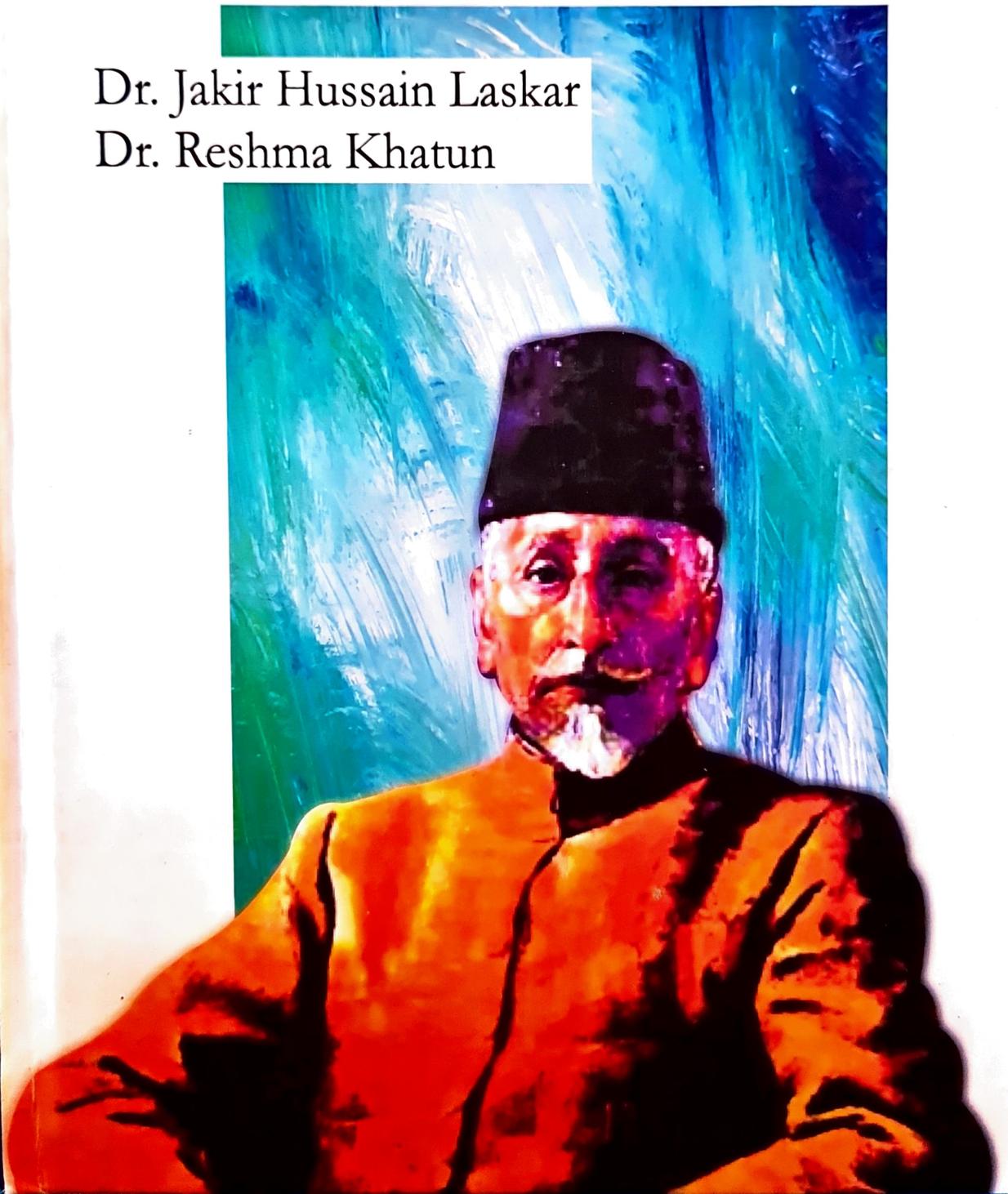


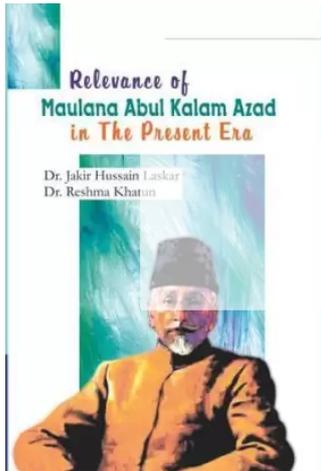
Relevance of
Maulana Abul Kalam Azad
in The Present Era

Dr. Jakir Hussain Laskar
Dr. Reshma Khatun



Contents

- 1. MAULANA ABUL KALAM AZAD: AN INSPIRATION FOR OUR COUNTRY 1**
Mita Banerjee
Marisha Chakrabarti
- 2. INNOVATIVE CONTRIBUTIONS OF MAULANA ABUL KALAM AZAD 7**
Shaheen Sultana
- 3. LIFE AND EDUCATIONAL PHILOSOPHY OF MAULA ABUL KALAM AZAD: CONTRIBUTION AND RELEVANCE IN THE SOCIETY 15**
Jakir Hussain Laskar
Rokaiya Rahaman
- 4. LIFE AND EDUCATIONAL PHILOSOPHY OF MAULANA ABUL KALAM AZAD: CONTRIBUTION AND RELEVANCE IN THE SOCIETY 23**
Enamul Shaikh
- 5. MAULANA ABUL KALAM AZAD'S VISION OF MODERN INDIAN EDUCATION 35**
Paromita Das
- 6. THE SUN THAT NEVER SETS : MAULANA ABUL KALAM AZAD – A LIFE AND LIGHT OF LEARNING 43**
Rekha Nariwal
- 7. MAULANA AZAD: AN EMBODIMENT OF COMMUNAL HARMONY IN INDIAN HISTORY 51**
Sagufta Sahin
- 8. EDUCATIONAL OVERVIEW OF MAULANA ABUL KALAM AZAD: A META ANALYSIS 60**
Ali Hosen Molla
- 9. MAULANA ABUL KALAM AZAD AND HIS POLITICAL CAREER 65**
Sahanaz khatun



Relevance of Maulana Abul Kalam Azad In The Present Era (English, Hardcover Reshma Khatun)

Price: Not Available

Currently Unavailable

Author [Dr. Reshma Khatun](#)

Highlights

- Language: English
- Binding: Hardcover
- Publisher: ABS Books India
- Genre: 0
- ISBN: 9789386088895, 9386088894
- Edition: 2019
- Pages: 166



For every ₹100 Spent,
you earn 2 SuperCoins
Max 50 coins per order

Specifications

Book Details

Book Type Hardcover

Contributors

Author Info Dr. Reshma Khatun is an ardent reader and follower of Education. She believes in disseminating education through innovative ways. She is having Masters in English and Masters in Education. She has done her B.Ed and M.Ed from Sikkim Central University. She has done her Ph.D in

