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Sarat Centenary College

Dhaniakhali, Hooghly

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Arun Kolatkar's Jejuri: A Conflict between Myth and Reality, Faith and Scepticism

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Abstract
Myth and mythical association with different gods and goddesses play a significant role in Indian English literature. Arun Kolatkar's *Jejuri* is a Commonwealth Writers' Prize winning collection of poems about a pilgrim place of the same name in Maharashtra and mythical stories associated with the local god Khandoba. Kolatkar tries to exploit the age old theme of a religious pilgrimage through his poetic persona, Monahar, who is a modern urban sceptic. To him Jejuri does not appear to be a spiritual place or a sacred place of worshipping God. Rather it is a barren, desolated and ruined place. This paper aims to analyze the conflict between the mythical association of the place and the god Khandoba and the socio-cultural and economic reality of the place; between the blind faith of the local people and the pilgrims who visit there and the sceptic attitude of an urban tourist with an objective eye and rational mind.

Keywords
pilgrimage, faith, scepticism, myth, conflict

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Effect of Gamma Rays on Various Physio-Morphological Characters in the M_1 Generation of Scented Rice

K. M. Hasib, A. K. Basak, P. C. Kole

Received 28 September 2018; Accepted 2 November 2018; Published on 24 November 2018

Abstract Seeds of local scented rice cultivar Tulaipanja were germinated in the laboratory and sown in the pot immediately after treatment with 2 doses (200 Gy and 300 Gy) of gamma rays. Thirty-day old seedlings were transplanted in the main field. Biological effects of gamma irradiation on different physiological parameters related to growth and development were studied. The germination ability of treated seeds and growth and survival ability of seedlings were affected considerably. Significant reduction in the the length of radicle and plumule, plant height, number of panicles per plant and survival ability of plants was observed with increasing doses of gamma rays. The flowering was also delayed due to radiation treatment. The growth and development of plants was greatly impaired as reflected on different physio-morphological characters studied in the above scented rice cultivar.

Keywords Gamma rays, Induced mutation, M_1 generation, Scented rice.

Introduction

Induced mutation is an important complementary and often unique approach in plant breeding. The induced mutation can provide useful alternative to natural variation particularly to improve one or few easily identifiable characters of well adapted variety specifically in scented rice. Tulaipanja, a non-basmati traditional aromatic tall *indica* rice cultivar is very popular in northern parts of West Bengal, an important rice growing province of India, due to its excellent grain quality and aroma. But this cultivar is handicapped by low yield potential. Therefore, there is urgent need to improve the yield potential of such rice. However, improvement in yield and

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Evaluation of Performance in the Crosses of Aromatic Rice Involving Induced Mutants

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ABSTRACT

An investigation was made on six basic generations viz., P_1, P_2, F_1, F_2, BC_1 and BC_2 of five cross-combinations which were grown in randomized complete block design with three replications to evaluate the performance of different characters in various generations. Observations were made on various morphological and physiological characters which would be useful for obtaining an idea on genetic nature and performance of crosses for the improvement of aromatic rice. In general, the mean performance of F_1 for different characters was in between two parents, while in some cases, it exceeded the better parent. The F_2 plants showed wide range of variability for each character studied. In many cases, the mean of BC_1 and BC_2 plants approached the respective recurrent parent. Wide range of variability was present in the population studied. The information obtained from this investigation would be useful for the improvement of aromatic rice.

Key words *Mean performance, quantitative characters, induced mutants, aromatic rice*

Rice is the most important staple food and also the predominant dietary energy source for various countries in the world. It is the most important food grain in respect to nutrition and calories, contributing more than one-fifth of the calories consumed worldwide by humans (Smith 1998). Aromatic rice has a special place in the world rice market. There is an increasing demand of high yielding aromatic rice with superior grain quality. Evaluation of performance of important traits including grain yield is the prerequisite for successful breeding strategies in aromatic rice. In the breeding programme, it is desirable to have an idea about the performance of different generations of the characters to be improved. Nature of variability in the populations is also important for genetic improvement of aromatic rice. To consider the above mentioned facts, an investigation on different generations of five cross combinations of aromatic rice involving induced mutants of local aromatic cultivars was made for the improvement of aromatic rice and also to formulate the appropriate breeding strategy.

MATERIALS AND METHODS

Gobindabhog and Tulaipanja are popular tall *indica* short grain aromatic non-basmati rice grown in West Bengal, which are susceptible lodging with low yield potential. Induced mutation through gamma irradiation resulted in a number of short height mutants and selection in advanced generation resulted in isolation of a number of true-breeding mutants. The induced true-breeding mutant IET 13541 derived from Gobindabhog (Ghosh and Ganguli 1994; Hasib and Ganguli 2005) and IET 14143 and IET 14142 derived from Tulaipanja (Basak *et al* 1995; Hasib and Ganguli 2005) retaining the characteristics aroma of mother plants were used in cross-breeding programme with three popular basmati varieties to generate five cross-combinations (Table 1). Plants of six basic generations namely, Parent1 (P_1), Parent 2 (P_2), F_1 ($P_1 \times P_2$), F_2 (selfing of F_1), BC_1 ($F_1 \times P_1$) and BC_2 ($F_1 \times P_2$) were grown in randomized complete block design with three replications adopting appropriate spacing in warm wet session. Standard agronomic practices were followed to raise the healthy plants of all six generations, *viz.*, P_1, P_2, F_1, F_2, BC_1 and BC_2 together in a single session. Data on important morphological and physiological characters like plant height, days to flowering, spikelet number per plant, grain length, grain breadth, dry matter production per plant, harvest index and grain yield per plant were recorded. The data collected from the six basic generations, *viz.*, P_1, P_2, F_1, F_2, BC_1 and BC_2 of five cross-combinations for different important morphological and physiological characters were considered for the estimation of mean performance and genetical interpretations for the improvement of aromatic rice.

RESULTS AND DISCUSSION

The mean performance of six basic generations of five cross combinations obtained from growing in single warm wet session is presented in Table 1.The results are described as below:

Plant height: The mean plant height of F_1 plants exceeded both the parents in all the crosses as was observed earlier by El-Lattef Abd *et al* (2012) and Elkhoby *et al* (2014) which indicated high hybrid vigour. The performance of F_1 plants also exceeded the F_2 plants in all the crosses as noticed earlier by Buu and Tao (1992). The F_1 mean also exceeded the mean values of two back crosses as was also recorded by El-Lattef Abd *et al* (2012). The means of BC_1 generation were greater than their respective recurrent parent for most of the crosses. The BC_2 plants were taller than their respective recurrent parent in all crosses except I ET 14143 × Basmati 370.

Days to flowering: The F_1 plants were found to be almost equal to the mid-parental values in all the crosses. The results are in agreement with El-Lattef *et al* (2012). The performance of F_1 plants was also very close to the respective F_2 means in all crosses. The BC_1 means were less than their respective recurrent parent as was recorded earlier by Ahmadikhah (2010). The means of BC_2 were greater as compared to their respective recurrent parent. The F_2 mean value was greater than the F_1 for days to flowering in IET 14142 × Pusa Basmati I indicating transgressive segregation.

Grain number per plant: The mean performance of F_1

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Spatial Distribution of Population of Different Socio-Cultural Entities within Chandernagore Municipal Corporation Area

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Abstract: Urban settlement always attracts people from the surrounding areas as well as from different parts of the country depending on the socio-economic criteria of that urban centre. Urbanisation in the modern world flourished along with the industrial revolution. The wave from the European industrial revolution largely hit different parts of India too. A new set of towns emerged along with European traders cum rulers. These towns attracted people having different languages, religions, caste, etc., but common inertia found among themselves that they had unitedly lived in towns with a unique identity related to that soil. So the town like Chandernagore Municipal Corporation has always followed the same legacy and remained as a bouquet with different flowers of social, cultural entities. The spatial distribution of these people within this town is always determined by specific social-cultural reasons.

Keywords: social, cultural, language, caste, religion

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ROLE OF GRAM PANCHAYAT FOR RURAL POVERTY ALLEVIATION THROUGH GOVERNMENT SCHEMES- A CASE STUDY IN GOPINATHPUR-I GRAM PANCHAYAT, DHANIAKHALI, HOOGHLY, WEST BENGAL

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Submitted : 16.11.2019 Revised : 03.12.2019 Accepted : 18.12.2019

Abstract: Poverty is a curse for human society, particularly now-a-days, when India is achieving much in space-science also. Most of the Indian population live in rural areas, so we can't ignore the institutional responsibilities for eradicating rural poverty. For present research work Gopinathpur-I Gram Panchayat under Dhaniakhali CD Block of Hooghly District has been taken into consideration. Panchayat is the micro-level institution which is the representative of the Government and the implementing authority of all the grass root level projects adopted by the Government. Through the survey work it can be clearly seen that the institutional participation is vibrant for rural poverty alleviation in the study area.
Keywords: Poverty, rural, Panchayat, alleviation

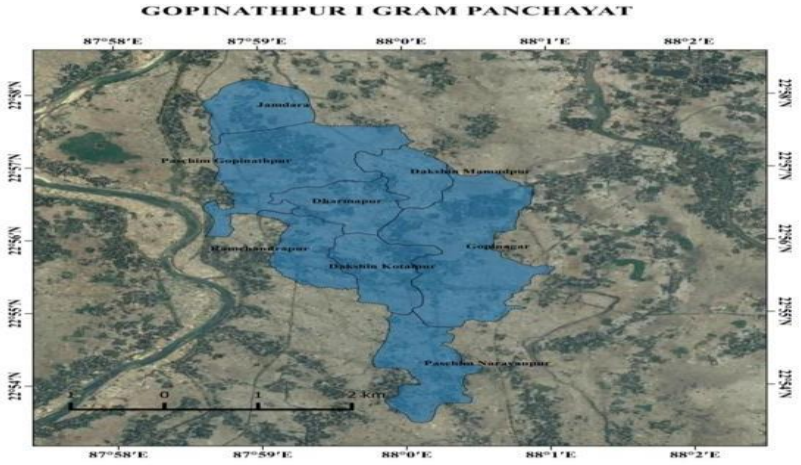
Introduction:

In Indian Constitution under its Directive Principal of State Policy in Article 38 it is clearly mentioned that state shall promote the welfare of the people in terms of justice, social, economical and political perspective. It has also been mentioned that state shall also minimise the inequalities in income and endeavour to eliminate inequalities in status, facilities and opportunities. Article 40 emphasises for formation of village panchayat with such power and authority as may be necessary to enable them to function as units of self-government (Mukherjee & Mukherjee 2008).

The Gram Panchayat is the lowest layer in three tier rural administration system. It has been empowered to identify the beneficiaries for different schemes and programmes of the government. Here Gopinathpur-I Gram Panchayat is found to be playing the same role as mentioned in Indian Constitution and following the instructions as per Government of India and Government of West Bengal. Several governmental schemes, like Indira AawasYojona, MGNREGA, Indira Gandhi National Old Age Pension Scheme etc. are running for eradicating rural poverty.

Study area:

Gopinathpur-I Gram Panchayat has been selected as the study area. It is under the jurisdiction of Dhaniakhali Block of Hugli district, West Bengal. The Panchayat area is constituted by eight mouzas viz., Dakshin Kotalpur (J.L. no. 53), Dakshin Mamudpur (J.L. no. 44), Dharampur (J.L. no. 45), Gopinagar (J.L. no. 43), Jamdara (J.L. no. 47), Pachim Gopinathpur (J.L. no. 46), Pachim Narayanpur (J.L. no. 55), and Ramchandrapur (J.L. no. 52). Total area of the Panchayat is 1322.87 hectors (Census, 2011).



Source: Google Earth

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Oral Traditions for Retrieving History through Stories: A Reading of Jack Davis' *The Dreamers*

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Abstract: *The Dreamers* (1982) by Jack Davis is a story of a country-town family and old Uncle Worru, who, in his dying days, recedes from urban hopelessness to the life and language of the Nyoongah spirit which in him has survived 'civilisation. Davis uses this setting to depict Aboriginality through language and other aspects of Nyoongah life, like song, dance, religion or mythical yarns. Davis's use of oral tradition not only enlivens the past but also enriches the present. This article analyses how such oral traditions are employed by the playwright to retrieve stories about the Aboriginal past.

Keywords: Orality, myth, history, Aboriginality

'Orality' is

> a term used to denote an extended complex of elements associated with oral cultures – that is, cultures either unaffected by literacy and the written word or only marginally affected by them. (Hawthorn 246)

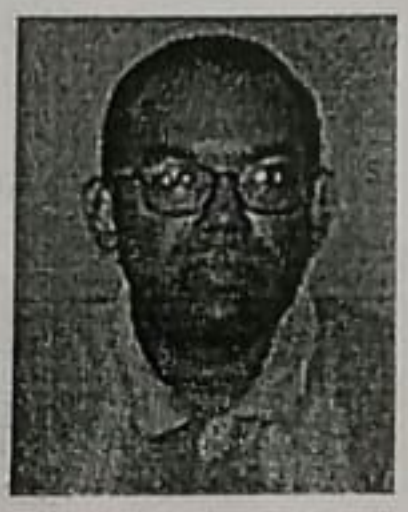
Romanuj Konar

Journal No. 63477 & Category: Arts and Humanities, Literature

Publication in 2019-20

COVER STORY

FINANCIAL INNOVATION IN THE MSME SECTOR: AN EMPIRICAL STUDY ON FIN-TECH



Dr. Rintu Nath
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Abstract

MSME sector is considered as power house of every emerging economy including India. Despite its significant contribution, the sector is facing massive problems relating to finance specifically. The purpose of this study is to review and to evaluate fintech revolution and its impact on MSME sector. Fintech is doing pioneering work in the money market. A special segment of banking industry is to provide financial support to the MSME sector. Fintech is developing tailor made solutions in the way of promoting Apps exclusively for fast approval of finance digitally to various segments including MSMEs.

Background

In general, significantly people in India are not habituated to accustom in digital transactions due to excess liquid money is circulated in the economy. It has cascading effect on inflation to move up and discouraged to cash less society on the other. Digital threats, inadequate infrastructure to accept debit and credit cards, linkage failure and no actions in case of post digital threats are considered as key concerns from users' point of view. Besides, awareness level to use several electronic mechanisms is one of the key constraints in rural and semi-urban areas. Thereby, financial sector reforms in India were necessitated. Banking reforms in India was debut its application in the early 1990s with the introduction of Electronic Fund Transfer (EFT). It has completely changed to buying habits and fashions and thereby payment modes. Demonetization in India during 2016 has been fueling individuals and businesses to use popular financial products in order to meet upcoming challenges. Fintech is one of them.eet upcoming challenges. Fintech is one of them.

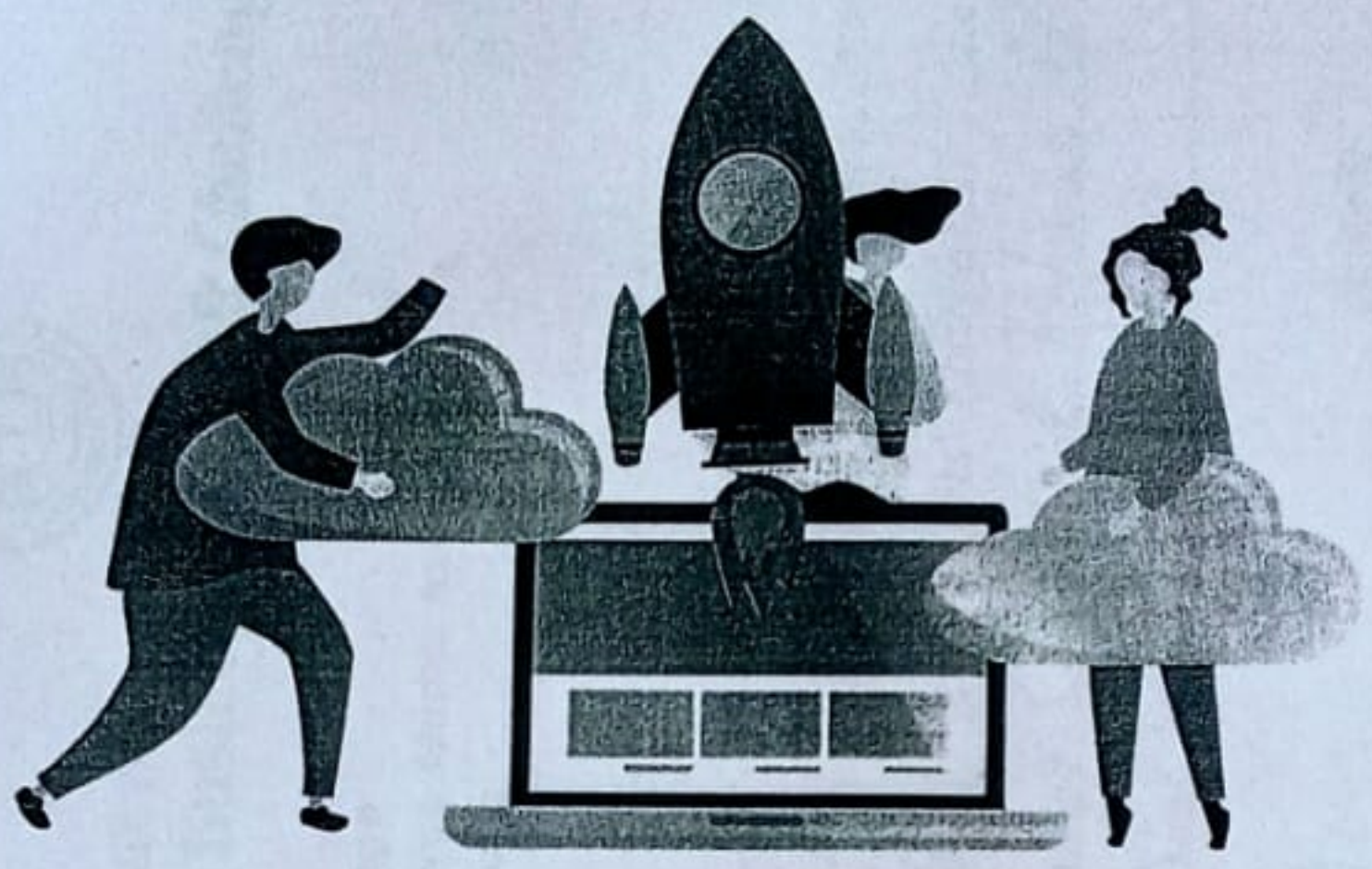
Introduction

Micro, Small and Medium Enterprises (MSMEs) sector has emerged as a dynamic and vibrant sector in India. This sector contributes significantly to manufacturing output, employment and exports of our country. Thus, MSME sector is considered as backbone of Indian economy.

