨ ਹੋ ਗਿਆ। ਇਸਦੇ ਨਾਲ ਹੀ ਸਮੁੱਚੇ ਮਾਨਵੀ ਨੂੰ ਆਪਣੇ ਕਬਜ਼ੇ ਵਿਚ ਕਰਨ ਲਈ ਐੱਲ.ਪੀ.ਜੀ. (ਉਦਾਰੀਕਰਨ, ਨਿੱਜੀਕਰਨ ਤੇ ਵਿਸ਼ਵੀਕਰਨ) ਦਾ ਸੰਕਲਪ ਸਾਡੇ ਸਾਹਮਣੇ ਆਇਆ। ਫਲਸਰੂਪ ਇਸ ਯੋਜਨਾਬੰਦ ਕੂਟਨੀਤੀ ਸਦਕਾ ਪੂਰਾ ਵਿਸ਼ਵ ਇਕ ਮੰਡੀ ਵਿਚ ਤਬਦੀਲ ਹੋ ਗਿਆ। ਇਸ ਦੌਰਾਨ ਸੂਚਨਾ ਤੇ ਸੰਚਾਰ-ਤਕਨਾਲੋਜੀ ਨੇ ਵਿਸ਼ਵ ਦੇ ਮੰਡੀਕਰਨ ਅਤੇ ਵਿਸ਼ਵੀਕਰਨ ਦੀਆਂ ਤਕਨੀਕੀ ਚਾਲਾਂ ਸਿਰਜਣ ਵਿਚ ਸਹਾਇਤਾ ਕੀਤੀ। ਸਿੱਟੇ ਵਜੋਂ ਮੰਡੀ ਮਾਨਸਿਕਤਾ ਅਤੇ ਖਪਤਕਾਰੀ ਰੁਚੀਆਂ ਵਿਚ ਵਿਸਫੋਟਕ ਵਾਧਾ ਹੋਇਆ। ਇਸਦੇ ਪ੍ਰਭਾਵ ਅਧੀਨ ਬਾਕੀ ਭਾਰਤੀ ਭਾਸ਼ਾਵਾਂ ਅਤੇ ਭਾਸ਼ਾ-ਸਮੂਹਾਂ ਵਾਂਗ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵੀ ਇਸੇ ਪ੍ਰਕਾਰ ਦੇ ਸਮਾਜਕ-ਰਾਜਨੀਤਕ ਵਾਤਾਵਰਨ ਵਿਚ ਵਿਚਰਨ ਦੀ ਮਜ਼ਬੂਰੀ ਤੇ ਬੇਵਸੀ ਭੋਗ ਰਹੀ ਹੈ।

ਭਾਸ਼ਾ ਕਿਸੇ ਵੀ ਸਮਾਜ-ਸਭਿਆਚਾਰ ਦਾ ਅਨਿੱਖੜਵਾਂ ਅੰਗ ਹੁੰਦੀ ਹੈ। ਇਹ ਅੱਗੋਂ

Inclusive Education



Jayanta Mete
Dr. Gurkirat Kaur
Dr. Sujata Bhan

INCLUSIVE CLASSROOM LEARNING

Dr. Biswajit Behera*

Backdrop

Education is life. It is a process that equips the learner with knowledge, attainment of skills, values and attitudes which enables him/her to participate effectively in all spheres of life. The learner should be prepared towards wholistic development of personality to become a part of the society. So, class room should be designed to address each individual needs of the learner. Kothari commission (1966) has rightly pointed out that "The destiny of India is now being shaped in her class room". Therefore, 'every child is a special child' should be emphasised. In this regard, a better school system can address the requirements of children with diverse needs and specialities. National Curriculum Framework (NCF, 2005) also emphasised the need of inclusive education for the betterment of the society. NCFSE (2000) recommended that "segregation or isolation is good neither for learners with impairment nor for general learners without impairment. Societal requirement is that learners with special needs should be educated along with other learners in inclusive schools which are cost effective and have sound pedagogical practices". According to 93rd Amendment Bill (passed as the 86th constitutional amendment), Education is a fundamental right for all. Both Article 45 and Article 21-A had stipulated for free and compulsory education to all children. The 'All' means children irrespective of caste, creed, colour, sex, religion, race, disability and etc. Sarva Shiksha Abhiyan (SSA) is a historic stride towards achieving the goal of UEE (Universalisation of Elementary Education). It aims to provide universal quality elementary education to all children including children with disabilities. It is an effort to provide social justice. Therefore, it stresses upon the educational participation of children for SC/ST, Religious and Linguistic Minorities, Disadvantaged groups and children with special needs. Even, UNESCO provides inclusive education or 'school for all'. It is the responsibility of every school to make arrangement and create favourable environment for the children having a variety of special needs. World Conference

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on Education for All (EFA) in the year 1990 emphasised that "the learning needs of the disabled demand special attention and steps need to be taken to provide equal access to education to every category of disabled persons as an integral part of the educational system". Thus, the target of "Education for All" through educational programme is a priority issue. Education for All is to be achieved in terms of 'Equality', 'Equity' and 'Quality'.

Therefore, inclusive education became an identified issue. One of the major action points is recognised as the development of teaching-learning environment required for different categories of students as well as pedagogical strategies needed to provide high quality education to all and the children with special needs in particular.

Inclusive School

The terminology "inclusion" is used to denote everyone. Inclusive school aimed at catering to the educational needs of all children who are vulnerable to exclusion due to their specific problems and circumstances. Inclusion means the process of educating children with and without special education needs (SEN) in general education system with innovatively designed instruction and support system in the curriculum, examination, methodology and class-room environment for attaining quality learning from the part of the learners. The UNESCO (2005) has defined that it is a process of addressing and responding to the diverse needs of all learners by increasing participation in learning. National Curriculum Framework 2005 viewed that the participation of all children needs to be ensured in all spheres of their life in and outside the school. Therefore, inclusive school demands that regular class room learners should be equipped with skills to provide congenial learning environment to meet the educational needs of the children. It involves 'regular schools' and 'class-rooms' genuinely adapting and changing to meet the needs of all children as well as valuing differences (Loreman, 2005). Thus, the fundamental principle of inclusive school is that all children should learn together. It should accommodate both different styles and rates of learning and ensuring quality education to all through appropriate curricula, teaching strategies, resources and creating learning environment (Lipsky & Gartner, 1999).

Inclusive Class Room Learning

Class room learning should meet the intellectual, social and personal needs of the diverse learners. Pedagogical approaches should embrace the diverse perceptions in content, methods and assessment process. The teachers must be prepared to deal with inclusion in the class room environment by adapting the curriculum, teaching strategies and the assessment. The study says that inclusive class room learning should be collaborative group learning. Kamlesh (1991) in a study on cooperation-based learning strategies found that co-operative learning



Information Technology, Communication and Distance Education



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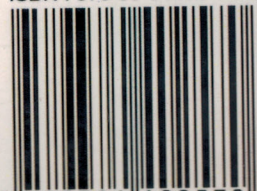
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