[Read More](#)

Ratings & Reviews

Rate Product

4 ★ 5 ★ 1
2 Ratings & 4 ★ 0
1 Reviews 3 ★ 1
2 ★ 0
1 ★ 0

5 Perfect product!

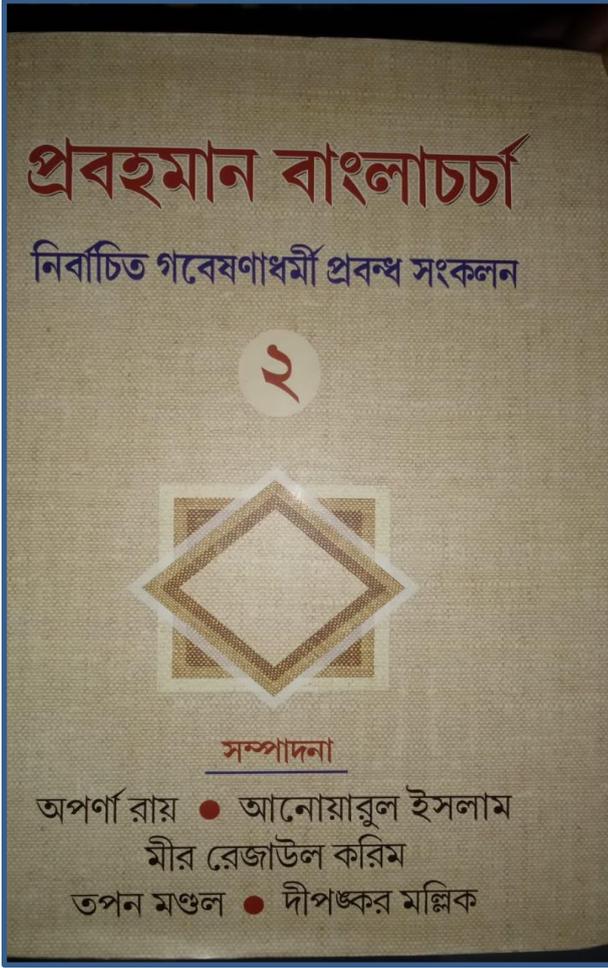
the book in very good and service is very good

soma Sarmina Certified Buyer, Malda May, 2019

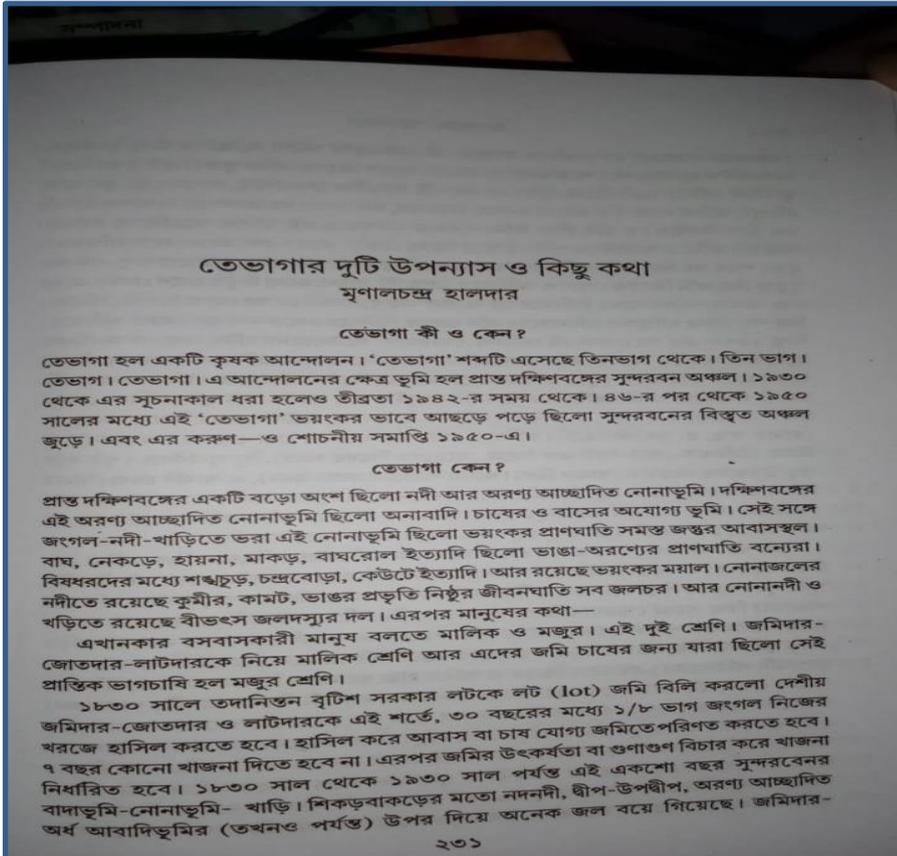
0 0

Chapters of book

1



| | |
|---|-----|
| একাঙ্ক নাটক ও মনোজ মিত্র | ২১৮ |
| অনন্যা বেরা | |
| রেপ পাটিকল : | |
| বাংলা নাটকে সামাজিক ভাবনা ও বিজ্ঞান-চেতনা | ২২৫ |
| শৌলমী রায় | |
| উপন্যাস | |
| তেভাগার দুটি উপন্যাস ও কিছু কথা | ২৩১ |
| মৃগালচন্দ্র হালদার | |
| আশাপূর্ণা দেবীর 'বলয়গ্রাস' উপন্যাসের শৈলী | ২৩৭ |
| অঞ্জলি পাহিক | |
| রবীন্দ্র উপন্যাসে কুটুম : টানা পোড়েনের বিচিত্র অধ্যায় | ২৪৫ |
| সুমন মজুমদার | |
| 'শেষের কবিতা'য় রবীন্দ্রনাথের আত্মনির্মাণ, | |
| অভিনির্মাণ ও আধুনিকদের সাথে তাঁর দ্বন্দ্বপ্রসঙ্গ | ২৫১ |
| উৎপলকুমার মণ্ডল | |
| বাংলাদেশের উপন্যাসে বৃন্দজীবন | |
| ও বৌদ্ধযুগ: রাজনীতি, মতাদর্শ | ২৫৫ |
| ঈশিকা সাহানা | |
| আফসারের কথা, কিসসা এবং আরও কিছু | ২৬১ |
| অমৃতা ভট্টাচার্য | |
| 'আত্মরলতা' : মূল্যবোধহীনতা থেকে নবীনতর | |
| বিশ্বাসের জগতে উত্তরণ | |
| সৌমেন দেবনাথ ও সাবিত্রী নন্দ চক্রবর্তী | |
| হাঁসুলী বীকের উপকথা : লোকসংস্কৃতির উপাদান অন্বেষণ | ২৭৭ |
| গৌরঙ্গ বিশ্বাস | |
| 'তবু আমি এমন একাকী!'—জীবনানন্দের | |
| কথা-সাহিত্যের নায়করা | ২৮৬ |
| শকুন্তলা দাস | |
| জনমানসের কঠোর : নবাবুণ ভট্টাচার্যের কথাসহিত্যে | ২৯৪ |
| পঙ্কজন নন্দর | |
| বঙ্কিমের তুলিতে নারীর রূপ-চিত্রণ : প্রসঙ্গ | ২৯৯ |
| কপালকুণ্ডলা ও মতিবিবি | |