Despite its commendable contribution to the nations' economy, MSME sector has been suffering with massive problems. Nature and magnitude of such problems have been changing over time. One of the biggest challenges faced by this sector is lack of required financial support from banks and financial institutions coupled with high cost of credit. It is increased in manifold particularly in unbanked and under banked areas. Financial innovation or initiatives have a good role in this juncture. One of the initiatives is Fintech which is a new phenomenon in Indian financial system. It has good potentiality to resolve financial crisis of the MSMEs judiciously.

There are three broad sections in this study which is based on secondary data. In first section, study outlines of economic initiatives in Indian money market followed by discussion on various aspects of fintech and finally to examine the impact of fintech on MSME sector.

COVER STORY



TECHNOLOGICAL STARTUP AND ITS IMPACT ON ECONOMY IN INDIA: AN OVERVIEW

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Abstract

Technology is considered as major thrust area of gaining strong economy. Indian economy has been transforming from conventional to digitalize through laughing of several initiatives. In this regard, technology startup was an important milestone in India. But, its contribution on economy has been slowly but steadily growing. Despite its contribution on economy, technology startup and its performance are not all satisfactory. The purpose of this study is to review and to evaluate technology startup and its impact on Indian economy. However, technology startup is at growing phase in India and plenty of opportunity to achieve expected goals subject to focus on innovations and initiatives.

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The Role of Hegemony in the Construction and Perpetuation of the Margin: Re-Reading George Orwell's *Animal Farm*

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ABSTRACT
This paper proposes to read George Orwell's novel, *Animal Farm*, to understand how Gramsci's concept of hegemony is represented in the novel and how the concept plays a crucial role in not only in constructing the marginal in a society but also in ensuring the perpetuation of their social location in the interest of the power centre of the society that instruments the application of hegemony on the margin.

KEYWORDS: Hegemony, margin, centre, class, Gramsci

Though George Orwell deals very little with the lives of the animals before the 'Rebellion' in *Animal Farm* (*AF*), it is very clear from the glimpses we get that Mr. Jones never took help of anything softer than brute force to control the animals. Clear signs of imperialism are evident in the nature of the Farm before the 'Rebellion'. The Farm was an empire of which Mr. Jones was the lord by the obvious virtue of his unanswerability. But the scenario changes as soon as Mr. Jones is ousted and the animals take upon themselves the responsibility of running the Farm. The changed scenario soon results in the turning point of the novel as Orwell himself has also said about his novel:

The turning point of the story was supposed to be when the pigs kept the milk and apples for themselves. (qtd. in Gaur 102)

This is not only a mere turning point, but also a beginning of 'a subtext of marginalization of helpless individuals by a coercive system and the unsaid misery of such souls' (Gaur 103). Before starting an analysis of that subtext, it is important to touch upon a few theoretical ideas about state and its machineries.

Antonio Gramsci, an Italian Marxist thinker, makes a contrast between 'rule' and 'hegemony'. This contrast between 'rule' and 'hegemony' is a key idea to the understanding of the subtext of *AF*. The former is, as Peter Barry says, 'direct political control, which uses force when necessary' (164). 'Hegemony', on the other hand, is very closely related to Althusser's concept of 'ideology'. It 'manufacture[s] consensus through immobile forms of social control such as the media, the educational system, religious institutions… [etc] that mould our ideas and attitudes' (Krishnaswamy 101). These 'immobile forms of social control' have been called 'Ideological State Apparatuses' by Althusser. In an imperialist state hegemony is absent almost to the point of null because the centre there has a direct control over the margin by means of force. The ruler in a democratic state cannot dominate by force and so replaces force with hegemony. So the ruler here at the centre has to fashion out the ways of 'manufacturing consensus' to keep the ruled at bay. Marx and Engels's *Communist Manifesto* (1848) announced that 'the ruling ideas of each age have ever been the ideas of its ruling class' (qtd. in Hawkes 117). According to David Hawkes, this 'dominant ideology thesis' means that the 'dominant will try to impose its own *peculiar* way of seeing the world on society as a whole' (emphasis mine, 117). The birth of hegemony is inherent in this peculiarity of the ruling class ideas: 'Thus the material basis of hegemony is constituted through reforms or compromises in which the leadership of a class is maintained' (Sassoon 230).

Water Resource Management of the Damodar Valley Corporation

Tail-end Deprivation of the Canal Network

RAJ KUMAR KUNDU, APURBA KUMAR CHATTOPADHYAY

The water resource management of the Damodar Valley Corporation project for irrigation purposes has been examined to reveal that illegal canal water utilisation has been increasing over the years. Water availability (per hectare) has been declining in the tail-end area compared to the head-reach and middle-reach areas in all seasons, which has led to differentiated agricultural productivity and crop patterns across different segments of the canal command area. Further, reduction of reservoir storage capacity and increased water demand for non-agricultural purposes have reduced the share of irrigation water and increased flood hazards in the monsoon season in the downstream area of the Damodar river.

The authors thank the anonymous referee for their useful comments on the earlier draft of this paper.

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The canal irrigation potential in West Bengal was 47.6% up to 1975–76, while it has covered only 23.78% area of irrigated land till 2008–09 (Rawal 2001; Ray and Shekhar 2009). On the other hand, the groundwater irrigated area was 16% in 1982, which increased to about 56.07% during the same period (Boyce 1987; Ray and Shekhar 2009). This reveals that canals as a source of irrigation have been losing importance vis-à-vis groundwater irrigation in West Bengal. According to Mitra (1996), the reasons for the declining importance of canals as a source of irrigation lies with the problems relating to the canal irrigation management as well as those associated with their construction. Construction problems are less important compared to the operation and maintenance problems for the underutilisation or misutilisation of canal irrigation potential. In most of the canal irrigation projects, when the canal command area is ready to receive the water after completion of land-levelling and construction of field channels, the users in the head-reach area are not ready to give up their cultivation of water-intensive crops like, paddy, sugar cane, banana, etc. This leads to low and insufficient irrigation water in the tail-end area. Therefore, there is an underutilisation or misutilisation of irrigation potential and inequitable distribution of water in the head-reach and tail-end areas (Wade 1976; Gorter 1989; Dhawan 1993; Gulati et al 1994; Mitra 1996). Shah (2003) termed this phenomenon as the tail-end deprivation (TED) problem.

In this paper an attempt has been made to analyse the water resource management of the Damodar Valley Corporation (DVC) project relating to canal irrigation and its role in the deprivation of canal water in the tail-end area of the canal network by using both primary and secondary data.[1] For the primary survey, we have selected samples in the left bank main canal (LBMC) command area of DVC that originates from Durgapur barrage. It covers three districts of West Bengal, namely Burdwan, Hooghly and Howrah. The entire area has been divided into three segments, namely head-reach, middle-reach and tail-end areas.[2] The sample size in each segment is 90 with a total sample size of 270. Further, we used the plot of cultivated land as our unit of survey, and the survey was conducted from December 2012 to March 2013.

Upstream and Downstream Water Management

The upstream water management of the Durgapur barrage is carried out by the Damodar Valley Reservoir Regulation Committee (DVRRC), headed by a representative of the Central

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ARTICLES

Financial Performance of Major and Medium Irrigation Projects in India - Some Issues

Raj Kumar Kundu and Apurba Kumar Chattopadhyay*

ABSTRACT

Major and Medium (M&M) irrigation projects in India have lost its importance to ground water minor irrigation projects due to their financial problems resulting ostensibly from the highly subsidised and stagnant canal irrigation charges. This study examines financial performance of M&M irrigation projects during pre-reforms and post-reforms period and explores if higher irrigation charges may improve both irrigation efficiency and share of cost recovery. It has been found that during post-reforms period the M&M irrigation projects have faced problems of inadequate cost recovery coupled with continuous reduction of expenditure on 'maintenance and repair' which have led to reduction of irrigation efficiency. We have also found that only increasing the irrigation charges by the states may not bring about higher irrigation efficiency rather, it would be prudent on the part of the concerned state governments to wind up the revenue departments and assign the responsibility for collection of users' charges to the Gram Panchayats that will improve the financial performance of the M&M irrigation projects and also increase efficiency of the canal irrigation.

Keywords: Canal irrigation, Irrigation charges, Irrigation efficiency, Financial performance, WUAs.

JEL: Q14, Q15, Q25

I

INTRODUCTION

The state governments operate and manage the entire irrigation system of the major and medium (M&M) projects within their domestic territories in India but they often neglect the operation and maintenance (O&M) part of the projects due to paucity of funds. This is partly due to the government policies regarding the level of water rates and their recovery (Gulati *et al.*, 1994). The share of cost recovery of the O&M cost or working expenses has steadily declined, *inter alia*, due to highly subsidised canal irrigation charges and substantial time lag for the revision of water rates by some states (about 10 to 35 years till 2010).[1] It may be noted that while in 1975-76, about 96 per cent of the working expenses could be met by gross receipts (water charges and other receipts); a meager 5.8 per cent could only be met for this purpose in 1997-98. In 2013-14, this share increased to about 20 per cent (CWC, 2015). The improvement in this share in the later years reflects increased water charges by some states. It may be noted that National Water Policy statements (1978 and 2002), Vaidyanathan Committee Report (Government of India, 1992) and Tenth

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PRIMARY RESEARCH PAPER

Effects of nutrient limitation, salinity increase, and associated stressors on mangrove forest cover, structure, and zonation across Indian Sundarbans

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Abstract Anthropogenic coastal activities and natural stressors aggravate degradation of small coastal patches of mangroves, which in turn destroy local resilience of mangrove forests in the Indian Sundarbans, the continuous mangrove habitat that spans between India and Bangladesh. We conducted an analytical survey across 19 shoreline mangrove fringes spanning the Sundarbans, including both healthy and disturbed forests, and evaluated ninety-five 60-cm composite sediment cores across a degradation and salinity gradient from ~ 4 to ~ 12 ppt. Increased salinity and anoxicity greatly inhibited nutrient cycling and release by microbial decomposers, subsequently resulting in nutrient-poor soil as a condition of degradation. Nutrient limitation, salinity rise, anoxicity increase, and sulfide build-up negatively controlled forest structure causing declines of forest coverage from ~ 98 to ~ 11%. In addition, the tide-dominated salinity gradient controlling species zonation was disrupted in disturbed forests with salinity-sensitive species gradually disappearing. An obvious change in species distribution is anticipated while salt-sensitive *Heritiera fomes*, *Xylocarpus* spp., and *Phoenix paludosa* failed to cope with increased salinity, evident by their absence from many forests. *Excoecaria agallocha* and *Avicennia* spp. acclimated well and expanded freely into degraded forests across the Sundarbans. Overall, our study strongly

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Rajojit Chowdhury and Tapan Sutradhar have contributed equally to this work.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10750-019-04036-9) contains supplementary material, which is available to authorized users.

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Forecasting mangrove ecosystem degradation utilizing quantifiable eco-physiological resilience -A study from Indian Sundarbans

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Sundarbans mangrove forest, the world's largest continuous mangrove forests expanding across India and Bangladesh, in recent times, is immensely threatened by degradation stress due to natural stressors and anthropogenic disturbances. The degradation across the 19 mangrove forests in Indian Sundarbans was evaluated by eight environmental criteria typical to mangrove ecosystem. In an attempt to find competent predictors for mangrove ecosystem degradation, key eco-physiological resilience trait complex specific for mangroves from 4922 individuals for physiological analyses with gene expression and 603 individuals for leaf tissue distributions from 16 mangroves and 15 associate species was assessed along the degradation gradient. The degradation data was apparently categorized into four and CDFA discriminates 97% of the eco-physiological resilience data into corresponding four groups. Predictive Bayesian regression models and mixed effects models indicate osmolyte accumulation and thickness of water storage tissue as primary predictors of each of the degradation criteria that appraise the degradation status of mangrove ecosystem. RDA analyses well represented response variables of degradation explained by explanatory resilience variables. We hypothesize that with the help of our predictive models the policy makers could trace even the cryptic process of mangrove degradation and save the respective forests in time by proposing appropriate action plans.

The Sundarbans stretches along the coast of Bangladesh and India and forms the largest contiguous mangrove forest in the world.The Indian part of Sundarbans received its formal designation recently in 2019 as Ramsar site (https://rsis.ramsar.org/ris/2370) and the Government of Bangladesh had already designated their part of the mangrove forests as Ramsar in 1992 (https://rsis.ramsar.org/ris/560) thus bringing the entire mangrove swamp under the domain of Ramsar wise use framework. UNESCO announced the Sundarbans a World Heritage Site in 1997[1]. In India, the stretch of Sundarbans is extended in southern part of the state of West Bengal along the estuarine coastline. It is the abode of highly diverse true mangrove species and some typical back mangroves referred as mangrove associates that do not possess the true mangrove characters but have the adequate potential to adapt to the mangrove environment. A heterogeneous assemblage of representatives from divergent and unrelated families migrating from mesophytic environment towards this estuarine extremophilic ecosystem and climaxing in a convergent evolution bring in uniqueness in this mangrove niche.Mangroves are among coastal foundation species that structure the coastal floral and faunal communities by modifying their habitats leaving a major influence on surrounding ecosystem structure and function[2]. Hence mangrove degradation is thought to impact the coastal ecosystem greatly. At the present moment small mangrove patches in Indian Sundarbans are facing immense threats of degradation[3]. This rapid degradation is caused due to increase in anthropogenic interferences such as conversion for urbanization, pisciculture, agriculture, salt farming, tourism, mining, refineries, dam and road constructions; changes in hydrological regimes; coastal pollution; siltation; exploitation of fishery resources; cattle grazing; incessant deforestation[4]. Natural stressors like increase in sediment salinity, increasing

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ORIGINAL ARTICLE

Contributions to Plasma Physics

Electron transfer in proton-hydrogen collisions in nonideal classical plasmas

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Abstract

Effects of nonideality of classical plasma on the reaction: $p + H(1s) \rightarrow H(nlm) + p$ has been investigated by carrying out fully quantum mechanical calculations within the framework of a first-order distorted wave method. Scattering amplitude is calculated conveniently by employing a simple, variationally determined wave function of hydrogen atom embedded in nonideal classical plasma. A detailed study is made on the changes in electron transfer cross sections due to the nonideality of plasma varying from 0 to 4 and the incident proton energy lying between 10 and 500 keV. It has been found that nonideality of plasma causes substantial change in capture cross section.

KEYWORDS

charge transfer, distorted wave method, non-ideal plasma, proton-hydrogen collision, pseudopotential

1 | INTRODUCTION

The scattering of proton from hydrogen atom is a paradigm of charge (electron) transfer during collisions. Studies on such scattering process provide us with several important information regarding mechanism of charge transfer processes. Moreover, the scattering of proton from hydrogen atom takes place naturally in various astrophysical environments.[1–9] As a result, various properties of the embedding environment are characterized by such scattering. Data of various scattering cross sections (CSs) are of frequent use in plasma diagnostics and interpretation of various astrophysical phenomena.[8,9] For instance, scattering CSs are used to calculate the profiles and intensities of emission (absorption) lines produced by hydrogen atom.[9] This scattering model has also an impact on fusion research.[10]

Over past few decades, the scattering of proton from hydrogen atom has been investigated quite elaborately[10–34] (and further references therein) by applying various techniques. Particular emphasis was given to obtain cross sectional data quite accurately for low to lower incident proton energies. In most of the reported studies, investigations were made in vacuum, that is interactions among protons and electron were considered to be pure Coulombic in nature.