ReMiT: Redundancy Migration for Latency Aware Fault Tolerant Cache Design in Multicore

Avishek Choudhury

Department of Computer Science
New Alipore College, New Alipore,
Kolkata 700053, India
Email: avishek.nac.cs@gmail.com

Brototi Mondal

Department of Computer Science
Sammilani Mahavidyalaya,
Kolkata 700094, India
Email: brototi.snp@gmail.com

Biplab K Sikdar

Department of Computer Science & Technology
Indian Institute of Engineering, Science & Technology
Shibpur, Howrah 711103
Email: biplab@cs.iests.ac.in

Abstract—Power dissipation in Chip Multiprocessors (CMPs) has been addressed by Dynamic Voltage and Frequency Scaling (DVFS). But uncontrolled reduction of voltage supply results in failure of cache cells due to either external particle intervention as soft errors or wearout effects as permanent errors. Several fault protection strategies for CMP cache have been proposed in this regard. But, these techniques fail to ensure complete fault protection with minimum latency. On this outset, this work proposes a redundancy migration strategy that not only ensures complete fault protection without using any auxiliary storage but also incurs minimum latency. Complete fault protection is achieved by remapping to non-conflicting faulty as well as potential non-reusable healthy blocks. Latency is minimized by migrating the redundant blocks towards their home tiles as the healthy blocks nearer to the home tiles gradually become non-reusable. Reusability is calculated by analysing the reuse distance distribution of the cache blocks. Through cycle accurate simulation in Multi2Sim 5.0 simulation framework for CPU-GPU heterogeneous computing, the proposed work claims up to 36.23% improvement in hit ratio and 51.04% improvement in L2 latency compared to the existing techniques.

Keywords—Multicore, Cache, Fault Tolerance, Latency, CMPs

I. INTRODUCTION

Chip Multiprocessors (CMPs) were introduced to deliver high processing power. But due to this massive density and high parallelism, power consumption raised exponentially [1] in CMPs. This became a real problem in the battery operated devices. To resolve this, Dynamic Voltage and Frequency Scaling (DVFS) has been broadly used. But unfortunately, uncontrolled voltage scaling results in cell failure in SRAM [2]. Also due to the faulty fabrication, these multicore chips became vulnerable to either transient or intermittent errors, due to external particle induced noises, or permanent errors due to wearout failures for aging. Cache, holding the most significant chip area, becomes susceptible to failure and restricts the threshold voltage supplied to the system [3]. Thus fault tolerance mechanisms, to ensure error free execution is extremely important as voltage scaling is indispensable.

Several fault resilient strategies have been proposed in the literature. A complete in-place fault remapping technique has

also been reported [16]. However, none of these techniques have considered the latency overhead due to fault remapping in remote cores. To ensure complete fault protection, faulty blocks must be remapped to remote cache banks. And as many blocks remapped to remote cache banks, their access latency from the requesting core increases, affecting the overall latency and performance of the system. Thus, if the degree of fault protection is increased, the latency is also increased due to remapping of large number of faulty blocks to remote banks. And if the degree of fault protection is lowered, latency is scaled down due to lesser number of faults remapped to remote banks. A simple optimization technique can be applied to balance the degree of fault protection and latency overhead for an optimum system performance. But in that case, the completeness of fault protection is harmed and the performance is bottlenecked at a local maxima. To overcome this issue, a technique is required that gives complete fault protection with minimum latency globally. This is what the proposed work concentrates in.

The main contributions of this work are: 1) Identification of the potential non-reusable blocks using the reusability prediction dynamically at run time by analysing their reuse distance distribution in regular intervals [14], 2) Remapping of the faulty blocks to the non-conflicting faulty blocks first and then in potential non-reusable blocks if no non-conflicting blocks are found, 3) Migrating the remapped blocks towards their home tiles, after certain intervals, on some new healthy blocks that become non-reusable in time.

Simulation of the proposed fault protection strategy and the existing ones is done on an Hexacore CMP architecture results in upto 36.23% improvement in hit ratio and upto 51.04% decrease in latency of the last level cache in ReMiT over existing fault tolerance strategies. The simulation is done in Multi2Sim 5.0 framework for CPU-GPU heterogeneous computing with plethora of fault maps. For evaluation, programs from the SPLASH-2 and PARSEC 3.0 benchmark suites have been considered.

II. RELATED WORK

Different fault tolerance techniques have been proposed at different levels. Fault resilient approaches for the traditional 6T (6 transistors) SRAM cell as well as 8T, 10T, 11T [4]

cells and the 10T SRAM cell based on Schmidt trigger are proposed at the circuit level. System level approaches include the Error Correcting Codes (ECC) [5]. Though, for large number of faults, multiple bit ECC are required incurring complex decoders with huge decoding and storage overhead.

There are also disability based fault tolerance techniques that disables the faulty cache parts (ways, sets, blocks or sub-blocks) are studied in [6, 7, 8]. But with increasing faulty cache parts, it incurs additional misses. The Redundancy based techniques reduce the number of misses by keeping redundant copies of the cache blocks or sub-blocks. Redundant strategies work by using redundant blocks in the cache [9], or a small fully associative spare cache [10] or by using a victim cache [11].

Another technique i.e. worth mentioning is REMEDIATE [12] which is a scalable fault resilient policy uses non-conflicting faulty blocks to hold data of faulty blocks and forms correct data if merged together. But, it fails to give complete protection as at most half of the faulty cache blocks can be used as targets in the best case.

Another fault resilient replacement strategy is proposed [13] based on a spatial footprint prediction mechanism but for only 2-way associative faulty caches. Another fault tolerant (re)mapping strategy is worth mentioning i.e. CIFR [16] that ensures a complete in-place fault remapping strategy.

III. THE REMIT

The goal of proposed fault tolerance technique is the remapping of faulty cache blocks in such a way that the complete fault resiliency can be achieved with minimum latency. To lower the remapping overhead, the potential reusable faulty blocks are identified by analysing their reuse distance distribution. Only the potential reusable faulty blocks are probed to be remapped to either non-conflicting faulty blocks or non-reusable healthy blocks for ensuring complete fault protection. For latency minimization, redundant blocks are migrated towards their home tiles on some non-reusable healthy blocks as the reusable blocks close to their home tiles become non-reusable with time.

A. Fault detection

Both the hard and soft faults are identified in this work. Permanent faults are detected using BIST at boot time and fault map is generated accordingly. For soft error detection, ECC is used. Periodic checking of ECC is done to detect errors and to perform the remapping as well as update the access map accordingly.

B. Fault protection

Once the faults are detected, the following steps are followed to ensure fault protection to the potential reusable faulty blocks.

1) *Potential Dead Block detection*: The potential dead blocks are identified by analysing the reuse distance distribution of the cache blocks. For selection of the reusable faulty blocks, for protecting and non-reusable healthy blocks

as redundancies, reusabilities of both the faulty as well as healthy blocks are analysed.

The reusability is measured according to the study reported in [14] which estimates the future behavior by observing the reuse distance of the cache blocks. The number of accesses to a cache set between two accesses to the same cache line is called the Reuse Distance (RD). The distribution of these reuse distances, called the Reuse Distance Distribution (RDD), is observed i.e. an unique signature of any program for a specific cache configuration. The RDD is analysed to select a reuse distance that increases hit ratio of the cache with minimal cache pollution. This RD is called Protecting Distance (PD).

The reuse distance that covers most of the cache lines in terms of their reuse is called the protecting distance (PD). It is a single value used for all blocks but kept individually for all blocks. A block is protected for PD accesses.

2) *Fault Remapping*: Once the reuse distances of all the blocks are analysed and potential reusable faulty as well as non-reusable healthy blocks are identified, the following steps are followed for fault remapping.

a) *Map in same set on non-conflicting faulty blocks* : Faulty blocks that are detected as live are tried to be replicated to non-reusable faulty blocks in same set. Two blocks not containing faults in same positions are called non-conflicting. Data is remapped on both of them and they together form the correct data. On successful remapping, both the target bit of the target line and mapped bit of the faulty line are set. For a block, if the remapped bit is not set and the target bit of the target block is not set, then only the block is remapped.

b) *Map in different set of distant tile on non-Conflicting faulty blocks* : Faulty blocks that are reusable are remapped to non-conflicting faulty blocks of different set in different bank if they could not be remapped in previous steps. Data recovery and bit modifications are same as (a).

c) *Map in same set on healthy blocks that are non-reusable*: BLocks that are faulty and not remapped in previous steps are remapped to non-reusable healthy blocks in the same set. An upper limit on the number of healthy remapped blocks is maintained to reserve sufficient space per set to keep data for normal execution. A block is only remapped when its remapped bit is not set. The faulty block can be remapped even if its target bit is set as the healthy block can itself deliver the correct data. For successful remapping, the mapped bit of the faulty block is set along with the target bit of the healthy line is set.

d) *Map in different set at distant tile on healthy blocks that are non-reusable*: Faulty blocks which are not remapped using any of the above steps are tried for remapping to blocks that are healthy and in different set of different bank. Constraint on threshold and bit modifications are same as (c).

C. Fault migration

The execution starts with the faulty blocks mapped on the faulty blocks that are not conflicting with each other. After the protecting distance, the faulty blocks that are yet to be mapped to the faulty blocks not conflicting with each other,

are probed to be remapped to the dead healthy blocks. Blocks remapped to the remote tiles incur the latency overhead.

To minimize the latency, the faulty blocks that had been remapped to the dead healthy blocks in remote tiles, are migrated to the dead healthy blocks in tiles nearer to the home tiles and the access map is updated accordingly after every Protecting Distance. The non-conflicting faulty blocks that had been used for remapping are still kept as the target blocks to maintain the effective capacity of the cache.

IV. EVALUATION

The proposed technique is simulated in Multi2Sim 5.0 simulator that is modeled for multicore architecture. Programs in PARSEC 3.0 and SPLASH-2 benchmark suites are used to compare the performances of ReMiT over existing fault tolerant techniques.

A. System configuration

For simulation in the multicore environment, the Multi2sim is configured with 16 cores of x86 instruction set architecture. There is private L1 cache and shared L2 cache with all the cores. L1 cache is configured with 8 sets and 16 ways with block size 512B. LRU is used for page replacement policy and NMOESI cache coherence protocol is used with write back policy. Data latency is set as 2 units.

All cores share the L2 cache, connected with L1 caches. L2 is also configured same as L1 with 8 sets and 16 ways with block size 512B. But data latency for L2 is set at 20 units. For page replacement, Reuse Distance based page replacement policy [15] is used with writeback.

The main memory is also configured similarly with data access latency as 200 units.

B. Experimental results

The proposed latency aware fault migration technique (ReMiT) is simulated alongside with the existing error resilient strategies. The hit ratio and the latency are analysed to compare the performances of ReMiT over the existing policies. 17 possible cases of faulty ways beginning with 0 faulty blocks among 16 blocks to 16 faulty blocks out of 16 blocks are have been considered.

The results of simulating the program called *fft* is given here. It does fourier transformation on a vector.

1) *Hit Ratios of ReMiT vs existing techniques:* Table I shows the hit ratios in different error resilient strategies along with ReMiT.

The first column shows the number of faulty blocks. The second, third and fourth column shows the hit ratios for REMEDIATE, CIFR and the ReMiT fault remapping strategies respectively.

Fig. 1 shows the hit ratios in different error resilient techniques.

Few results of Comparison of hit ratio in different strategies for different benchmarks are shown in Fig. 2 to Fig. 4:

Figure 2, 3 and 4 show the hit ratios for different benchmark programs like Vips, Facesim and Bodytrack with increased

TABLE I
HIT RATIO IN FAULT TOLERANCE TECHNIQUES

| Faulty ways | REMEDiate | CIFR | ReMiT |
|-------------|-----------|-------|-------|
| 0 | 0.532 | 0.584 | 0.665 |
| 1 | 0.529 | 0.583 | 0.660 |
| 2 | 0.522 | 0.564 | 0.653 |
| 3 | 0.511 | 0.551 | 0.635 |
| 4 | 0.473 | 0.559 | 0.635 |
| 5 | 0.465 | 0.542 | 0.617 |
| 6 | 0.454 | 0.517 | 0.598 |
| 7 | 0.405 | 0.516 | 0.575 |
| 8 | 0.398 | 0.496 | 0.547 |
| 9 | 0.416 | 0.476 | 0.543 |
| 10 | 0.416 | 0.479 | 0.539 |
| 11 | 0.368 | 0.475 | 0.535 |
| : | : | : | : |
| 15 | 0.327 | 0.251 | 0.457 |
| 16 | 0.285 | 0.264 | 0.418 |