In this work, we make an attempt to study the scattering process,

$$p + H(1s) \rightarrow H(nlm) + p \tag{1}$$

in nonideal classical plasmas (NCP). Nonideality of plasma is characterized by the nonideality parameter γ which is defined as the ratio of mean potential energy to the mean kinetic energy of the thermal motion of the plasma particles.

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Electron transfer in proton-hydrogen collisions in dense semi-classical hydrogen plasma

Kamalika Das, Biswajit Das, Pramit Rej, Arijit Ghoshal

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EDITOR'S CHOICE

Contributions to Plasma Physics

Electron transfer in proton-hydrogen collisions in dense semi-classical hydrogen plasma

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Abstract

Quantum mechanical calculations have been accomplished to study the dynamics of the reaction: $p + H(1s) \rightarrow H(nlm) + p$ in dense semi-classical hydrogen plasma. Interactions among the charged particles in plasma are represented by a pseudopotential which takes care of the collective effects at large distances and quantum effect of diffraction at small distances. Various capture cross sections are computed for the incident proton energy lying within 10 to 500 keV by applying a distorted wave method which uses a variationally determined closed-form wave function of hydrogen atom. Moreover, an inclusive study is made to explore the effects of screening of plasma and quantum diffraction on various capture cross sections for a wide range of thermal Debye length and de Broglie wave length. It has been found that various cross sections suffer considerable changes due to varying Debye length and de Broglie wave length.

KEYWORDS

charge transfer, distorted wave method, proton-hydrogen collision, pseudopotential, semi-classical hydrogen plasma

1 | INTRODUCTION

The scattering of proton from hydrogen atom is a common process that use to take place naturally in almost every astrophysical environment because of the abundant presence of atomic hydrogen in those environments.[1,2] Consequently, different kinds of important properties of the embedding environment are substantially regulated by this scattering process. Explanation of numerous phenomena associated with the embedding medium often requires the results of various cross sections (CS) of that process.[3,4] For example, explanation of profile and line intensities of absorption or emission of hydrogen atom requires the results of CSs.[4] As a matter of fact, a typical example of ion-atom scattering is the scattering of proton from hydrogen atom in which, depending on the energy, elastic, excitation, ionization, and rearrangement processes are possible to take place. Performing sophisticated quantum mechanical calculations on rearrangement scattering (also called electron or charge transfer process) is a challenging task, and thus the process has attracted the fancy of researchers[5–31] ever since the work of Oppenheimer in vacuum.[5] In plasma environments, reported investigations are relatively small.[20–22] Of late, the authors have investigated the following electron transfer process[22]:

$$p + H(1s) \rightarrow H(nlm) + p \tag{1}$$

in classical non-ideal plasmas by using a distorted wave method.[9] It was found that collision dynamics of the above process suffered considerable changes due to varying non-ideality of the plasma.

In this paper, we focus our attention on the above mentioned electron transfer process in dense semi-classical partially ionized hydrogen plasma. Degree of denseness is important in determining the behaviours of plasma at short distances

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ORIGINAL ARTICLE

Charged strange star in $f(R, T)$ gravity with linear equation of state

Pramit Rej[1] · **Piyali Bhar**[2]

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Abstract Our present study involves the strange stars model in the framework of $f(R, T)$ theory of gravitation. We have taken a linear function of the Ricci scalar R and the trace T of the stress-energy tensor $T_{\mu\nu}$ for the expression of $f(R, T)$, i.e., $f(R, T) = R + 2\gamma T$ to obtain the proposed model, where γ is a coupling constant. Moreover, to solve the hydrostatic equilibrium equations, we consider a linear equation of state between the radial pressure p_r and matter density ρ as $p_r = \alpha\rho - \beta$, where α and β are some positive constants, Both α, β depend on coupling constant γ which have been also depicted in this paper. By employing the Krori-Barua *ansatz* already reported in the literature (J. Phys. A, Math. Gen. 8:508, 1975) we have found the solutions of the field equations in $f(R, T)$ gravity. The effect of coupling constant γ have been studied on the model parameters like density, pressures, anisotropic factor, compactness, surface redshift, etc. both numerically and graphically. A suitable range for γ is also obtained. The physical acceptability and stability of the stellar system have been tested by different physical tests, e.g., the causality condition, Herrera cracking concept, relativistic adiabatic index, energy conditions, etc. One can regain the solutions in Einstein gravity when $\gamma \to 0$.

Keywords General relativity · Compact star · $f(R, T)$ gravity · Causality condition

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1 Introduction

Recently, the LIGO/Virgo Collaboration announced the observation of a merger of a black hole with mass $23.2^{+1.1}_{-1.0}\ M_\odot$ with a compact object with mass $2.59^{+0.08}_{-0.09}\ M_\odot$ (Abbott et al. 2020), where the mass of the secondary component lies within the so-called low mass gap (Bailyn et al. 1998; Özel et al. 2010; Belczynski et al. 2012). Theoretical and observational evidence suggests that black holes of mass less than 5 $M_\odot$ may not be produced by stellar evolution (Özel et al. 2010; Belczynski et al. 2012; Farr et al. 2011). According to some candidate equations of state, a stable neutron star must have a mass of at most 3 $M_\odot$ (Müller and Serot 1996; Rhoades and Ruffini 1974; Özel et al. 2012; Kiziltan et al. 2013). If the mass exceeds this limit, it is hypothesized that neutrons lose their individuality under extreme pressure and breakdown into quarks. A quark star is smaller in size but ultra-dense as compared to the neutron star. However, increased pressure in its core stops quark stars from collapsing into black holes. Moreover, estimates of radii of some stellar objects (LMC X-4, 4U 1820-30, Her X-1, etc.) suggest that their structure and characteristics may be similar to that of strange quark stars. On the other hand, the relatively small tidal deformability measured in gravitational-wave signal GW170817 do not favor such large values of $M_{\max}$ but rather suggest it is of the order of 2.5 $M_\odot$ (Abbott et al. 2018, 2019). The heaviest neutron star observed to date has a mass of $2.01 \pm 0.04\ M_\odot$ (Antoniadis et al. 2013), and the existence of compact objects in the mass regime [2.5, 5] $M_\odot$ is highly uncertain.

From the pioneering work done by Ruderman (1972) it was already proposed that celestial bodies under certain conditions may become anisotropic. The author observed that relativistic particle interactions in a very dense nuclear matter medium could lead to the formation of anisotropies. In-

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THE EUROPEAN PHYSICAL JOURNAL C

Regular Article - Theoretical Physics

Charged compact star in $f(R, T)$ gravity in Tolman–Kuchowicz spacetime

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Abstract In this current study, our main focus is on modeling the specific charged compact star SAX J 1808.4-3658 (M = 0.88 $M_{\odot}$, R = 8.9 km) within the framework of $f(R, T)$ modified gravity theory using the metric potentials proposed by Tolman–Kuchowicz (Tolman in Phys Rev 55:364, 1939; Kuchowicz in Acta Phys Pol 33:541, 1968) and the interior spacetime is matched to the exterior Reissner–Nordström line element at the surface of the star. Tolman–Kuchowicz metric potentials provide a singularity-free solution which satisfies the stability criteria. Here we have used the simplified phenomenological MIT bag model equation of state (EoS) to solve the Einstein–Maxwell field equations where the density profile (ρ) is related to the radial pressure (p_r) as $p_r(r) = (\rho - 4B_g)/3$. Furthermore, to derive the values of the unknown constants a, b, B, C and the bag constant B_g, we match our interior spacetime to the exterior Reissner–Nordström line element at the surface of stellar system. In addition, to check the physical validity and stability of our suggested model we evaluate some important properties, such as effective energy density, effective pressures, radial and transverse sound velocities, relativistic adiabatic index, all energy conditions, compactness factor and surface redshift. It is depicted from our current study that all our derived results lie within the physically accepted regime which shows the viability of our present model in the context of $f(R, T)$ modified gravity.

1 Introduction

Einstein's General Relativity (GR) has continued to withstand the test of time in its predictions of physical phenomena within the realms of astrophysics and cosmology. From the classical predictions of the precession of Mercury's orbit and the deflection of starlight by a massive gravitating body to present day detection of gravitational waves and observations of black holes GR has triumphed. Early attempts seeking solutions of the Einstein field equations which describe stellar objects were crude and for most part unrealistic. The first exact solution of the Einstein field equations describing a self-gravitating sphere was obtained by Schwarzschild. The so-called interior Schwarzschild solution which described a constant density sphere suffered from various pathologies, the most notable being that the propagation speed for any signals within the fluid sphere was noncausal [1]. A survey of exact solutions appearing in the literature describing stellar objects by Delgaty and Lake [2] revealed that only a small subset of solutions meet the rigorous tests for physical viability, regularity and stability of fluid spheres.

The search for more realistic stellar models within GR required researchers to connect the macroscopic properties of stars determined through observations to the microphysics. A new era of stellar modeling was born, which went beyond the mathematical excursion of the Einstein field equations where ad hoc assumptions were made just to generate a toy model. Standard approaches which included assumptions on the metric function, density profiles, pressure profiles, anisotropy parameter and even the matter content which allowed for the system of equations to be integrated gave way to well-motivated techniques intrinsically connected to physics which include an equation of state (EoS), mass profiles linked to surface redshift and compactness of typical stellar structures. The linear EoS which links the radial pressure to the energy density has been generalized to include the microphysics (at least on a phenomenological level) via the so-called MIT bag model. The departure from pressure isotropy makes the modeling of stellar objects mathematically tractable. Imposing a barotropic EoS of the form $p_r =$

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Charged gravastar model in $f(T)$ gravity admitting conformal motion

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In this paper, model of charged gravastar under $f(T)$ modified gravity is obtained. The model has been explored by taking the diagonal tetrad field of static spacetime together with electric charge. To solve the Einstein–Maxwell field equations, along with $f(T)$ gravity, we assume the existence of a conformal Killing vector which relates between geometry and matter through the Einstein–Maxwell field equations by an inheritance symmetry. We study several cases of interest to explore physically valid features of the solutions. Some physical properties of the model are discussed and we match our interior spacetime to the exterior Reissner–Nordström spacetime in presence of thin shell.

Keywords: General relativity; $f(T)$ gravity; gravastar; junction condition.

Mathematics Subject Classification 2020: 83C20, 83D05, 85A15

1. Introduction

In modern cosmology, one of the most important problems is to deal with the dark energy issue which causes the accelerating expansion of the Universe. This phenomenon has been confirmed by numerous observations of large scale structure [1,2] and measurements of the cosmic microwave background (CMB) anisotropy [3, 4]. The source that drives this cosmic acceleration is termed as 'dark energy' and it possesses positive energy density but negative pressure. It is well known that this form of energy acts as a repulsive gravitational force so that in General Relativity (GR) one needs to consider a further non-standard fluid with a negative pressure

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THE EUROPEAN PHYSICAL JOURNAL C

Regular Article - Theoretical Physics

Relativistic compact stars in Tolman spacetime via an anisotropic approach

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Abstract In this present work, we have obtained a singularity-free spherically symmetric stellar model with anisotropic pressure in the background of Einstein's general theory of relativity. The Einstein's field equations have been solved by exploiting Tolman *ansatz* [Richard C Tolman, Phys. Rev. 55:364, 1939] in $(3+1)$-dimensional space-time. Using observed values of mass and radius of the compact star PSR J1903+327, we have calculated the numerical values of all the constants from the boundary conditions. All the physical characteristics of the proposed model have been discussed both analytically and graphically. The new exact solution satisfies all the physical criteria for a realistic compact star. The matter variables are regular and well behaved throughout the stellar structure. Constraints on model parameters have been obtained. All the energy conditions are verified with the help of graphical representation. The stability condition of the present model has been described through different testings.

1 Introduction

Stellar evolution predicts that when the nuclear fuel gets exhausted, the stars turn into highly dense compact objects such as white dwarf, neutron star or back hole. Massive stars undergoing the supernova explosion turn into neutron star and black hole. For neutron star, the main idea is that the gravitational collapse is supported by the neutron degeneracy pressure. The general perception is that for high densities at the core, nucleons have to converted to hyperons or either form condensates. Some studies predict that these nucleons could form Cooper pairs and can be in superfluid state. Based on the MIT bag model, Witten [1] provides the existence of strange quark matter, which indicates that the quarks inside the compact objects might not be in a confined hadronic state. At the high densities and pressures they could form a larger colorless region with equal part of up, down and strange quarks. Consequently, the composition of the core region of compact objects is still an open subject in relativistic astrophysics.

When densities of compact stars are greater than the nuclear matter density, it expects the appearance of unequal principal stresses, called anisotropic effect. This usually means that the radial pressure component p_r is not equal to the transverse component p_t. The presence of anisotropy was first predicted for self-gravitating objects in Newtonian regime by Jeans [2]. Later, Lemaitre [3] considered the local anisotropy effect in the context of general relativity and showed that the presence of anisotropy can change the upper limits on the maximum value of the surface gravitational potential. Ruderman [4] showed that a compact star with matter density ($\rho > 10^{15}$g cm^{-3}), where the nuclear interaction become relativistic in nature, is likely to be anisotropic. Herrera [5] presented the evidence on the appearance of local anisotropy in self gravitating systems in both Newtonian and general relativistic context. Since then, a lot of investigations have been carried out in finding new exact solutions with anisotropy feature.

For half of century, the theory of anisotropic compact stars in General Relativity has been developed. Bower and liang [6] provided the generalization of Tolman–Oppenheimer–Volkov equation in presence of anisotropy. The stability of a stellar model can be enhanced by a presence of a repulsive anisotropic force when $\Delta = p_t - p_r > 0$. This feature leads to more compact stable configurations compare to

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Finch–Skea star model in $f(R,T)$ theory of gravity

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This work discusses about the existence of compact star model in the context of $f(R,T)$ gravity with R as the Ricci scalar and T as the trace of energy–momentum tensor $T_{\mu\nu}$. The model has been developed by considering the spherically symmetric spacetime consisting of isotropic fluid with $f(R,T) = R + 2\beta T$ with β be the coupling parameter. The corresponding field equations are solved by choosing the well-known Finch–Skea *ansatz* [M. R. Finch and J. E. F. Skea, A realistic stellar model based on an ansatz of Duorah and Ray, *Class. Quantum Gravity* **6**(4) (1989) 467–476]. For spacetime continuity, we elaborate the boundary conditions by considering the exterior region as Schwarzschild metric. The unknown constants appearing in the solution are evaluated for the compact star PSR J 1614-2230 for different values of coupling constant. The physical properties of the model, e.g. matter density, pressure, stability, etc. have been discussed both analytically and graphically. This analysis showed that the geometry and matter are compatible with each other as well as the model is in stable equilibrium in the context of $f(R, T)$ modified gravity.

Keywords: Compact objects; $f(R,T)$ gravity; stability.

Mathematics Subject Classification 2020: 83C05, 83D05, 85A05, 85A15

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The Growth And Development Of Children's Literature In Australia: A Brief Survey

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ABSTRACT

This paper proposes to historically chart the initiation, growth and development of the writings for children in the field of Australian Literature. This includes commentary and critical analysis of the persepectives representations in the works of the White and Aboriginal Australian authors and the crosscurrents involved in the process.

KEYWORDS children's literature, Australian literature, White Australian Authors, Aboriginal Australian Authors.

Introduction

In Australian literature, the settlement discourses related to the establishment of Australia and related adventure stories dominate the initial phase. Rhonda M. Bunbury observes, "The origins of published children's literature in Australia actually lie within the efforts of the monocultured, class-bound English who were conscious of the need to bring civilisation to children of a convict colony" (833). Such White-authored texts were caught up in a tension between two kinds of needs. Bradford observes that on the one hand there was the need "to position child readers as young Australians; and on the other [to] manage the colonial past for children" (Reading Race 15). The "strategies of silence and concealment" practised by White authors for this purpose is exemplified in Eve Pownall's The Australia Book (1951) that received the Australian Children's Book Council's 'Book of the Year' award in 1952 (Braford 15). Illustrated by Margaret Senior, this book is accepted as one of the canonical history books for children. Being a history book for White children, it is concerned with representation of childhood, though the way history is presented to the White children also becomes crucial here. The history here begins only with the arrival of the Whites and gives an impression "as though the country was lost in a kind of limbo before being found [by White men], as though untamed and untouched by humans before being settled" (Bradford Reading Race 18). Such mechanism of placing and allowing strategic gaps and omissions for the sake of presenting a benign myth of Australian settlement history to the young readers continued in the school texts and readers, too, that prevailed under the leadership of State Departments of Education. Exploration narratives were accompanied here with maps which were constructed to show the journeys in uninhabited territories. Exploration and adventure narratives, whether written by male or female White authors, were also explicitly discriminatory about gender issues. Since these works represented the imperial

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CLUSTER DEVELOPMENT PROGRAMME IN THE MSME SECTOR: EVIDENCE FROM WEST BENGAL

Dr. Rintu Nath*

Abstract

MSME sector is well-regarded as the backbone of the country's manufacturing output is facing a stiff competition from large scale manufacturers as well as MNCs. In such circumstances, CDP is an important platform and one of the finest schemes for the MSMEs. The key objectives of this scheme are to enhance productivity and capacity building of the MSMEs. Also, strengthen enterprises to combat internal challenges and external threats of the today's competitive business climate. The purpose of this study is to evaluate the impact of CDP on select MSME clusters in West Bengal, using 8 selected clusters across the state of West Bengal as case study. In order to understand the study aim, the entire study has divided into four sections. It starts with introduction; overview of CDP in the MSME sector in West Bengal is discussed in next section, followed by examination of the impact of CDP on select MSME clusters in West Bengal and finally, concludes the study. The study is based on case study of the eight selected clusters in West Bengal which already have received soft interventions of CDP. A qualitative research approach of the data collection is adopted using a questionnaire comprising of 4 questions relating to soft interventions. Based on this sample comprises of 399 respondents, the results obtained that CDP has a positive effect on MSMEs. The findings can prove useful to the MSME department and its policy makers, new entrepreneurs, researchers, as well as government and academic institutions.