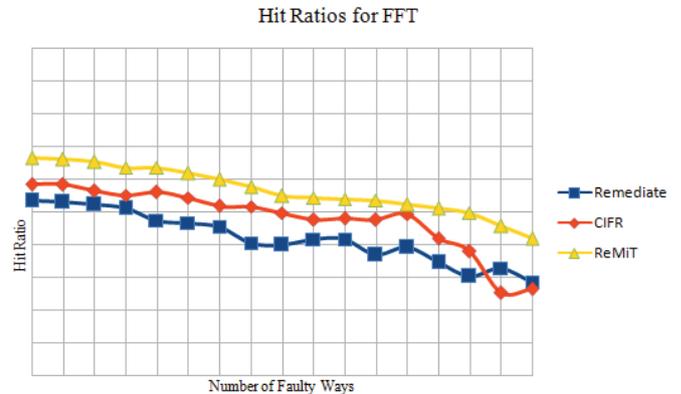


Fig. 1. Comparison of hit ratio for *fft*

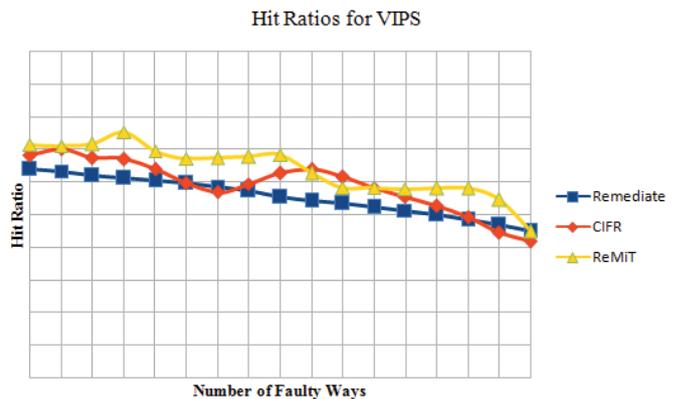


Fig. 2. Comparison of hit ratio for *vips*

number of faulty blocks. It is conclusive from these figures that ReMiT out performs the existing fault tolerance techniques.

2) *Latency of proposed technique vs existing techniques:* Table II show the l2 latencies in different fault tolerance

Hit Ratios for FACESIM

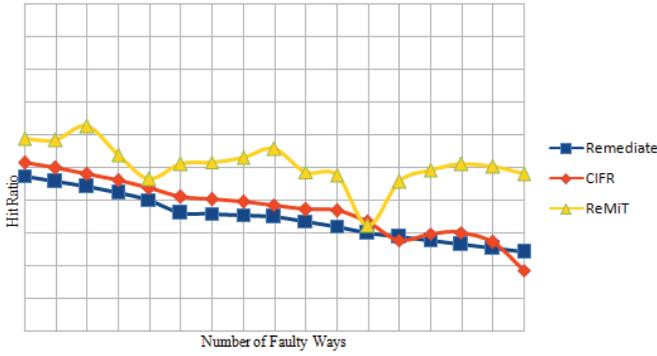


Fig. 3. Comparison of hit ratio for facesim

Hit Ratios for BODYTRACK

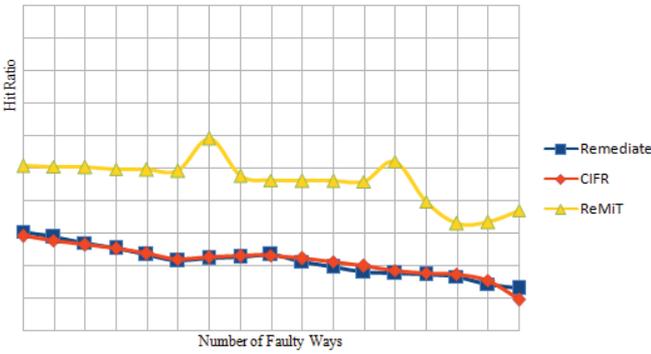


Fig. 4. Comparison of hit ratio for bodytrack

techniques along with ReMiT. The first column contains the number of faulty blocks. The second, third and fourth column represents the latency in REMEDIATE, CIFR and in ReMiT respectively.

TABLE II
L2 LATENCY IN FAULT TOLERANCE TECHNIQUES

| Faulty ways | REMEDiate | CIFR | ReMiT |
|-------------|-----------|-------|-------|
| 0 | 19480 | 19560 | 9633 |
| 1 | 19240 | 18600 | 9412 |
| 2 | 19491 | 19640 | 9201 |
| 3 | 18441 | 19640 | 9002 |
| 4 | 17844 | 18440 | 9220 |
| 5 | 16360 | 18200 | 9100 |
| 6 | 16240 | 17440 | 8700 |
| 7 | 14244 | 17320 | 8500 |
| 8 | 14080 | 16640 | 8320 |
| 9 | 15040 | 15720 | 8040 |
| 10 | 15080 | 16080 | 8160 |
| 11 | 12800 | 16040 | 8021 |
| : | : | : | : |
| 15 | 11720 | 6120 | 6260 |
| 16 | 9880 | 8880 | 4540 |

Latencies in different techniques are given in Fig. 5. It shows the results of simulating the program fft in Hexacore architecture.

Latencies for FFT

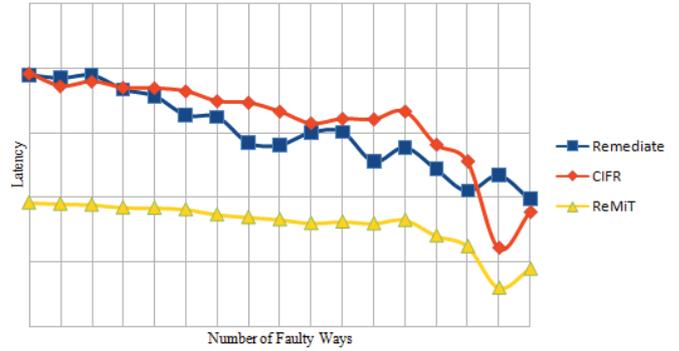


Fig. 5. Comparison of Latency for fft in different fault tolerance techniques

Few results of comparison of latency for other benchmarks vips, facesim and bodytrack are shown in Figure 6, 7 and 8 respectively.