Keywords: *MSME, interventions, clusters, academic*

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CDP ACTS AS DRIVING FORCE TO THE MSME SECTOR A CASE STUDY OF FAN CLUSTER IN WEST BENGAL

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Abstract

MSME sector well-regarded as the backbone of the country is facing with huge problems in connection with fund, technology, demand and efficiency. CDP acts as safeguard mechanism to the MSME sector which is generating second largest employment. The purpose of this study is to evaluate the effects of CDP on capacity building of the MSMEs, using electric fans industry in Kolkata, West Bengal as case study. Based on this sample, the results obtained indicate that CDP has a clear effect on the capacity building of the MSMEs. MSMEs have been immensely benefitted in terms of productivity and competitiveness from various capacity building measures. The findings can prove useful to MSME department and its policy makers, new entrepreneurs, researchers, as well as government and academic institutions.

1. Introduction

Micro, Small and Medium Enterprises (MSMEs) are the growth accelerators and considered as the 'backbone of the Indian economy.' In spite of sizeable contribution to the economy, this sector is struggling for existence because of facing stiff competitions from large scale manufacturers as well as global corporations. In such circumstances, Cluster Development Programme (CDP) is an excellent platform and one of the finest schemes for the MSMEs in order to safeguard this sector properly. CDP acts as catalyst for channelizing the necessary resources in a social network towards enhancement of building confidence and competitiveness of this sector. The key objectives of CDP are to increase productivity and capacity building of the MSMEs. It also strengthens enterprises to combat internal challenges and to defeat global threats of the today's competitive business climate. CDP has its two successive interventions namely soft and hard interventions. CDP protects MSMEs through soft interventions or to build up soft skills development and hard interventions or to build up the common facility Centre (CFC).

The purpose of this study is to examine the effects of CDP on capacity building of the MSMEs, using electric fans cluster in Kolkata, West Bengal as case study. In order to understand

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Spatio-Temporal Variations of Block Wise Rural Sex Ratio of Hooghly District in West Bengal (2001-2011)

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Abstract

Sex ratio is an important demographic index to access the social perception of the population of a region. It varies from one place to another and also changes from time to time depending on the socio economic progress of a region. The district of Hooghly located in the lower Ganga plane of West Bengal has a reach socio-cultural heritage as well as economic prosperity. However, the rural population in most part of the district are not so aware of the multiplications but still the imbalances are for more natural in occurrence. All these have been observed in the census year 2001 and 2011.

Keywords

Rural sex ratio; literate sex ratio; crude sex-ratio; worker sex-ratio; social perception.

Introduction

Demography is an indispensable part of geographical studies and sex ratio is one of the vital demographic attributes for any region. It affect the social, economic and political structure of a nation **(Saha and Debnath, 2016)**. Sex ratio is also an index of the socio-economic conditions prevailing in an area and is a useful tool for regional analysis **(Franklin, 1956)**. In Indian perspective sex ratio is measured in terms of number of females per thousand males. Since the two sexes play partly contrasting and partly complementary roles in the economy and society, the study of sex composition assumes added significance for a population geographer **(Chandna, 2007)**.So far the national scenario of the spatial distribution of sex ratio is concerned, it is found that the states of southern part of India have more than the national average while the northern and central part of the country are far behind from the national average**(Census, 2001 and 2011)**. As the northern states are highly populated so it can be realised that a huge portion area of total population of the country experiences a deficit sex ratio. The same trend continued during the last two census years 2001 and 2011.Reasons behind low female sex ratio in Indian scenario are gender discrimination (preference for son), discrimination against girl child, failure of stringent laws, MTP (abortion), female feticide

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Assessment of Agricultural Economy and Livelihood: A Case Study of Chandinagar Mouza, Hooghly District, West Bengal

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Abstract

Presently micro-level studies play a key role to measure the spatial differentiation as each space has its criterion that determines the differentiation. The study area is concentrated within mouza level. Chandinagar mouza is situated within Jangipara block in Hooghly district of West Bengal. Being a part of the rural area along with the vast agricultural field, agriculture is the livelihood of the people of the mouza. Most of the people are engaged in agricultural practices which is the driving force of the rural economy. The focus of the study is to find the interrelationship between the agrarian economy and the involvement of the people in it. Moreover, the feelings and mental attachment to agriculture are also taken into consideration.

Introduction

India is predominantly known for its riverine civilization since the ancient period. Over 60% of India's land area is arable making it the second-largest country in terms of total arable land (Goyel, 2016). Agriculture plays a vital role in India's economy. About 54.6% of the total population is engaged in agriculture and allied activities (Census 2011). Gross Value Added (GVA) at current prices for agriculture, forestry and fishing contributed 17.02% of national GVA in 2017-18 (MSPI, GOI, 2018-19). Contribution of agriculture, forestry and fishing in Indian economy is much higher than the world average of 3.4% in 2017 (World Bank, 2020).

In the beginning of the 21st Century, Indian farming shows a significant shift from traditional farming to modern commercial farming due to the availability and growth of infrastructural facilities like HYV seeds, chemical fertilizers, irrigation, pesticides, marketing, transport and Govt. extension programmes. Small and marginal farmers constitute a major portion of rural agricultural sector. So transformation of agriculture through modernization is positively related to sustainable livelihood of rural population (Mondal, Chakraborty and Mishra, 2017). The rural people in Indian scenario have traditionally accepted agriculture initially to fulfil the requirement of food for their families or to meet up the occupational demand, and thus, a bridge of affinity has been built between the farmer and soil. Agriculture in India is more a 'way of life' than a 'mode of business' (Goyel, 2016).

West Bengal is predominantly an agrarian State. Comprising of only 2.7% of India's geographical area, it supports nearly 8% of its population. There are 71.23 lakh farm families of whom 96% are small and marginal farmers. The average size of land holding is only 0.77 ha. However, the State is bestowed with diverse natural resources and varied agro-climatic conditions which support cultivation of a wide range of crops. The net cropped area is 52.05 lakh ha which comprises 68% of the geographical area and 92% of arable land. The cropping intensity is 184%. However, as the State is located in the humid tropic and the Bay of Bengal is close by, it has to often face vagaries of nature like flood, cyclone, hailstorm etc. Though the State has a surplus production of rice, vegetables and potato, a huge gap exists

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Basic Features and Strategies of Women's Empowerment of a Developing Urban Area – A Case Study of Memari Municipality, Purba Bardhaman, West Bengal, India

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ABSTRACT

Women's Empowerment is a holistic and sustainable goal for development of a society. They are the resources of family, society, community and nation. They are the greatest asset of an economy. Urbanization processes are not properly guided their roles in this society. Transformation of gender roles in urban contexts will require wider community involvement as well as administration. They are disadvantaged in income poverty, asset poverty, time and power. This paper is properly focused on features of empowerment of women in this society, their educational status, employment opportunities, social and economic status, as well as future strategies.

KEYWORDS: *Empowerment, Employment, Equality, Correlation, Census, Education, Workers*

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I. INTRODUCTION:

In a particular situation, offering power or authority to powerless is called empowerment. According to Kebber (2001), Empowerment is "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them. She explained that it is the process through which people's awareness, confidence, ability to solve problems, gaining access to resource and public facilities are increased. **The World Bank** defines empowerment as "the process of increasing the capacity of individuals or groups to make choice and transform those choices into desired actions and outcomes. Central to this process is actions which both build individual and collective assets and improve the efficiency and fairness of the organization and individual context which govern the use of these assets".

Generally, empowering of women is called women's empowerment. Women's empowerment is the process whereby women become able to organize themselves to increase their self reliance, to assert their independent rights to make choices and control resources which will assist in challenging and eliminating their own subordination. (Keller and Mbwewe, 1991 cited in Rowlands, 1995).The empowerment and autonomy of women and the improvement of their political, social, economic and health status is highly important end in itself. In addition, it is essential for the achievement of sustainable development [United Nations Population Fund (UNFPA), International Conference on Population and Development (ICPD), Power of Attorney (POA), Communications Audio Interface for Remote Operations (CAIRO), 1994]. . In UNDP Human Development Report, 1995, women's empowerment is the expansion of choices for women and an increase in the women's ability to exercise choices. Women must be considered as the agent of development rather than target of development agencies (R. India and Deepak Kumar Behra, 1999). According to Swami Vivekananda, "....there is no chance for the welfare of the world unless the condition of the women is improved. It is not possible for the bird to fly on one wing"(Yojana, August, 2001).Empowerment of women develops them as more aware individuals, who are politically active, economically productive and independent and are able to make intelligent decision in matters that affect them and their nations. (Lillikutty, 2003).

II. BACKGROUND OF THE STUDY:

According to working paper of **World Bank**, Alsop, et al (2005), empowerment is the enhancing of the individual's or group's capacity to make choices and transform those choices into desire actions and outcomes. In **Millennium**

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Studies of aromatic rice based on genetical parameters utilizing induced mutants

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Abstract
Genetical studies on eight hybrids involving four induced mutants of local aromatic cultivars were made to gain information on recombination breeding and heterosis breeding. The hybrids IET-14142 x Pusa Basmati I for plant height, IET-14142 x Basmati-370 for panicles number, test weight and dry matter production, IET-13541 x Pusa Basmati I for primary branches per panicle, IET-13541 x Basmati-370 for spikelet number per plant, grain number per plant, dry matter production and grain yield per plant, 21-6-1 x Basmati-370 for spikelet number plant and 21-6-1 x Pusa Basmati-I for grain number plant , IET-14143 x Basmati 370 for grain length and IET-14143 x Basmati-370 for test weight and grain number plant would be effective for recombination breeding. The hybrid IET-14143 x Basmati-370 for panicle weight and spikelet number plant, IET-14142 x Pusa Basmati I for dry matter production plant, IET-13541 x Pusa Basmati I for panicle weight and secondary branches per plant, 21-6-1 x Basmati-370 for secondary branches per plant and grain yield per plant, 21-6-1 x Basmati 370 for dry matter production per plant would be promising for heterosis breeding. Although, the future breeding programme always should be based on their estimates in particular environment.

Keywords: aromatic rice, heterosis breeding, induced mutants, recombination breeding

Introduction
Aromatic rice has the greater importance in the national and international rice market because of its premium quality and good smell. Several varieties are being cultivated in different regions of India including the basmati varieties. Non-basmati varieties like are also cultivated along with others in the different regions of India including West Bengal. These are also much superior and having with great demand because of its several quality traits like aroma and kernel characters [1, 2]. Tulaipanja and Gobindabhog are of two such scented verities of West Bengal. Some mutants were isolated from such two non-basmati varieties. These induced mutants are marked with their characteristic aroma and good yield. These are hybridized with the basmati varieties to analyze its genetical potentialities. The analysis based on various genetical parameters is very much important to formulate the breeding strategy of aromatic rice. The idea on combining power can be used to identify the effective cross combinations for recombination breeding. Studies on using multiple genetic parameters like specific combining ability, heterosis as well as per se performance can be focused for the identification of hybrids for heterosis breeding. Considering all the above aspects, an investigation was carried out to obtain some basic information needed in formulating breeding programme of aromatic rice involving induced mutants of aromatic rice.

Materials and Methods
Eight hybrid combinations generated from two basmati verities viz., Basmati-370 and Pusa basmati-I and four gamma ray induced mutants IET-14143 and IET-14142 of local traditional aromatic cultivar Tulaipanja [3] and IET-13541 and 21-6-1 of Gobindabhiog [4] were sown in the earthen pots to generate seedlings. The seedlings of about one month old were then transplanted in the field following randomized block design with standard spacing replicated thrice. The plants were grown by adopting normal standard agricultural practices. Observations were made on various morphological and physiological traits from the whole population including the parents for statistical analysis on genetical parameters required for the present studies..

Results and Discussion
The parents and cross combinations with desirable combining ability effects for different morphological characters is very much useful for breeding programme of aromatic rice. Recombination breeding makes use of fixable additive gene action. To get effective recombinants in segregating generations, the parents of hybrids should possess superior combining ability for the morphological characters to be improved. In addition to it, the SCA effects, should not be significant because selection of superior recombinants will be hindered by significant SCA effects. Hence, it is desirable to select only those hybrids having non-significant SCA effects with parents possessing significant GCA effects [5]. On the basis of above mentioned consideration, out of all the hybrids of aromatic rice evaluated, seven hybrids may be useful in recombination breeding for their respective morphological and physiological characters (Table-1).
The hybrids IET-13541 x Basmati-370 for spikelet number per plant, grain number per plant, dry matter production and grain yield per plant, IET-14142 x Basmati-370 for panicle number, test weight and dry matter production, IET-14143 x Basmati-370 for test weight and grain yield per plant, 21-6-1x Basmati-370 for spikelet number per plant and grain number plant, IET-14143 x Basmati 370 for grain length, IET-14142 x Pusa Basmati I for plant height, IET-13541 x Pusa Basmati I for number of primary branches per plant and 21-6-1 x Pusa Basmati I for number of grains per plant would be expected to produce effective recombinants of aromatic rice. Several characters of these crosses showed

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Compact stellar model in the presence of pressure anisotropy in modified Finch Skea space–time

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Abstract. A new model of an anisotropic compact star is obtained in our present paper by assuming the pressure anisotropy. The proposed model is singularity free. The model is obtained by considering a physically reasonable choice for the metric potential g_{rr}, which depends on a dimensionless parameter n. The effect of n is discussed numerically, analytically, and through plotting. We have concentrated a wide range for n ($10 \leq n \leq 1000$) for drawing the profiles of different physical parameters. The maximum allowable mass for different values of n has been obtained by the M–R plot. We have checked that the stability of the model is increased for a larger value of n. For the viability of the model, we have considered two compact stars PSR J1614-2230 and EXO 1785-248. We have shown that the expressions for the anisotropy factor and the metric component may serve as generating functions for uncharged stellar models in the context of general theory of relativity.

Keywords. General relativity—anisotropy—compactness—TOV equation.

1. Introduction

The term 'compact object' is mainly used in astronomy to describe collectively white dwarfs, neutron stars and black holes. It is well known that stars are an isolated body that is bounded by self-gravity, and which radiates energy supplied by an internal source. Most compact objects are formed to a point of the stellar evolution when the internal radiation pressure from the nuclear fusions of a star cannot balance the external gravitational force and the star collapses under its own weight. It is familiar that the model of a compact star can be obtained by solving Einstein's field equations in the context of general theory of relativity. There are large numbers of papers on the exact solution of Einstein's field equations for spherically symmetric perfect fluid spheres (Delgaty & Lake 1998; Stephani *et al*. 2003). Durgapal *et al*. (1982) have obtained two new classes of solutions of field equations with constant proper mass densities. Stewart (1982) has solved field equations for finding interior solutions for spherically symmetric, static, and conformal flat anisotropic fluid spheres. According to Ruderman (1972), the pressure inside the highly compact astrophysical objects such as an X-ray pulsar, Her-X-1, X-ray buster 4U 1820-30, the millisecond pulsar PSR J1614-2230, LMC X-4, etc., that have a core density beyond the nuclear density (10^{15} g/cc) show anisotropic nature, i.e., the pressure inside these compact objects can be decomposed into two parts: the radial pressure p_r and the transverse pressure p_t. The existence of a solid stellar core, the presence of a type-3A superfluid, pion condensation, different kinds of phase transitions, a mixture of two gases, etc., are reasonable for pressure anisotropy (Sawyer 1972; Letelier 1980; Sokolov 1980; Kippenhahn & Weigert 1990). A large number of works have been done by assuming pressure anisotropy (Herrera & Santos 1997; Dev & Gleiser 2003; Sharma & Maharaj 2007; Rahaman *et al*. 2010, 2012; Bhar & Murad 2016).