Latencies for VIPS

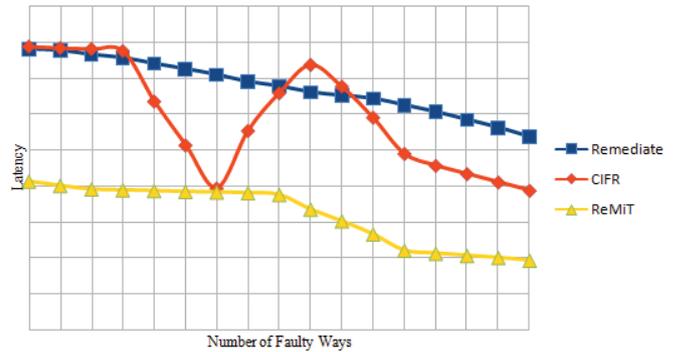


Fig. 6. Comparison of latency for vips in different fault tolerance techniques

Latencies for FACESIM

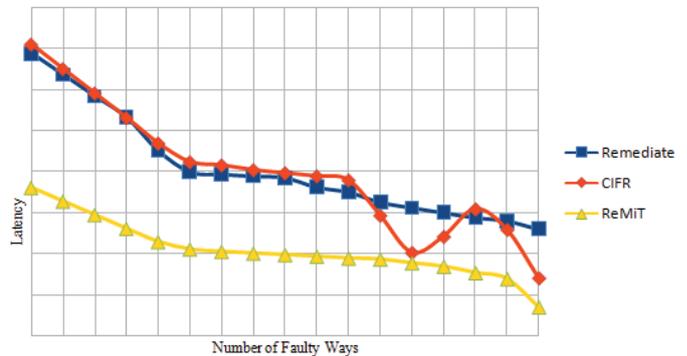


Fig. 7. Comparison of latency for facesim in different fault tolerance techniques

Latencies for BODYTRACK

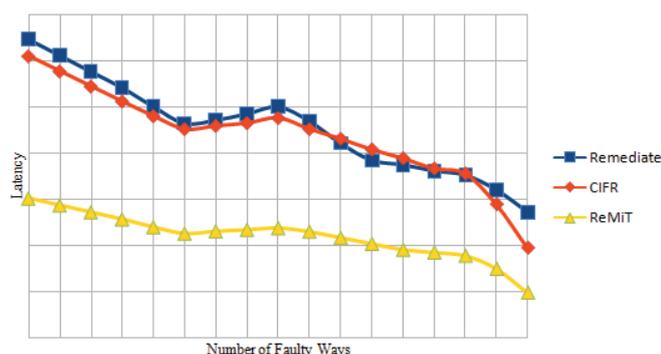


Fig. 8. Comparison of latency for bodytrack in different fault tolerance techniques

From all these figures, it can be concluded that the ReMiT outperforms the existing error resilience strategies.

C. Analysis

The hit ratios observed in Fig. 1 to Fig. 4 can be analysed as follows:

- 1) The hit ratio is similar for all healthy ways as it is due to routine caching with all healthy ways and there is no effect of any fault protection strategy.
- 2) The hit ratio in REMEDIATE is low for all faulty ways as it remaps few faulty blocks on some faulty blocks not conflicting with each other and which can be at most 50% in best case. CIFR also gives similar result as all the ways are faulty and healthy ways can't be used to act as remapping targets. But ReMiT gives better result for its Reuse Distance based replacement policy.
- 3) Within the lower and upper bound of faulty ways, REMEDIATE shows lower hit ratio as few of the faulty blocks are remapped to other non-conflicting faulty blocks. The CIFR performs better than REMEDIATE but converges with REMEDIATE with increasing number of faulty blocks due to dearth of healthy ways where as ReMiT outperforms other techniques.

The latencies observed in Fig. 5 to Fig. 8 can be analysed as follows:

- 1) The latencies of REMEDIATE and CIFR are higher and equally large memory access is observed for all healthy ways due to no initiative taken for latency minimization. ReMiT gives lower result as it migrates to nearer healthy non-reusable blocks.
- 2) When all the ways are faulty, latency in REMEDIATE and CIFR converges as no healthy block exists to give advantage to CIFR for better result but in ReMiT, latency is low as it can migrate reusable faulty blocks to non-reusable healthy blocks nearer to the home tile.
- 3) , The latency of CIFR is higher than REMEDIATE between the upper and lower bounds of the faulty ways due to its complete remapping and less amount of memory access. But ReMiT again outperforms others

with its migration power nearer to the home tile.

V. CONCLUSION

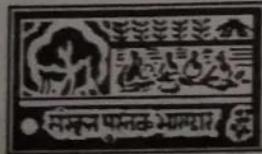
In this work, a migration policy is proposed that ensures better error resiliency without harming effective cache capacity. ReMiT maintains significantly lower latency and higher hit rate over the existing error resilient strategies even with increased number of faults. ReMiT sustains higher hit ratio and lower latency by using the reuse distance based cache replacement policy. Simulation shows that the ReMiT can ensure upto 36.23% improvement in hit ratio in average and 51.04% improvement in latency of the last level cache over the existing fault resilient policies.

REFERENCES

- [1] T. Skotnicki, J. Hutchby, T.-J. King, H.-S. Wong, and F. Boeuf, *The end of cmos scaling: toward the introduction of new materials and structural changes to improve mosfet performance*, Circuits and Devices Magazine, IEEE, vol. 21, no. 1, pp. 16–26, jan.-feb. 2005.
- [2] A. Banaiyanmofrad, H. Homayoun, N Dutt, *Using a Flexible Fault-Tolerant Cache to Improve Reliability for Ultra Low Voltage Operation*, ACM Transactions on Embedded Computing Systems, Vol. 14, No. 2, Article 32, Publication date: February 2015
- [3] H. R. Ghasemi, et al., *Low-voltage on-chip cache architecture using heterogeneous cell sizes for multi-core processors*, IEEE International Symposium on High-Performance Computer Architecture, pages 3849, February 2011
- [4] F. Moradi, D. Wisland, S. Aunet, H. Mahmoodi, and T. Cao, *65nm-sub-threshold 11t-sram for ultra low voltage applications*, Intl. Symposium on System-on-a-Chip, pages 113118, Sept. 2008.
- [5] S. Lin and D. J. Costello, *Error Control Coding (2nd Edition)*, Prentice Hall, 2004.
- [6] S. Ozdemir et al., *Yield-Aware Cache Architectures*, Proc. Of Intl. Symposium on Microarchitecture, 2006.
- [7] F. Pour and M. D. Hill, *Performance implications of tolerating cache faults*, Trans. on Computers, 1993.
- [8] G. Sohi, *Cache Memory Organization to Enhance the Yield of High-Performance VLSI Processors*, Trans. on Computers, 1989.
- [9] A. Ansari et al., *Enabling ultra low voltage system operation by tolerating on-chip cache failures*, Proc. of Intl. Symposium on Low power electronics and design, 2009.
- [10] H.T. Vergos and D. Nikolos., *Performance Recovery in Direct-Mapped Faulty Caches via the Use of a Very Small Fully Associative Spare Cache*, Proc. of Intl. Computer Performance and Dependability Symposium, 1995.
- [11] N. Ladas, Y. Sazeides, and V. Desmet, *Performance-Effective Operation below Vcc-min*, Proc of Intl Symposium on Performance Analysis of Systems & Software, 2010.
- [12] A. BanaiyanMofrad et al., *REMEDiate: a scalable fault-tolerant architecture for low-power NUCA cache in tiled CMPs*, Proc. IGCC, 2013.
- [13] G. Keramidas, M. Mavropoulos, A. Karvouniari & D. Nikolos, *Spatial pattern prediction based management of faulty data caches*, Proceedings of ACM Conference on Design, Automation & Test in Europe, 2014.
- [14] N. Duong et al., *Improving cache management policies using dynamic reuse distances*, in Proceedings of the 45th Annual IEEE/ACM International Symposium on Microarchitecture, 2012.
- [15] G. Keramidas, P. Petoumenos, and S. Kaxiras, *Cache replacement based on reuse-distance prediction* in Proceedings of the 25th International Conference on Computer Design, 2007.
- [16] A. Choudhury and Biplab K. Sikdar, *CIFR: A Complete In-Place Fault Remapping Strategy for CMP Cache using Dynamic Reuse Distance* in Proceedings of the 7th International Conference on Embedded Computing and System Design, ISED 2017.