To obtain the maximum value of the mass-to-radius ratio for a model of a compact star is an important

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Stable and self-consistent charged gravastar model within the framework of $f(R, T)$ gravity

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Abstract In this work, we discuss the configuration of a gravastar (gravitational vacuum stars) in the context of $f(R, T)$ gravity by employing the Mazur–Mottola conjecture (Mazur and Mottola in Report No. LA-UR-01-5067, 2001; Mazur and Mottola, Proc Natl Acad Sci USA 101:9545, 2004). The gravastar is conceptually a substitute for a black hole theory as available in the literature and it has three regions with different equation of states. By assuming that the gravastar geometry admits a conformal Killing vector, the Einstein–Maxwell field equations have been solved in different regions of the gravastar by taking a specific equation of state as proposed by Mazur and Mottola. We match our interior spacetime to the exterior spherical region which is completely vacuum and described by the Reissner–Nordström geometry. For the particular choice of $f(R, T)$ of $f(R, T) = R + 2\gamma T$, here we analyze various physical properties of the thin shell and also present our results graphically for these properties. The stability analysis of our present model is also studied by introducing a new parameter η and we explore the stability regions. Our proposed gravastar model in the presence of charge might be treated as a successful stable alternative of the charged black hole in the context of this version of gravity.

1 Introduction

Over the past few years, we have witnessed a considerably growing interest to study *gravastars* [1–8] (and the references therein), the gravitational vacuum star as it was proposed as an alternative theory of black holes. In 2001, Mazur and Mottola (MM) [9] first proposed a new idea for gravastars (collapsing stellar object) by extending the Bose–Einstein condensate (BEC) theory in the gravitating system. They further developed the theory in 2004 [10]. This MM model gives us a stable idea about the endpoint of gravitational collapse in the form of cold, dark, compact objects having mass above some critical values and provides a solution to the classical black hole problems. After the pioneering innovation of the discovery of the gravitational wave (GW) in 2015 [11], it is assumed that the GWs arise due to the merging of two massive black holes. But there is no observational proof for this theory. In this situation, the gravastar may play a crucial role to describe the final stage of the stellar evolution. Instead of there not being sufficient observational evidence in favor of the gravastars directly for their existence, it is important to study the concept of the gravastar that can be claimed as a feasible alternative to understand the concept of the black holes (BHs).

The proposed model [10] is a static spherically symmetric perfect fluid model having three different regions designated by: (I) interior region ($0 \leq r_1 < r$), (II) thin shell region ($r_1 < r < r_2$), (III) exterior region ($r_2 < r$) and it is separated by a thin shell of stiff matter. In the interior region of the gravastar the relation between pressure and density is given by $p = -\rho$, inside the thin shell it is described by $p = \rho$ and finally in region III $p = \rho = 0$. Here p represents the isotropic pressure, ρ is the matter density of the perfect fluid sphere and $r_2 - r_1 = \epsilon$ is the thickness of the shell, where $\epsilon \ll 1$, because in a gravastar the thickness is very small compared to its size. For an uncharged model of the gravastar in $(3 + 1)$-D, the exterior spacetime is described by Schwarzschild geometry [12], whereas in the case of a charged gravastar model, the exterior spacetime is described by the Reissner–Nordström geometry [13,14].

The idea of the gravastars has been discussed several times in the literature as an alternative to BH theory based on different mathematical as well as physical aspects. But most of the investigations have been carried out by several workers in the framework of Einstein's general relativity (EGR) [15–

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Phantom energy-supported wormhole model in $f(R, T)$ gravity assuming conformal motion

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In this article, we have discussed Morris and Thorne (MT) wormhole solutions in a modified theory of gravity that admits conformal motion. Here, we explore the wormhole solutions in $f(R, T)$ gravity, which is a function of the Ricci scalar (R) and the trace of the stress–energy tensor (T). To study wormhole geometries, we make assumption of spherical symmetric static spacetime and the existence of conformal Killing symmetry to get more acceptable astrophysical outcomes. To do this, we choose the expression of $f(R, T)$ as $f(R, T) = R + 2\gamma T$. Here, we employ the phantom energy EoS relating to radial pressure and density given by $p_r = \omega\rho$ with $\omega < -1$ to constrain our model. Following a discussion of wormhole geometry and behavior of shape function, the study moves on to the computation of proper radial distance, active mass function, the nature of total gravitational energy and a discussion on the violation of energy conditions. We have shown that the wormhole solutions exist for positive as well as negative values of the coupling constant γ. From our analysis, we see that no wormhole solution exists for $\gamma = -4\pi, -\pi(3 + \omega)$. All the physical parameters have been drawn by employing the values of γ as $\gamma = -0.3, -0.2, -0.1, 0, 0.1$ and 0.2, where $\gamma = 0$ corresponds to general relativity (GR) case. It is found that for our proposed model, a realistic wormhole solution satisfying all the properties can be obtained.

Keywords: Wormhole; phantom energy; exotic matter; modified gravity.

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Tolman IV fluid sphere in $f(R, T)$ gravity

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ABSTRACT

In this article, we studied the behavior of relativistic spherical objects considering Tolman IV spacetime in modified $f(R, T)$ gravity for the uncharged perfect fluid matter. We have chosen the matter Lagrangian as $\mathcal{L}_m = -p$ to develop our present model. In particular, for this investigation we have reported for the compact object LMC $X-4$ [Mass=$(1.04 \pm 0.09)M_{\odot}$; Radius= $8.301^{+0.2}_{-0.2}$ Km] in our paper. The effect of the coupling parameter β on the local matter distribution of compact stars has been investigated in this paper. It can be seen that with greater values of β, the sound speed and adiabatic index are higher. On contrary, the mass function takes lower value for higher values of β. Our obtained solution does not admit singularities in the matter density, pressure and metric functions. According to our graphical analysis, this new stellar model satisfies all physical requirements anticipated in a realistic star.

1. Introduction

General relativity (GR) has proved itself a tremendously successful theory, which provides fruitful information about the evolution and hidden secrets of the universe. However, it is exposed to some serious challenges in the presence of dark elements, i.e., dark matter and dark energy. According to the predictions of GR, a universe dominated by matter or radiation accelerates in a negative direction due to the gravitational pull. Nevertheless, current astronomical observations uncover this scenario and confirms the accelerated expansion of the universe [1–11]. In this situation, it is essential to modify the framework of GR, so that cosmological and astrophysical phenomena caused by dark components can be best explained. In this connection, $f(R)$ theory is an important milestone [12,13], which is based on the modification in the geometrical sector. It modifies the standard Einstein–Hilbert (EH) action by inserting an arbitrary function $f(R)$ instead of the Ricci scalar R. After the innovational work on cosmological inflation in the realm of $f(R)$ gravity [14], it has become an active research arena. Qadir and his co-researchers [15] strengthened the idea of modified relativistic dynamics and pointed out the role of this modification in order to resolve the issues related to dark matter and dark energy.

Following the idea of introducing alteration in EH action, Harko et al. [16] presented $f(R,T)$ theory in which trace of stress energy tensor T has been introduced as a new ingredient. The appearance of this new ingredient is associated with the quantum effects or imperfect fluids. This modified theory consists on minimal matter coupling between the matter and gravitational sectors, which facilitates the study of new gravitational aspects. In literature, there has been a huge amount of research work on different aspects of $f(R,T)$ theory. It has been tested in different dimensions which include cosmology [17–21], thermodynamics [22,23], gravitational waves [24] and astrophysics of stellar systems [25–31], and it has presented valuable contributions to the different

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Model of hybrid star with baryonic and strange quark matter in Tolman–Kuchowicz spacetime

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The purpose of our work is to investigate some new features of a static anisotropic relativistic hybrid compact star composed of strange quark matter (SQM) in the inner core and normal baryonic matter distribution in the crust. Here we apply the simplest form of the phenomenological MIT bag model equation of state $p_q = \frac{1}{3}(\rho_q - 4B_g)$ to correlate the density and pressure of strange quark matter within the stellar interior, whereas radial pressure and matter density due to baryonic matter are connected by the simple linear equation of state $p_r = \alpha\rho - \beta$. In order to obtain the solution of the Einstein field equations, we have used the Tolman–Kuchowicz *ansatz* [R. C. Tolman, Static solutions of Einstein's field equations for spheres of fluid, *Phys. Rev.* **55** (1939) 364–373; B. Kuchowicz, *Acta Phys. Pol.* **33** (1968) 541] and further derivation of the arbitrary constants from some physical conditions. Here, we examine our proposed model graphically and analytically in detail for physically plausible conditions. In particular, for this investigation, we have reported on the compact object Her $X-1$ [Mass $= (0.98 \pm 0.12)M_{\odot}$; Radius $= 8.1^{+0.41}_{-0.41}$ km] in our paper as a strange quark star candidate. In order to check the physical validity and stability of our suggested model, we have performed various physical tests both analytically and graphically, namely, dynamical equilibrium of applied forces, energy conditions, compactness factor and surface redshift. Finally, we have found that our present model meets all the necessary physical requirements for a realistic model and can be studied for strange quark stars (SQS).

Keywords: Hybrid star; general relativity; baryonic matter; strange quark matter; Tolman–Kuchowicz ansatz.

Mathematics Subject Classification 2020: 85A05, 85A15

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HISTORY OF HUMAN SETTLEMENT IN THE INDIAN SUNDARBANS, WEST BENGAL: A HISTORICAL BACKGROUND

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Abstract:

The Sundarbans, world's largest active delta, are unique in its nature. Its own estuarine system, intricate coastlines, clusters of smaller deltas, innumerable islands, criss-crossed by numerous distributaries, provides great diversity to the eco-system. I want to reconstruct the early settlement history of the Sundarbans. The Sundarbans was known as *'Bhati'* or *'Bhati desh'* in the medieval texts. Somewhere again it is called *'Athorro vattir desh'*. During the Colonial Rule pull factors and push factors had played important role in the settlement of the migrants in the Sundarbans in India, especially in the process of execution of Tilman Henckell's "Sundarban's Plan".The colonial governments leased the reclaimed land of the Sundarbans to the *zamindars* (land lords), those who paid the highest price in the auction. During colonial period, the entire Sundarbans region was divided into 167 *lots* and 12 *plots*. However, the *zamindars* to avoid paying enhanced revenue, started large scale encroachment of the forest adjacent to their estates. The lotdars/zamindars of the Sundarbans hired in different ethnic groups from neighbouring states and districts as labourers who are known as *'Abadkari'*.

Key Words: Sundarbans, Migration, Environmental Change, Settlement

Sundarbans, the largest delta in the world, is formed on the extreme downstream of the Ganges River. The region is spread across the southern part of West Bengal a provincial state of the Indian Union and the neighbouring country of Bangladesh. The Indian part of Sundarbans is demarcated by the river Hooghly on the West, the Bay of Bengal on the South, the Ichhamati, Kalindi and Raimangal rivers on the East and Damphere-Hodges line on the North. The entire mangroves forest, which is covers approximately 9630 square kilometres, is known for extraordinary wildlife bio-diversity including numerous threatened species such as the Royal Bengal tiger, estuarine crocodile, Indian python and several species of river dolphin. According to Sir William Wilson Hunter the Sundarbans as a tangled region of estuaries, rivers, and watercourses, enclosing a vast number of islands of various shapes and sizes.[1]

This largest single stretch eco-region forest lies 60% located in the Nation state of Bangladesh and the remaining 40% rests with India. The entire Sundarbans area of India is spread over the districts of North 24 Parganas and South 24 Parganas, covering 19 administrative blocks. It comprises 102 islands among which 54 islands are inhabited by men, where more than 4.5 million people live in the rest part of the reserved mangrove forest. It consists of roughly 4200 km^2 of reserve forest and 5400 km^2 of non-forested area (inhabited portion of the Sundarbans). In a deltaic terrain, the most characteristic geomorphological feature is the pan-shaped interfluves.

সাঁওতালি জন্মসংস্কারে : লোকাচার ও লোকগীত

ছোটু টুডু

মানবজীবনের গুরুত্বপূর্ণ ঘটনাগুলির সঙ্গে লোকাচার ও লোকগীত এর সম্পর্ক খুবই ঘনিষ্ঠ। জীবনের ওই গুরুত্বপূর্ণ ঘটনার মধ্যে জন্ম-সংস্কার হচ্ছে একটি অন্যতম। এই জন্মকে কেন্দ্র করে বিভিন্ন লোকসমাজে অসংখ্য লোকবিশ্বাস ও লোকসংস্কার বর্তমান। সাঁওতালদের ক্ষেত্রেও এর ব্যতিক্রম হয়নি। তাই এই লোকবিশ্বাস ও লোকসংস্কারকে সম্মুখে রেখে গড়ে উঠেছে অসংখ্য লোকাচার ও লোকগীত। সাঁওতালদের সমাজ জীবনে বিভিন্ন আচার-অনুষ্ঠান যেমন বর্তমান, তেমনি জন্মকে কেন্দ্র করে গড়ে ওঠা লোকাচারও বেশ বিচিত্র ও প্রাচুর্যে ভরপুর। আর এই জন্মকে কেন্দ্র করে গড়ে ওঠা বিভিন্ন আচার-বিশ্বাস-লোকগীতকেই জন্মসংস্কার বলে গণ্য করা হয়। জন্ম-সংস্কারে যেসব আচার-বিশ্বাস মান্য বা পালন করা হয় তার মূল উদ্দেশ্য হলো শিশু ও প্রসূতি। মা প্রসবের পূর্ববর্তী ও পরবর্তীতে পৃথিবীর প্রতিকুল পরিবেশে যাতে সুস্থ এবং সবল হয় সেই জন্যই সকল সমাজের মানুষের চেষ্টার অন্ত নেই। সাঁওতাল সমাজের জন্মলগ্নে আচার-বিশ্বাস-লোকগীত দৃষ্টান্ত উল্লেখ পর্যায়ে রয়েছে আমাদের আলোচনার সূত্রপাত হলো নবজাত শিশু-প্রসূতিকে নিয়ে।

সাঁওতাল লোকসমাজে গোটা জন্ম-সংস্কারকে তিনটি পর্যায়ে সম্পূর্ণ করা হয়, যেমন–

১. জন্ম-সংলগ্ন/নারতা
২. জানাম ছাটিয়োর/নামকরণ বা শুদ্ধিকরণ
৩. জন্ম-পরবর্তী/চাচো ছাটিয়োর

সাঁওতাল লোকসমাজে শিশু জন্মের পূর্ববর্তী অবস্থায় গর্ভবতীকে নিয়ে তেমন কোনো আচার-বিশ্বাস লক্ষণীয় নয়, কারণ হিসেবে অর্থনৈতিক দূরবস্থা ধরা যেতে পারে, তবে গর্ভিনীর কিছু বাধক থাকে যেগুলি করলে খারাপ হয়। এই তিন পর্যায়ে বিভিন্ন আচার-বিশ্বাস-লোকগীতগুলিই আলোচনার মধ্যে উপস্থাপনের চেষ্টা করলাম। সাঁওতাল লোকসমাজে জন্ম-সংলগ্নে/নারতায় অনেকগুলি লোকাচার ও লোকগীত বর্তমান। যথা–

১. জন্ম-সংলগ্ন/নারতা

● **অমন অড়াঃ/আঁতুড় ঘর** : নবজাত শিশু প্রসবের প্রাক্কালে গর্ভধারিণীর যাতে কোনোরকম সমস্যা না হয়, সেইজন্য একটা পৃথক ঘরে রাখার ব্যবস্থা করা হয়। এই ঘরই অমন অড়াঃ/আঁতুড়ঘর নামে পরিচিত। পুরুষদের এই ঘরে প্রবেশ নিষেধ, শুধু থাকে ধাই-বুড়ি, দু-একজন মহিলা যারা প্রসবের কাজে ধাই-বুড়িকে সহযোগিতা করতে পারবে। আঁতুড়ঘরে প্রসুতির প্রবেশ করার পূর্বে নিমপাতা-নিমের ছোটো ছোটো ডাল পুড়িয়ে ধুঁইয়ে ঘরটিকে শুদ্ধ করা হয়। ধাই বুড়ি আসার সঙ্গে সঙ্গে ঘরের মধ্যে বাতি, একটি মাটির পাত্রে ঘুটের আগুন, আঁকন্দ-আসন-পাতা মিশ্রিত গরম সরিষার-তেল, কাঁচা-হলুদ, এক হাঁড়ি গরম-গ

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Empowering women through alternative livelihoods in the coastal areas of the sundrbans, west bengal, india.

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Abstract:

Women comprise over half of the world's population and play an important role for the well-being of their family members and sustainable development of their communities and nations, and also for the maintenance of the Earth's eco-systems, bio-diversity, and natural resources. United Nations Environment Programmers hope that women and their psychological affinity towards the environment will inspire the future of environmental and sustainable development of community towards the better understanding of the importance of gender and integration of gender perspectives across the world. There is a fundamental difference between the attitude of men and that of women towards Nature and natural resources. Throughout history, men used to look natural resources as commercial entities or income generating tools, while women have tended it to see the environment as a resource supporting of their basic needs. As we know very well that, women usually collect the dead branches, dry-leaves as fuel for cooking rather than cutting the trees. Ecological conditions are gradually deteriorating in the Sundarbans, being associated with poverty, unlimited and unplanned settlements leading to the environmental degradation. Production and processing of biomass, agriculture, and forestry and village crafts based on biomass as raw materials are also the biggest sources of employment in the Sundarbans. Since the Sundarbans is an underdevelopment region, women are ceaselessly facing additional barriers to empower themselves due to the viable presence of the issues like- male dominated society, illiteracy, lack of economic independence and conservative social structure with religious obscurantist practices and beliefs. I would discuss alternative livelihoods option of women in the Sundarbans.

Key words: Sundarbans, livelihood, migration, alternative women.

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Induction of Chlorophyll and Morphological Mutations through Gamma Ray in Traditional Aromatic Cultivar Tulaipanja

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The induced mutation of the traditional aromatic cultivar may provide useful alternative or complement to natural variation which may be used directly in mutation breeding or as a source of germ plasm in hybridization programme. Induced mutations irradiated through gamma ray in aromatic cultivar Tulaipanja were studied for chlorophyll and other morphological characters in the M2 generation. The frequency of chlorophyll mutations was high in higher doses. Among the chlorophyll mutants studied, albina was the most frequent, followed by alboxantha, alboviridis, xantha, viridis and striata. The mutation efficiency and the mutagenic effectiveness of the mutagen is more in the lower dose. The semi-dwarf mutants were more prevalent followed by dwarf and semitall-I mutants. The number of height mutants is much more in lower dose than that of higher dose. Among the morphological mutants, a number of mutants with broom stick leaf and few mutants with grassy leaf, rolled leaf, striped leaf were obtained. Besides these, delayed flowering mutants were obtained in low frequency in both the doses while the early flowering mutants were obtained only in the lower dose. The desirable dwarf or semi-dwarf early flowering mutants may be utilized directly or for recombination breeding, whereas the high yielding lines screened may be used directly as aromatic cultivar provided if the performance in the later generation is good.

Keywords: Aromatic rice; Chlorophyll mutants; Induced mutation; Morphological mutants.

India is well acquainted for the production and supply of aromatic rice in the national and international market. Tulaipanja is a traditional non-basmati aromatic cultivar which is cultivated in the agro-climatic condition of West Bengal, but it is somehow neglected for its poor yield. The induced mutation of this aromatic cultivar may provide useful alternative or complement to natural variation which may be used directly in mutation breeding or as a source of germ plasm in hybridization programme. Large random variation can be produced through induced mutation in short time in a chosen genetic background. But one of the most important disadvantage of induced mutation is the undesirable effects produced by the pleiotropic action of the mutant gene or simultaneous mutation of closely linked genes. Mutagenic treatments of seeds with different doses showed a definite increase or decrease in sensitivity to treatments which can be shown as mutation frequency in early generation like M_2. Mutagenic efficiency is the proportion of mutation in relation to understandable changes like lethality, injury or sterility and mutagenic effectiveness is a measure

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VERMICOMPOSTING - THE USEFUL TECHNOLOGY FOR THE CONVERSION OF BIODEGRADABLE WASTES INTO DESIRABLE PRODUCTS FOR PLANTS

K. M. HASIB

The undesirable enormous wastes created as a result of overgrowing population of this planet is increasing rapidly in the surface of soil causing pollution and affects the environment remarkably. These kinds of pollution significantly affect the various life forms. The biodegradable wastes may be used for the production of vermicompost to utilize it for the growth and development of plants. Such kind of organic fertilizers can be used effectively in both rural and urban areas. Vermicomposting is the useful to convert the biodegradable wastes to nutrient rich organic manure with the help of microorganisms and earthworms. Various species of earthworms and microorganisms plays important roles for the improvement of soil. The increasing use of inorganic fertilizer along with pesticides, insecticides etc. affect the environment adversely and also destroy the inherent properties of soil. The application of inorganic fertilizers for long time reduces the fertility of soil and is detrimental for future. Therefore, the use of these kinds of harmful substances should be reduced. Vermicompost made from biodegradable wastes in association with earthworms, microbes etc. provides essential nutrients for the plants. The article emphasized the exploitation of enormous biodegradable wastes to produce vermicompost considering various aspects of it like concept of vermicomposting, requirements, methods of production, process and dose of application, nutrients available in the vermicompost, advantages and disadvantages and precautions during vermicomposting.

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Studies on Internode Length and Culm Anatomy of Induced Mutants of Aromatic Rice

K. M. Hasib

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ABSTRACT

Dry unhusked seeds of Tulaipanja, a tall aromatic *indica* rice, were irradiated with 200 Gy and 300 Gy doses of gamma rays for inducing short height mutants. A number of non-lodging true-breeding height mutants were studied in advanced generation. The number and length of the internodes of various mutants along with their parent Tulaipanja were studied for alteration in these characters for height reduction and culm anatomy for stiff-strawed non-lodging habit. There was no alteration in the number of identifiable internodes in the short culm mutants. All the mutants and the control Tulaipanja showed progressive decrease in individual internode length from the top (numbered in descending order) to downwards, with the panicle bearing internode (number one) being the longest. However, the mutants showed variation in the pattern and degree of reduction of individual internodes. All the mutant lines and control Tulaipanja except one mutant line (33-9-15) had almost similar number of vascular bundles. The thick band of sclerenchymatous tissue in the hypodermal region in the stiff-strawed mutant 88-8-3 may contribute to the rigidity of culm for non-lodging habit.

Keywords Internode, Culm anatomy, Induced mutants, Aromatic rice.

INTRODUCTION

The development of short statured non-lodging semi-dwarf plant is the important breeding objective in crop improvement program. A significant part of the success of the 'Green Revolution' in the 1960s resulted from the breeding of grain crops that had more efficient plant architecture (Khush 2001). The short statured non-lodging habit of the plant is associated with some morphological or anatomical features of stem which have a close relationship with yield. Lodging is the most important factor associated with reduction of grain yield and may reduce the grain yield significantly. The major constraints in increasing grain yield of traditional aromatic rice varieties are the lack of response to higher doses of fertilizers and susceptibility to lodging. Tulaipanja is such type of local aromatic tall cultivar which is susceptible to lodging. Mutants were isolated from such aromatic cultivar through induced mutation by gamma ray irradiation. These mutants are semi-dwarf in nature having superior plant type and are resistant

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Stepwise Regression Analysis in Induced Mutants of Aromatic Non-Basmati Rice

K. M. Hasib

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ABSTRACT

A population of 28 true-breeding induced mutants of aromatic non-basmati rice with its mother Tulaipanja was grown during warm wet season for two consecutive years. Data on ten important morphological characters were recorded. Stepwise multiple regression analysis was performed for identifying key yield determining traits in the mutant population. Stepwise regression analysis in the first year revealed that harvest index was the most important determinant of yield, which secured 1st position in the final regression analysis in the advanced generations. Harvest index alone accounted for 60.460% in first year and 39.443% in second year for the total variance in grain yield. The next important determinant was number of panicles per plant which appeared in 2nd position in first year and 3rd position in second year in the final regression analysis. Panicle length was the next important determinant for grain yield.

Keywords Regression, Forward selection, Quantitative characters, Induced mutants, Aromatic rice.

INTRODUCTION

There is a great demand of aromatic rice in the whole world. It has special market in world rice trade and fetches premium price. India and its subcontinent are popular for the cultivation and production of scented rice. Tulaipanja is popular landrace of aromatic rice in northern part of West Bengal. But its yield potential is low due to inefficient partitioning of biomass and susceptibility to lodging. Gamma ray induced mutation with a view to developing new plant type resulted in a number of promising mutant families with improvement in different agro-botanical characters. It is important to know the key yield determining traits in such mutant population. Kole *et al*. (2008) reported that selection favoring higher panicle number per plant, test weight and straw weight and medium plant height with a reasonable balance for moderate grain number would help to achieve higher grain yield in induced mutant population of aromatic non-basmati rice. Statistical analysis like stepwise regression method provides useful information for breeding program. Stepwise multiple regression analysis is used for estimating the contribution of a given trait to productivity with other traits held constant and determining the choice

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Research Article

Reversible Electrochromic/Electrofluorochromic Dual Switching in Zn(II)-Based Metallo-Supramolecular Polymer Films

Sanjoy Mondal, Dines Chandra Santra, Susmita Roy, Yemineni S. L. V. Narayana, Takefumi Yoshida, Yoshikazu Ninomiya, and Masayoshi Higuchi*

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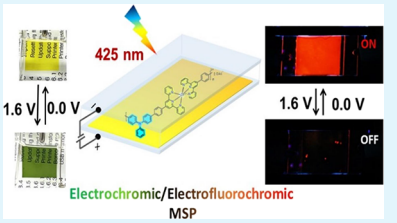
ABSTRACT: The introduction of novel materials with multifunctional chromogenic properties, such as electrochromic/electrofluorochromic (EC/EFC) properties, has recently attracted prospective interest in the development of various optoelectronic devices and smart windows. In this study, a novel Zn(II)-based metallo-supramolecular polymer (**polyZn**) has been developed as an ON/OFF switchable EFC application with prominent EC behavior. In this regard, the polymeric chain of **polyZn** was first synthesized by 1:1 complexation in a zigzag manner with Zn(II) ions at the metal center and 4,4′-[bis(2,2′:6′,2″-terpyridinyl)-benzene]triphenylamine ($L_{TPY\text{-}TPA}$) as the redox-active ditopic ligand. The **polyZn** exhibits excellent solubility in organic solvents and can form a very good uniform thin film on an indium tin oxide/glass substrate by spin-coating. In a neutral state, transparent **polyZn** exhibits a bright yellow color to the naked eye (absorption at ∼325 nm). The electroactive triphenylamine (TPA) core of $L_{TPA\text{-}TPY}$, however, undergoes reversible single-electron oxidation when a positive bias of +1.6 V vs Ag/Ag^+ is applied, generating radical cations ($TPA \leftrightarrow TPA^{\bullet+}$) with a significant drop in transparency (77%). A noticeable chromic shift in the hue of the film from brilliant yellow to green was observed with the appearance of a near-infrared absorption band at ∼897 nm with a tail of 1300−1600 nm. Interestingly, in addition to this EC phenomenon, the fabricated solid-state **polyZn** film exhibits intense, high-contrast reddish-orange photoluminescence with λ_{em} = 650 nm, which is significantly desired as a molecular probe for bioimaging. Both the TPA core and the redox-inactive Zn(II)-terpyridine core emit orange-red photoluminescence in **polyZn**, which is significantly quenched upon the oxidation of the film and is re-emitted at 0.0 V vs Ag/Ag^+. This ON/OFF EFC transition was sustained for several cycles. This study should motivate to design and create distinctive new unique materials with combined EC/EFC behavior for the fabrication of optoelectronic devices by combining a metal-fluorescent core with a redox-active spacer.



KEYWORDS: *metallo-supramolecular polymer, electrofluorochromism, electrochromism, redox-inactive Zn-fluorescent core, optoelectronic device, dual-switching display, orange-red photoluminescence*

1. INTRODUCTION

Reversible bistable switchable materials with electrochemical inputs and optical absorption or emission outputs have received significant attention as information displays, optical memory, sensors, smart windows, etc.[1−6] In electrochromic (EC) changes, the optical output leads to a change in the chromic shift inside the material, resulting in a color change in the visible/near-infrared (NIR)/vis−NIR region.[7−10] However, in electrofluorochromic (EFC) behavior, the optical output results in a change in the photoluminescence (PL) behavior of the material.[11−13] Although modern technology has made significant progress in the EC or EFC technology individually,[8,13] the development of a unified device with both EC and EFC characteristics is highly desirable and beneficial for a wide range of applications in display technology, as both the absorption or emission output can be modulated with low *dc* bias applications.[14,15] In addition, the absorption or emission in the NIR (750−2500 nm) region is more useful because red NIR emission is highly recommended for bioimaging[16] and other military applications,[17] while NIR solar absorption can reduce solar heat gain to reduce the building-energy consuming cost for indoor heating/cooling.[18−20]

Various kinds of materials have been considered for EFC applications, such as organic small molecules, lanthanide-based complexes, aryl amine-appended conjugated polymers, inorganic crystals, and polymeric gels.[4,21−25] Meanwhile, a wide range of materials, including transition metal oxides, small organic molecules and conjugated polymers, transition metal complexes and polymers, organic−inorganic hybrid nanostructures, and plasmonic nanocrystals, exhibit variable electrochromism.[26−37] However, to realize a unified EC/EFC device, material design is critical so that the chromophore can modify

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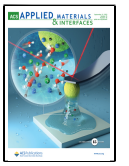
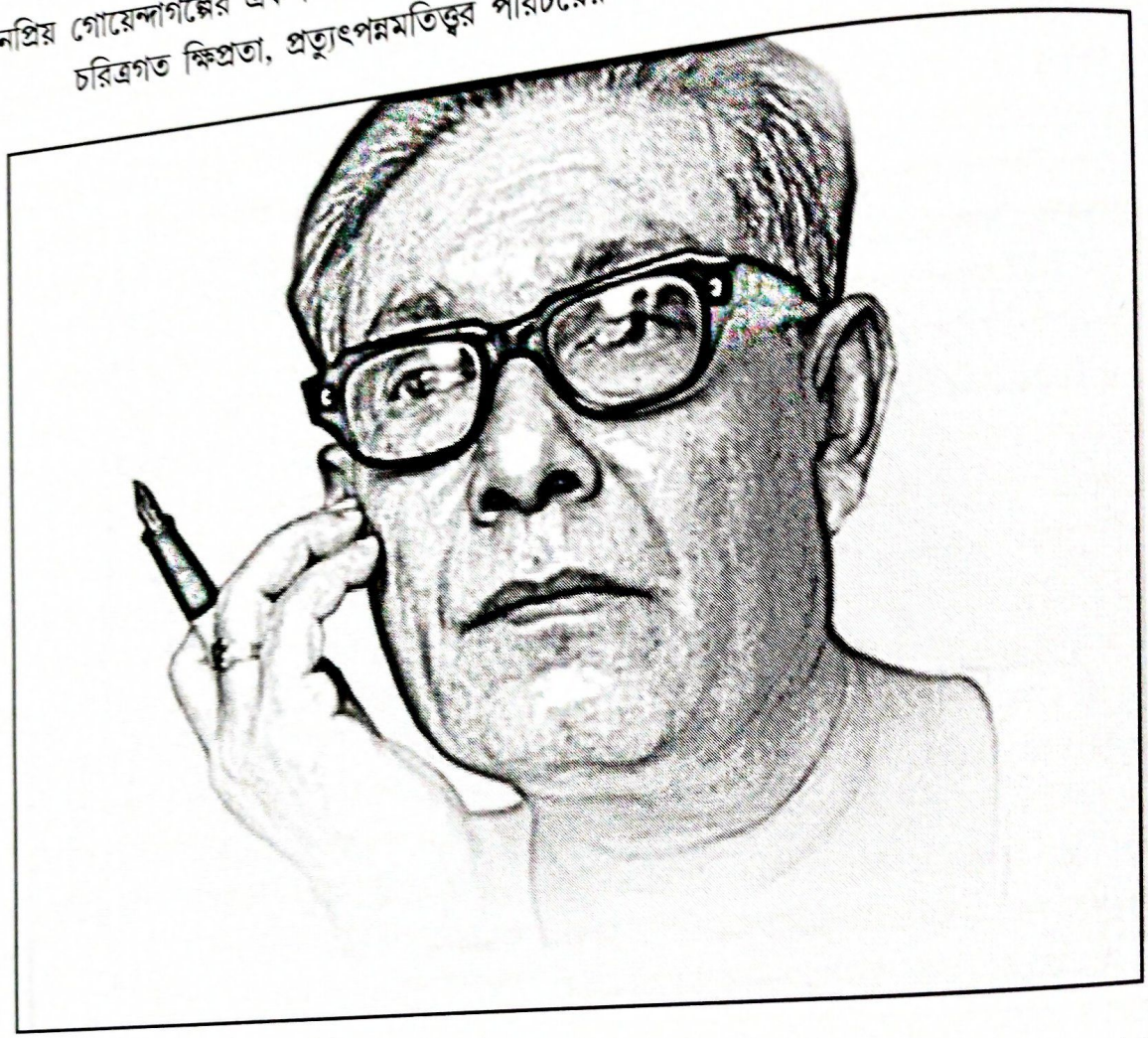


নীহাররঞ্জন গুপ্তের কিরীটী রায় : বুদ্ধি ও মুষ্টির মেলবন্ধন

জনপ্রিয় গোয়েন্দাগল্পের এক বিখ্যাত চরিত্রের ওপর গভীর আলোকপাত এই রচনা। কিরীটি রায়ের চরিত্রগত ক্ষিপ্রতা, প্রত্যুৎপন্নমতিত্ত্বর পরিচয়ের সন্ধানে নামলেন **সুনেত্রা ব্যানার্জী**।