Women in Ancient India : Myriad Voices

Edited by
Mau Das Gupta



SANSKRIT PUSTAK BHANDER
38, Bidhan Sarani, Kolkata-6

Published by :
Sri Debasish Bhattacharya
SANSKRIT PUSTAK BHANDAR
38, Bidhan Sarani, Kolkata-700 006

First Published : 2018

Price : Rs. 400.00

ISBN : 978-93-87800-33-5

Laser Print :
Binapani Laser Print
Kolkata-700 114

Cover artist :
Nabin Saha

Printed by :
Orient Press
Kolkata 700 006

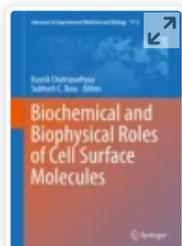
| | | |
|--|---|------------|
| 25. | Unique Characteristics of Devī Bhavānī. in Śaṅkarācārya's <i>stotras</i> Pranati Jana | 213 |
| 26. | उत्तररामचरिते नारीणामुत्तरणम् Poulomi Saha | 218 |
| 27. | कौटिलीये अर्थशास्त्रे नारीकल्याणभावना Debashree Mahapatra | 226 |
| 28. | न मनुर्नारीः द्वेष्टि Prasanta Karmakar | 232 |
| Women in Narrative Literature : | | 243 |
| 29 | Ladies-in-Waiting: A Psycho-social Study of Women in Pañcatantra Ananya Mitra | 245 |
| 30. | Characterization of Woman in the <i>Śūkasaptatikathā</i> Ashoke Mukherjee | 257 |
| 31. | Glimpses of Ethical Values, as Introspected Through Some Women Characters in <i>Sekaśubhodayā</i> Parthasarathi Bhattacharya | 261 |
| 32. | An Illustrative Approach to the Study of Women in Sanskrit Buddhist Narrative Literature Kakali Ghosh | 272 |
| 33. | Position of Ordinary Women and Almswomen in Budhist Era Sutapa Ray | 282 |
| 34. | Depiction of Women Donors in the image Inscriptions of the Pāla Rulers Noor Bano Sattar | 287 |
| Contributors list | | 303 |

Glimpses of Ethical Values, as Introspected Through Some Women Characters in Sekaśubhodayā

Parthasarathi Bhattacharya

Backdrop:

Man has the greatest gift of intelligence. The gift made him independent. But such independence depends on mutual correspondence and cohabitation addressing the source of ethics and morality. Morality is a system of principles and values concerning people's behaviour, which is generally accepted by a society or by a particular group of people. Without these human life is a bird without feathers or a ship without rudder. Society means where we live together. There is no concept of society without Man because Humanity is inseparably woven with social fabric. Values determine the line of demarcation between us and beast. We often remember the proverbial saying in Bengali - '*vanyerā vane sundar(a) śiśurā māṭṛkroḍe*' i.e. the wild life is the perfect foil to wild nature (forest) whereas; a child suits the mother's lap. How the concept of values in society emerged and evolved issues further contention. In fact the scholars are divided into two. One is of the opinion that it is an innate process while the second considers it as the process of imitation. At the beginning a child tends to imitate his/her parent's (especially mother's) activities. Gradually when grown up, society and surroundings play a vital role to nurture the behaviour compatible with maturation both physically and



Book | © 2018

Biochemical and Biophysical Roles of Cell Surface Molecules

[Home](#) > [Book](#)**Editors:** [Kausik Chattopadhyay](#), [Subhash C. Basu](#)

Provides comprehensive updates on the major advances in the field of membrane biology research

Explains concepts in a lucid manner, using actual in-depth laboratory data on cell-surface molecules

Covers topics ranging from the role of cell surface receptors in neurobiology to infectious diseases

Part of the book series: [Advances in Experimental Medicine and Biology](#) (AEMB, volume 1112)

43k Accesses | **173** Citations | **9** Altmetric

Editors and Affiliations

Centre for Protein Science, Design and Engineering, Department of Biological Sciences, Indian Institute of Science Education and Research (IISER) Mohali, Mohali, India

Kausik Chattopadhyay

Department of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, USA

Subhash C. Basu

[Back to top ↑](#)

About the editors

Dr. Kausik Chattopadhyay is an Associate Professor in the Department of Biological Sciences at the Indian Institute of Science Education and Research Mohali (IISER Mohali). He received his PhD degree in Biochemistry from the Calcutta University in 2004, and subsequently completed his post-doctoral research with Prof. Stanley G. Nathenson at the Department of Microbiology and Immunology at the Albert Einstein College of Medicine, Bronx, New York, USA. He joined IISER Mohali as an Assistant Professor in 2009, and became Associate Professor in 2014. His research interests focus on understanding the structure-function mechanisms of membrane-damaging, bacterial, pore-forming toxins, and their implications for the host-pathogen interaction processes and immunity. He received the prestigious National BioScience Award for Career Development for the year 2014, awarded by the Department of Biotechnology, Ministry of Science &

Technology, Government of India for his work in this area.