অপরাধ যেমন আদিম প্রবৃত্তিজাত, তেমন তাকে প্রতিরোধের চেষ্টাও সুপ্রাচীন। সভ্যতার ইতিহাসে নিয়ম ভেঙে যখনই অপরাধ ঘটেছে তখনই মানুষের শুভ চৈতন্য তার প্রতিরোধে অগ্রসর হয়েছে। সেই প্রতিরোধ কখনও গড়ে উঠেছে ধর্মীয় অনুশাসনে, আবার কখনও সামাজিক সংস্কারে বা কখনও রাষ্ট্রশক্তির তৎপরতায়। রাষ্ট্র অপরাধীকে চিহ্নিত করে শাস্তিদানের মাধ্যমে প্রতিরোধ গড়ে তোলার চেষ্টা করেছে। অপরাধীকে সনাক্তকরণ ও শাস্তিদানের জন্যই পুলিশি ও গোয়েন্দা ব্যবস্থা গড়ে উঠেছে। পুলিশ বা গোয়েন্দা রহস্য উদঘাটনের মাধ্যমে অপরাধীকে সনাক্ত করেন। এইভাবে অপরাধ ও অপরাধ দমনের কাটাকুটিতে গোয়েন্দা গল্প তৈরি হয়। গল্প শোনার আগ্রহ মানুষের চিরন্তন। আর এই অপরাধ বা অপরাধীকে অন্বেষণের চরিত্রই এমন যা গল্পের কাঠামোকে আগাগোড়া টানটান রাখতে সক্ষম। তাই অপরাধের কাহিনিও জন্ম লগ্ন থেকেই জনপ্রিয়তার শীর্ষে থেকেছে।

প্রাচীনকালে গোয়েন্দা কাহিনি লেখা না হলেও সমাজ যে অপরাধ মুক্ত ছিল না তার পরিচয় যেমন আমাদের বেদে কুক্কুরী সরমার গল্পে আছে, তেমনই আছে বাইবেলের ওল্ড টেস্টামেন্টের 'বেল অফ দ্য ড্রাগন'[১] বা দানিয়েলের কাহিনিতে। এমনকি আমাদের মহাকাব্য অর্থাৎ রামায়ণ,

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Isotropic Buchdahl's relativistic fluid sphere within $f(R, T)$ gravity

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Modified gravity
Causality condition

ABSTRACT

The aim of the research is to look into a new solution for isotropic compact stars in the context of the $f(R, T)$ theory of gravity. We used the Buchdahl (1959) metric potentials as input to deal with the field equations in the $f(R, T)$ framework. For different values of the coupling parameter χ, graphical representation of the model parameters have been shown to canvass the analytical results more clearly. Interestingly, we have proven that for $\chi = 0$, the standard General Relativity (GR) results can be recovered. A comparison of our obtained solutions with the GR results is also discussed. To study the effect of the coupling parameter χ, the numerical values of the different physical variables have been tabulated for the values of the coupling parameter $\chi = 0, 0.25, 0.5, 0.75, 1, 1.25$. We used the compact stars candidate LMC X-4 with mass= $(1.04 \pm 0.09) M_{\odot}$; Radius $= 8.301^{+0.2}_{-0.2}$ km. respectively, for graphical analysis. To determine the physical acceptability of the model, we looked into the necessary physical properties such as energy conditions, causality, hydrostatic equilibrium, and pressure–density ratio etc. and found that our system satisfies all of these criteria, indicating that the model is physically reasonable.

1. Introduction

Massive stars explode as supernova to the end of their life and yield extremely compact objects with an average density of 10^{14} gm cm^{-3}. The internal matter of these compact objects is compressed by the strong gravitational fields to densities that range from sub-saturation to a few times nuclear saturation density, $n_0 = 0.16$ fm^{-3} (Glendenning, 2012). In 1934, Baade and Zwicky (1934) set up the idea that massive compact stellar objects could form, establishing the theory that a supernova might produce a small, super dense star.

There are two distinct theories that might be used to settle the argument over how to account for the universe's accelerating expansion. One is the possibility that mysterious dark energy exists, as well as its possible expansions, such as modified gravity theories. The cosmological constant, which represents a constant energy density of the vacuum and satisfies cosmological data, is the simplest illustration of dark energy. This problematic nature of cosmological constant has motivated intense research for alternative theories of gravity extending the Einstein's theory of gravity. This leads to the search for a different gravity theory that can answer the universe's current acceleration phase. Alternative explanations have been demonstrated to be capable of adequately describing cosmological observations. One of the simplest possible modification is the $f(R)$-gravity. Another alternative theory of gravity is so called $f(R,T)$ gravity. An interesting aspect of $f(R,T)$ theory is that it may provide an effective classical description of the quantum properties of gravity. In addition to improving fundamental understanding, this theory has produced certain results. The other motivations are related to reconstructing $f(R,T)$ gravity from holographic dark energy, cosmological and solar System Consequences, anisotropic cosmology, non-equilibrium picture of thermodynamics, a wormhole solution, and some other relevant aspects. However, it is vital to do astrophysical research, such as using relativistic stars, in order to develop a suitable gravity theory. Some justifications for these theories are based on the idea that relativistic stars in a strong gravitational field may distinguish between the fundamental laws of gravity and its generalizations. Considering all the facts, we consider here $f(R,T)$ gravity theory from the set of alternative theories of gravity. By considering modified theories of gravity like $f(R,T)$ gravity, the problem of accelerated expansion of the universe can be resolved (Harko et al., 2011). The $f(R, T)$ gravity offers an alternate explanation for the current cosmic acceleration without requiring the introduction of either an exotic dark energy component or the creation of additional spatial dimensions. Cosmic acceleration in $f(R, T)$ gravity may be caused by matter contents in addition to geometrical contributions to the total cosmic energy density (Zubair et al., 2016).

The $f(R,T)$ theory has become increasingly popular among researchers in recent decades. Harko et al. (2011) studied $f(R,T)$ modified theories of gravity, in which the gravitational Lagrangian is given

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Regular Article - Theoretical Physics

Charged strange star model in Tolman–Kuchowicz spacetime in the background of 5D Einstein–Maxwell–Gauss–Bonnet gravity

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Abstract In this article, we provide a new model of static charged anisotropic fluid sphere made of a charged perfect fluid in the context of 5D Einstein–Maxwell–Gauss–Bonnet (EMGB) gravity theory. To generate exact solutions of the EMGB field equations, we utilize the well-behaved Tolman–Kuchowicz (TK) *ansatz* together with a linear equation of state (EoS) of the form $p_r = \beta\rho - \gamma$, (where β and γ are constants). Here the exterior space-time is described by the EGB Schwarzschild metric. The Gauss–Bonnet Lagrangian term $\mathcal{L}_{GB}$ is coupled with the Einstein–Hilbert action through the coupling constant α. When $\alpha \to 0$, we obtain the general relativity (GR) results. Here we present the solution for the compact star candidate EXO 1785-248 with mass$= (1.3 \pm 0.2)M_{\odot}$; radius $= 10^{+1}_{-1}$ km. respectively. We analyze the effect of this coupling constant α on the principal characteristics of our model, such as energy density, pressure components, anisotropy factor, sound speed etc. We compare these results with corresponding GR results. Moreover, we studied the hydrostatic equilibrium of the stellar system by using a modified Tolman–Oppenheimer–Volkoff (TOV) equation and the dynamical stability through the critical value of the radial adiabatic index.The mass-radius relationship is also established to determine the compactness factor and surface redshift of our model. In this way, the stellar model obtained here is found to satisfy the elementary physical requirements necessary for a physically viable stellar object.

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1 Introduction

Owing to the difficulties encountered by the general theory of relativity (GTR) in explaining the anomalous behavior of gravitational events such as the accelerated expansion of the cosmos in a late-time [1,2], alternative or extended gravity theories have suddenly gained considerable importance. Conjecturing the presence of exotic matter fields, including quintessence fields (QFs), ghost fields (GFs), dark energy (DE), and dark matter (DM), to name a few, is one approach to solving this problem. There is currently no empirical evidence for these conjectures, but a variety of experiments are being carried out. In this concern, de Rham [3] proposes that the graviton is not massless but actually bears a small mass to explain the dark sector. This has several implications for physics, which have already been addressed previously in the literature. Reexamining the geometrical side of the field equations offers an alternative approach, meanwhile higher curvature impacts may have a role to play. Specifically, the Einstein–Gauss–Bonnet (EGB) theory has shown to be promising in this aspect and is hence widely investigated. It should be noted that the EGB is part of a more generic category of theories named Lovelock's polynomial Lagrangians which are the most comprehensive tensor theory yielding at most 2nd-order motion equations. The most common theory is owed to Horndeski [4] if one allows the Lagrangian to involve both tensor and scalar fields. The reality that the Gauss–Bonnet Lagrangian naturally manifests in the applicability of heterotic string theory at the low energy limit [5] provides another compelling argument in favor of the EGB theory. For inhomogeneous distributions of dust [6,7] and null dust [8], the causal structure of the singularities deviates

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New classes of wormhole model in $f(R,T)$ gravity by assuming conformal motion

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ABSTRACT

The two models of wormhole in $f(R,T)$ gravity using relationship between radial and transverse pressure is discussed in the article. To obtain the wormhole model, we used a separable functional form given by $f(R,T)=f_1(R)+f_2(T)$. R is the Ricci scalar, and T is the trace of the energy momentum tensor, with $f_1(R)$ and $f_2(T)$ being arbitrary functions of R and T, respectively. We also explored the possibility of wormhole (WH) solutions by assuming that the spacetime admits conformal killing vectors. Using different values for the coupling parameter γ, we studied the viable solutions and graphically analyzed the various features of these models. It can also be noted that the energy conditions are violated for our anisotropic model and isotropic model violates null energy condition (NEC) for $\gamma=\mathbf{0},\mathbf{-2},\mathbf{-4}$ while holds NEC for $\gamma=\mathbf{2},\mathbf{4}$. Hence, the anisotropic WH throat is supported by exotic matter and the isotropic by exotic/non-exotic (i.e. $\gamma=\mathbf{0},\mathbf{-2},\mathbf{-4}$ & $\gamma=\mathbf{2},\mathbf{4}$) although not an interesting model as there is no opening throat.

1. Introduction

In the early days of research on black holes, before they had no proper name, physicists were still not sure as to whether these type of strange things actually did exist in reality. They could have been a result of the complicated mathematics used in the very recent general theory of relativity (GTR), which describes gravity at the time. However, the recent detection of gravitational waves (GWs) (Abbott et al., 2016) confirms that stellar-mass black holes are very real and even truly exist here in our universe. Interestingly, in 1916, Flamm (1916) discovered that Einstein's equations exhibit for another solution, very recently known as a white hole.

Nowadays, Wormholes (WH) are another strange theoretical prediction from general relativity. Conceptually these are fantastical looking tunnels connecting distant locations in a same universe or a parallel universe, that can travel without violating causality condition. Its existence remains still in doubt. This concept came from white holes, as opposite to black holes, were thought to release matter and light from their event horizon. These two solutions might be two distinct regions of spacetime connected by a channel. Two pioneer scientists Einstein and Rosen (1935), first put forwarded the concept in 1935 by naming that channel as a "bridge". So these channels are also known as "Einstein–Rosen bridge". They investigated the strange equations and asked what they actually stood for. These equations are now known to describe the inescapable pocket of space known as a black hole. According to Einstein and Rosen, the surface of a black hole may hypothetically serve as a bridge connecting to another region of space. The term "wormhole" was first introduced historically by Mishra et al. (2020) a few decades later. WH has since become a focus for researchers looking into new areas of study. The WH has long been used as a crucial plot by science fiction authors and movie script writers. Through these tunnel like structures, characters can travel over vast distances in spacetime from Point A to Point B in a matter of seconds. For decades, several theorists have pondered the existence of these spacetime portals, but no one has been able to provide physical evidence of their existence until recently. However, an original version of wormholes was later dismissed because they are not traversable in nature, i.e., its throat opens and closes so quickly.

Making a stable WH necessitates the addition of an unusual ingredient that prevent the WH throat from closing, which researchers refer to as "exotic" matter. Visser et al. (2003) determined the amount of exotic matter of a wormhole determined by "volume integral quantifier". This exotic matter violates the known energy conditions. In 1988, Morris and Thorne (1988) introduced some conditions for traversable WH. Furthermore, this exotic matter with negative energy density satisfy the

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CASTE, SCOURGE AND OPPRESSION AS TENETS OF MANUAL SCAVENGING

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Abstract
The manual scavengers work is dangerous, hazardous, unclean, degrading, and above all, even today, the very presence of manual cleaning of the sewage system, septic tanks, and manholes continues in India. Manual scavenger refers to a person who manually cleans, carries, disposes, or handles human excreta from dry toilets and sewers. In our country this work is done under the guise of caste system, the oppressed classes are somehow made to maintain this systematic scourge. This article tries to look into this aspect and tries to highlight on the act that tries to null away with the practice of scavenging in bare oppressed hands.

Keywords: manual scavenging, caste, oppression, act, India

Manual scavenging, a caste-based-forced occupation,[1] has been in practice in several parts of India. It is the manual cleaning of human and animal excreta with the help of brooms and small tin plates and carrying them in baskets for disposal at a designated place, which is far away from the living area. Across India, castes that work as "manual scavengers" collect human excrement on a daily basis, and carry it away in cane baskets for disposal. Women from this caste usually clean dry toilets in homes, while men do the more physically demanding cleaning of sewers and septic tanks. In India we have caste hierarchy, it is ubiquitous and this has resulted in an ideal tolerant of diversity [2].

The international labour organisation (ILO) mentioned [3] the existence of three forms of manual scavenging in all over India, i.e., removal of human excreta from public streets and dry latrine, cleaning septic tanks and cleaning gutters and sewers. The human waste management in India can be classified into four categories [4]: (1) Manual scavenging: A caste-based practice where a sanitation worker scoops waste from dry latrines and dumps it in a gutter or dumping site at some distance from the households; (2) Manual pit emptying: The pits / tanks that latrines are connected to may need to be emptied manually for various reasons; (3) Manual sewer servicing: Only 12-15% of the Indian population is connected to sewers, but sewers become blocked and may need to be manually unblocked; and (4) Mechanical servicing: Mechanization (such as a pump with a hose) is used to unblock sewers and empty pits.

The allocation of labor on the basis of caste is one of the fundamental tenets of the Hindu Situational Analysis [5] and Recommendations on Manual Scavenging. Within this system dalits have been assigned tasks and occupations which are deemed ritually polluting by other caste communities - such as sweeping, disposal of dead animals and leatherwork. By reason of their birth, dalits are considered to be "polluted", and the removal of human and animal waste by members of the "sweeper" community is allocated to them and strictly enforced. Caste is an overbearing [6] identity. It is not simply a tag of identity but dictates a way of life. It continues to reinforce inequality of basic value and the allocation of labour is one of its prime manifestations.

The caste system assists in believing that all work related to dirt is a lot of the low castes. Because of this not only the upper castes but castes within the smaller castes do not associate with dirt lifting castes. And this has transcended the confines of Hinduism alone to become a way of living that pervades all of Indian society. Gandhi would hail manual scavengers [7] as he used to "I am not ashamed of myself called manual scavenging, and I invoke manual scavengers not to be ashamed of being called one. This society is based on many services, a scavenger is at the base of every service. That being one of the many reasons why Ambedkar was in war of ideas with Gandhiji.

Asymmetrical Arrangement of Federalism with Special Reference to India

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Abstract

The objective of this paper is to examine the asymmetrical arrangement of federation especially in India. Asymmetry is inherently linked with all federations. The meaning of asymmetry federalism is, federalism based on unequal power and relationship in the political, administrative and fiscal arrangements sphere between the units constituting the federation and it can be viewed in both vertical (between centre and states) and horizontal (among the states) senses in a federation. However, there was an agitation in the existence of asymmetry which makes the federation stable or unstable. To run the federation successfully, few people think there should be limitations in asymmetry.

The central government in India have the power, and it actually does invade the legislative and executive domains of the state. India being such a diverse country accommodates various sub-national and ethno-cultural identities in some cases, constitutional recognition has been given to the asymmetrical arrangement. So far Indian federalism is running successfully.

Keywords: Asymmetric Federalism, Federation, Federalism, Confederation, Subcontinent, Social-Economic Diversity.

Introduction

This paper provides an overview and analysis of asymmetry in Indian federalism. India is an ancient country. India's civilization and culture are full of variations. In India we can see the amalgamation of various races, languages, religions, and cultures. In fact, India is a large and variegated cultural subcontinent. India's people are divided into many small communities on the basis of the geographical formation, local history, language, religion, nationality and economic development. In this context, various rival multiparty systems are also established in India.in this multicultural circumstance, Indian federal system in capable of establishing the national integration. This federal system is established as a weapon to administrate the conflict between the various races and communities. In recent times in Asia's three countries-India, Pakistan and Malaysia the federal system has established formally, in the only India's federal system become relatively successful. In the year 1965 Singapore has been deviated from Malaysia. In 1971 Bangladesh is also separated from Pakistan. Though we can see that there are so many crises arises in the political system of India, but with the help of the democracy and federal system India can protect its multiculturalism and provincial autonomy in one hand and on the other hand its national integration is established. In fact, India is not a nation state, but a multicultural federation.

शोधप्रभा
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ECOCRITICISM IN LITERARY CREATIONS WITH SPECIAL REFERENCE TO KĀLIDĀSA'S MEGHADŪTA

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Abstract :
Literature is the medium to reflect the current problems of society. Ecocriticism alerts the persons of the society through literary works to sensitize with all problems. The word "ecocriticism" is the combination of two words – eco and criticism. Eco means earth, the whole universe and criticism mans study. So ecocriticism means study of nature. It widens and gives more comprehensive approach to the study of literature. Eco system is an important environmental aspect which lays down the close relation between plants and living creatures. An observation of the literary texts shows that poets were staunch advocates of nature. In their revelation they gave the impression that nature is the life of all creatures. Kālidāsa's Meghadūta has specially referred here to evaluate it as an eco-critical text. An attempt has been made here in this paper to throw fresh light on the eco-critical ideas of the poets and their literary creations.

Key words : Ecology, Eco-criticism, Global-warming, Animal studies.

Introduction :
Since prehistory, literature and the arts have been drawn to portrayals of physical environments and human-environment interactions. The modern environmentalist movement as it emerged first in the late-nineteenth century and, in its more recent incarnation, in the 1960s, gave rise to a rich array of fictional and nonfictional writings concerned with humans changing relationship to the natural world. Only since the early 1990s, however, has the long-standing interest of literature studies in these matters generated the initiative most commonly known as "ecociritcism", an eclectic and loosely coordinated movement whose contributions thus far have been most visible within its home discipline of literature but whose interests and alliances extend across various art – forms and media. In such areas as the study of narrative and image, ecociriticism converges with its sister disciplines in the humanities : environmental anthropology, environmental history, and environmental philosophy. In the first two sections, we begin with a brief overview of the nature, significance and evolution of literature – environmental studies.

Methodology :
Some depictions of the journey of the environmental concept of the poets of Sanskrit literary works through the natural elements have been analyzed. Some general ideas related to the subject recorded in the Sanskrit texts are examined to come to the conclusion. For supporting the views Sanskrit and others works related to environmental science are used for the study.

Depictions

(I)

Literature and environment studies – commonly called "ecocirticism" or 'environmental criticism' in analogy to the more general term literary criticism – comprise an eclectic, pluriform and cross-disciplinary initiative that aims to explore the environmental dimensions of literature and other creative media in a spirit of environmental concern not limited to any one method or commitment.

Ecocriticism begins from the conviction that the arts of imagination and the study thereof – by virtue of their grasp of the power of word, story and image to reinforce, enliven, and direct environmental concern – can contribute significantly to the understanding of environmental problems : the multiple forms of ecodegradation that afflict planet Earth today. In this, ecocriticism concurs with other branches of the environmental humanities – ethics, history, religious studies, anthropology, humanistic geography – in holding that environmental phenomena must be comprehended and that today's burgeoning array of environmental concerns must be addressed qualitatively as well as quantitatively.

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पतञ्जलिसम्मतः शव्दस्वरूपः स्फोटवादश्च

विश्वजित-पाखिरा सहकारी अध्यापकः(विभागीयप्रधानः), धनियाखालि शरत् सेन्टिनारी महाविद्यालयः
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शव्दतत्त्वविषये आलोचना प्राचीनभारते वैदिकयुगतः प्रचलिता। वेदस्य विविधसूक्ते, व्राह्मणग्रन्थसमूहे, व्याकरणादि वेदाङ्गे, प्रातिशाख्ये, वैदिके च अवैदिके दार्शनिकप्रस्थाने शव्दत्त्वस्य विविधविषयं स्वीकृत्य वेचित्र्यपूर्णालोचनायाः प्रभूतनिदर्शनं आधुनिकभाषातत्त्वविदसम्प्रये विस्मयमिश्रितं प्रशस्तिं लभते। शव्दविद्यायाः सुदीर्घे इतिहासे श्रेष्ठासनं लव्धवान् महाभाष्यकारपतञ्जलिः ।पाणिनिकात्यायनव्याड्यादिनां पूर्वाचार्यानां ग्रन्थसमुहानां आश्रयकृतेन आर्चायेन पतञ्जलिना तस्य शव्दतत्त्वविषयकः अतिगम्भीरः दुरुहदार्शनिकविचारमण्डितः 'महाभाष्यम्' इति ग्रन्थः विरचितः । शव्दतत्त्वस्फोटविषये समीक्षा एव अस्य निवन्धस्य विषयः। आलोचनापूर्वे उक्तं आलोच्य N विशदरूपे समाधातुम - सास्नालाङ्गलककुदखुरविषाणेत्यादीनि द्रवाणि गोशव्दस्य वाच्यानि न भवन्ति। यदि तथा स्यात् तर्हि 'गोः सास्नालाङ्गुलादि' इति भेदाग्राही अनुभवसिद्धः व्यावहारः असम्भवः एव। अतः द्रवं गोशव्दस्यार्थः न । एवं गोः गमनशयनादि क्रियापि गोशव्दस्य अर्थः न । अन्यथा गो गमनशयनादि भेदप्रतियोगि अर्थ न स्यात्। अतः गोशव्दः क्रियावाचकः न। पुनः श्वेतकृष्णलोहितादि गुणाः गो शव्दस्य अभिधेयः न। यतो हि गोः श्वेतकृष्णादि गुणरूपे प्रसिद्धत्वात् उभयोः भेदः अनुभावसिद्धः। तथैव गोत्वंरूपं सामान्यं वा जातिः 'गो' शव्दस्यार्थः नास्ति। यतो गोः गोत्वम् असाधारणधर्मं एवं सर्वसिद्धव्यावहारः उभयोः भेदस्य प्रयोजकः। यदि सामान्यमेव गोशव्दस्यार्थः तर्हि गोत्वमेव गौ इति व्यवहार स्यात्। एवं द्रव्यं वा गुन वा क्रिया वा 'गो' शव्दस्यार्थः तर्हि सास्नादि गौः, श्वेतकृष्णादि गौः, गमनादि गौः इति व्यावहारः स्यात्।

परन्तु एवं व्यावहारः कुत्रापि नास्ति। गौः द्रवस्य वाचकः न, अतः सास्नादि गोशव्दस्य वाच्यः न।अतः द्रव्यगुणक्रियासामान्यम् किमपि पृथकरुपे शव्दस्यार्थः न भवति। भाष्यकारस्य एवं गोशव्दस्यार्थः स्वीकारे आशङ्का भवेत्येव । अतः शङ्कायाः समाधायन् आह महामुनिपतञ्जलिः-

' येनोच्चारितेन सास्नालाङ्गूलककुदखुरविषाणिनां संप्रत्ययो भवति स शव्दः '।[1]

अभिव्यङ्गं स्फोटः एव शव्दः इति ध्वनितः। स्फोटाख्यः शव्दः एव अर्थस्य वाचकः। स्फोटः नित्यशव्दः, स अनादिनिधनः अर्थात् उत्पत्तिविनाशरहितः। स्फोटः स्वप्रकाशः च सर्वव्यापि। वैयाकरणमतानुसारेण स्फोटोख्यः शव्द एव जगतः स्रष्टा। जगऽस्रष्टा निरावयवः अविकृतस्वरूपः परानिष्टितः भूत्वा जगऽरूपं भूतवान्। एष एव शव्दव्रह्मनः विवर्त। तथैव वाक्यपदीयकारः -

"अनादिनिधनं व्रह्म शव्दतत्त्वं यदक्षरम् ।

विवर्ततेऽर्थभावेन प्रक्रिया जगतो यतः ।।[2] इति

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[1] दण्डिस्वामी, दामोदर-आश्रम, पतञ्जल महाभाष्य (पस्पशाह्निक), १४१७ वङ्गाव्द, पृः १४

"व्याकरणस्मृतेरुपयोगिता प्रतिपादने एक समीक्षात्मकम् आलोचनम्"

पार्थ: च्याटार्जी, अतिथि: अध्यापक:(SACT)-धनियाखाली शरत् सेन्टिनारी महाविद्यालय:, हुगली
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भाषा भावस्य वाहिका- इत्युच्यते। भाषा हि लोकस्य सर्वश्रेष्ठनिधिरस्ति। इयं तु अस्माकं सांस्कृतिक-सामाजिक-व्यवहारस्य माध्यमरुपा।

भाषा तदा कालजयी भविष्यति यदा भाषायाः एकं सुसमृद्धं व्याकरणं भविष्यति। यष्टिं विना पङ्गुप्रख्यः यादृशी अवस्था, व्याकरणं विना भाषायाः तादृशी अवस्था भवति। व्याकरणं तु अपराविद्या। वेदात् एव अस्य उत्पत्तिरभवत्। इदं तु वेदाङ्गम्। छान्दोग्योपनिषदि व्याकरणं "वेदानां वेदम्"इत्यभिधीयते।तत्र भाष्यकारेण शङ्कराचार्येण उक्तं च-"वेदानां वेदं व्याकरणम्।"इत्यर्थः।

भाषायाः स्वरुपं सर्वदा परिवर्तते। भाषायाः आधारेण व्याकरणोन्मेषः भवति। अतः भाषायाः प्रयोगाधारेण परिवर्तनाधारेण च अधुना मया व्याकरणशास्त्रपाठस्य प्रयोजनं वर्णितम् ।

शास्त्रपाठपूर्वं शास्त्रपाठस्य प्रयोजनं प्रतिपादनम् अवश्यमेव कर्तव्यम्।कुतः 'प्रयोजनमविज्ञाय न मन्दोऽपि प्रवर्तते।' प्रसङ्गेण 'श्लोकवार्तिके' कुमारिलभट्टेण चोक्तम्-

" "सर्व्वस्यैव हि" "शास्त्रस्य कर्म्मणो वापि" "कस्यचित्।"
"यावत्" "प्रयोजनं नोक्तं तावत् तत् केन" "गृह्यते।।"१"

व्याकरणस्य मुख्यप्रयोजनविषये महाभाष्यकारेण पतञ्जलिनोक्तम् -" "रक्षोहागमलघ्वसन्देहः" "प्रयोजनम्।"२" अत्र पतञ्जलिना व्याकरणपाठस्य मुख्यरुपेण पञ्च प्रयोजनानि उक्तानि।

असाधुशब्देभ्यः साधुशब्दानां ज्ञानमेव व्याकरणशास्त्राध्ययनस्य साक्षात्प्रयोजनभूतम्। महाभाष्यकारः पतञ्जलिः वदति- " "अथ शब्दानुशासनम्।"" ३ पुनः वेदरक्षोहादीनि व्याकरणाध्ययनस्य परम्परासम्बन्धेन मुख्यप्रयोजनानि भवन्ति। महाभाष्यप्रदीपे चोक्तम्-"भाष्यकारो विवरणकारत्वाद् व्याकरणस्य साक्षात्प्रयोजनमाह अथ शब्दानुशासनमिति। प्रयोजनप्रयोजनानि तु रक्षोहादीनि पश्चाद् वक्ष्यति।"४

(१)"तेऽसुराः"(२)"दुष्टः शब्दः"(३)"यदधीतम्"(४)"यस्तु प्रयुङ्क्ते"(५)"अविद्वांसः"(६) "विभक्तिं कुर्वन्ति"(७)"यो वा इमान्"(८)"चत्वारि"(९)"उत त्वः"(१०)"सक्तुमिव"(११)
"सारस्वतीम्"(१२)"दशम्यां पुत्रस्य"(१३)"सुदेवो असि वरुणः"इति ।।(१२)-इमानि शास्त्रवाक्यानि वेदस्य ब्राह्मणग्रन्थेभ्यः उद्धृतानि। एतेभ्यः शास्त्रवाक्येभ्यः व्याकरणाध्ययनस्य आनुषङ्गिकप्रयोजनानि सूचितानि।आगमादयः यथा व्याकरणाध्ययनस्य प्रवर्तकाः तथा 'तेऽसुराः'प्रभृतयः व्याकरणाध्ययनस्य प्रवर्तकाः भवन्ति।म्लेच्छता निवारणमपि व्याकरणाध्ययनस्य प्रयोजनम्। महाभाष्यकारेणोक्तम् - " "तस्माद्" "ब्राह्मणेन न म्लेच्छितवै" "नापभाषितवै," "म्लेच्छो ह वा यदपशब्दः।"" "म्लेच्छा मा भूमेत्यध्येयं" "व्याकरणम्। "तेऽसुराः"५" ।।१३।। महाभाष्यकारः पतञ्जलिः शास्त्रवाक्यानाम् प्रत्येकं प्रथमम् अंशम् उद्धृतवान् पर्यायक्रमेण च तेषां सम्पूर्णोल्लेखपूर्वकं व्याख्यातवान्। अत्र मया व्याकरणाध्ययनस्य परम्परासम्बन्धेन मुख्यप्रयोजनानि लिख्यते।

व्याकरणं वेदपुरुषस्य मुखरुपेण कल्पितमस्ति। पाणिनीयशिक्षायाम् उक्तं च- " "वेदस्य मुखं व्याकरणं स्मृतम्।"" ६ व्याकरणं षट्सु वेदाङ्गेषु प्रधानं च सर्वेषां तपसाम् उत्तमं तपः।"वाक्यपदीये" भर्तृहरिणोक्तम्-

" "आसन्नं" "ब्रह्मणस्तस्य" "तपसामुत्तमं तपः।"
"प्रथमं" "छन्दसामङ्गं प्राहुर्व्याकरणं" "बुधाः।।"७"

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SHORT COMMUNICATION

Diversity of bees in two crops in an agroforestry ecosystem in Kangsabati South Forest Division, Purulia, West Bengal, India

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Abstract: The investigation study assesses the diversity of bees in Brinjal *Solanum melongena* L. and Ridge Gourd *Luffa acutangula* L. crop field from agroforestry ecosystem in South Kangsabati Forest Division, India. The study was carried out in May 2021 to May 2022 that based on transect, focal observation and pan trap samplings. A total of 1,085 individuals were identified during the field work, belonging to three family seven genera (*Apis*, *Tetragonula*, *Xylocopa*, *Ceratina*, *Amegelia*, *Nomia*, and *Megachile*) and seventeen species, the non *Apis* bees (63.78%) were most abundant than *Apis* bees (36.22%). In brinjal, Shannon diversity index of bees is 2.12 and Shannon evenness index is 0.35, whereas, Shannon diversity index in ridge gourd was 1.94 and Shannon evenness index is 0.3. The observations signify greater diversity and population of wild bees. The natural habitat close to agricultural land helps to sustain the diversity and population of wild bees, which enhance the crop quality and yield.

Keywords: Agro forestry, *Apis* bees, eggplant, non *Apis* bees, pollinator, Ridge Gourd, *Tetragonula*, *Xylocopa*.

Now-a-days, agroforestry is an important ecosystem especially in a tropical country and it is an intensive land management system. It consists of agriculture systems and have potential biodiversity conservation sites. The agroforestry ecosystem provide rural livelihood alongside biodiversity conservation in a sustainable land use system. This system is a transitional process from conventional agricultural practices to agro-ecological agricultural practices (Souza et al. 2014). Combination of crops and diverse plants species in forest provide a rich insect diversity due to increased niche diversity than any agro-ecosystems (Stamps & Linit 1998). Heterogeneous agroforestry ecosystem provides floral resources for pollinators (Sinu & Shivanna 2007). Habitat loss and intensification of agricultural practices threaten wild as well as domestic pollinators. Agroforestry ecosystem provides them suitable nesting sites and floral resources, enhancing their pollination services to crops at a landscape level (Sutter 2017; Kay et al. 2019). Bees are the primary pollinators and roughly cover 90% of world plant population (Winfree 2010).

In agriculture land bees are the essential pollinators for pollination as well as crop production. Non *Apis* species are effective pollinators than honey bees (Javorek 2002; Kreman et al. 2002), but they both can together enhance crop production (Greenleaf & Kreman 2006). Brinjal *Solanum melongena* L. and Ridge Gourd *Luffa acutangula* L. are important and widely cultivated crops across the studied area and also bee-attracting vegetable crops. Buzz pollinators are effective pollinators for solanaceous (Brinjal) and cucurbitaceous (ridge gourd) crops. Brinjal flowers have abundance of pollen but to expel the pollen requires vibration by insects called 'buzz pollination'. Wild bees are efficient in buzz pollination than honey bees (Buchmann 1983; Herren & Ochieng 2008). Natural forest is a suitable habitat for wild bees but due to extensive deforestation they are

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Impact of Cluster Development Programme on MSME Sector in West Bengal: An Empirical Study

Rintu Nath

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Keywords: Cluster, CDP, MSMEs, Capacity Building, Academics

Abstract

The MSME sector, which is also considered the backbone of the countryâ€™s manufacturing output, is facing stiff competition from large-scale as well as multinational manufacturers. The Cluster Development Programme (CDP) was introduced by the Ministry of MSME, Government of India in 2007. The CDP acts as a protection mechanism for the second largest employment generating MSME sector. CDP is used to improve the productivity, competitiveness and capacity building of MSMEs. The aim of this study is to examine and assess the impact of Cluster Development Programme on MSME sector, using eight selected clusters in West Bengal as case study. The results of the study show that MSMEs have benefited greatly from CDP. The results could be useful to the MSME department and its policymakers, new entrepreneurs, researchers, as well as government and academic institutions.

Downloads

Download data is not yet available.

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