Dr. Subhash C. Basu is an Emeritus Professor at the University of Notre Dame (UND), Department of Chemistry and Biochemistry and also the president of the CDDRF (Cancer Drug Delivery Research Foundation). He received his PhD degree in Biochemistry in 1966 from the University of Michigan and was a Helen Hay Whitney Research Fellow (1966-70) under Professor Saul Roseman at the Johns Hopkins University. He joined both the teaching and research faculty at the UND in 1970 and became a Full Professor and Chairman of the Biochemistry, Biophysics and Molecular Biology program in 1983. He was awarded a D.Sc. degree in Biochemistry from the University of Calcutta, India in 1976. He received the Jacob Javits Neuroscience Research Award from NIH (1989-98), and the S. C. Roy Medal of Achievement Award from the University of Calcutta, India in 1990. He was elected to the prestigious Johns Hopkins Honor Society in 1995. He has been an elected fellow of the American Association for the Advancement of Sciences (FAAAS) since 1988. He received the "NRI-2015 Award" Trophy in the International Professional category from the respected *India Times* newspaper in April 2015.

[Back to top ↑](#)

Bibliographic Information

| Book Title | Editors | Series Title |
|---|---------------------------------------|---|
| Biochemical and Biophysical Roles of Cell Surface Molecules | Kausik Chattopadhyay, Subhash C. Basu | Advances in Experimental Medicine and Biology |
| DOI | Publisher | eBook Packages |

<https://doi.org/10.1007/978-981-13-3065-0> Springer Singapore
[Biomedical and Life Sciences](#),
[Biomedical and Life Sciences \(R0\)](#)

| | | |
|---|---|---|
| Copyright Information | Hardcover ISBN | eBook ISBN |
| Springer Nature Singapore Pte Ltd. 2018 | 978-981-13-3064-3 Published: 25 January 2019 | 978-981-13-3065-0 Published: 12 January 2019 |

| | | |
|--------------------|----------------------|-----------------------|
| Series ISSN | Series E-ISSN | Edition Number |
| 0065-2598 | 2214-8019 | 1 |

| | | |
|------------------------|--|---|
| Number of Pages | Number of Illustrations | Topics |
| XI, 363 | 60 b/w illustrations, 85 illustrations in colour | Membrane Biology , Cell Physiology , Regenerative Medicine/Tissue Engineering , Biomedical Engineering/Biotechnology , Microbiology |

[Back to top](#) ↑



A Glycomic Approach Towards Identification of Signature Molecules in CD34⁺ Haematopoietic Stem Cells from Umbilical Cord Blood

Suchandra Chowdhury, Kaushik Bhattacharya, Chandan Mandal, Susmita Mondal, Sayantani Sarkar, Sarmila Chandra, Subir Banerjee, and Chitra Mandal

Abstract

Umbilical cord blood (UCB) is a powerful storehouse for normal CD34⁺ haematopoietic stem cells (HSCs), often used for allogeneic bone marrow (BM) transplantation in malignant and non-malignant diseases. The glycomic especially the sialoglycomic aspect of these HSCs has been unravelled in this study. Cell surface expression of the glycans with the related enzymatic activities has been compared with the BM of childhood acute lymphoblastic leukaemia, a common BM-associated malignancy. An enhanced cell surface expression of α 2,3-linked sialic acid, P- and E-selectins, and intercellular adhesion molecule along with reduced expression of L-selectin distinguishes CD34⁺ HSCs of UCB from leukaemic samples. More importantly, high expression of *O*-acetylated sialoglycoproteins, a hallmark of lymphoblasts, is drastically reduced in the CD34⁺ HSCs of UCB and is substantiated by

the low activity of sialylate-*O*-acetyltransferase and high sialidase activity. In contrast, a significant variation is evident in the expression of sialic acid, α 2,6-linked sialic acids, and the sialyltransferase activity. Taken together, these studies indicate a few signature molecules, forming a unique glycomic template, which may be a potential indicator, reassuring the normal profile of these stem cells, to be used for future transplantation.

Keywords

CD34⁺ haematopoietic stem cell · Glycomics · Sialic acid · Cell adhesion molecules · Sialylate-*O*-acetyltransferase · Sialidase

21.1 Introduction

Allogeneic haematopoietic stem cell (HSC) transplantation has provided curative therapy for severe bone marrow (BM)-related malignant and non-malignant diseases in patients. However, only a few of them have the option of a human leukocyte antigen (HLA) identical sibling donor. Substantial advances in the use of alternative donors like unrelated volunteer donors and umbilical cord blood (UCB) donors enable almost all patients to benefit from this life-saving treatment. Nevertheless, each donor type has its own demerits (Chowdhury et al. 2014; Hough et al. 2009).

S. Chowdhury · K. Bhattacharya · C. Mandal · S. Mondal · S. Sarkar · C. Mandal (✉)
Cancer Biology and Inflammatory Disorder Division,
Council of Scientific and Industrial Research
(CSIR)-Indian Institute of Chemical Biology, Kolkata,
India
e-mail: cmandal@iicb.res.in

S. Chandra
Clinical Haematology Service, Kolkata, India

S. Banerjee
Department of Anaesthesiology and critical care, Medical
College and Hospital, Kolkata, India

The problems inhibiting the wider use of alternative donors are the probability of identifying a 'suitable' donor, the speed with which a graft can be acquired, and the risk of graft-versus-host disease. Since UCB stem cells are the simplest to collect, allowing greatest flexibility in HLA matching (Chowdhury et al. 2014; Hough et al. 2009), therefore, at present, the strategy of expanding the potential donor pool involves transplantation with UCB, which maintains an acceptable level of treatment-related complications (Brown and Boussiotis 2008).

Following this success, UCB banks have been established to facilitate UCB transplants (Hough et al. 2009) that offer parents the opportunity to store UCB for possible future use for their child or other family members. These banks have grown rapidly across the world with a cumulative repository (Chowdhury et al. 2014; Hollands and McCauley 2009).

A plethora of studies has been conducted to investigate the *in vitro* and *in vivo* characterization of UCB cells, with the ultimate goal of optimizing and increasing their clinical use. Several approaches have been initiated to understand the phenotypic, biochemical, and biological properties of these cells (Satomaa et al. 2009). However, the profile of these HSCs from the glycomic especially sialoglycomic aspect has never been satisfactorily explored till date.

Carbohydrates are essential constituents of glycoproteins, glycolipids, and proteoglycans (Satomaa et al. 2009). Among them, sialic acids, a family of 9-carbon carboxylated monosaccharides, have diverse modifications (Schauer 2000; Mandal et al. 2000). Commonly modified derivatives like *O*-acetylated sialoglycoproteins (Neu5,9Ac₂-GPs) (Sinha et al. 1999a, 1999b; Pal et al. 2004; Chowdhury et al. 2007, 2008; Chowdhury and Mandal 2009) and *O*-acetylated sialoglycolipids (9-*O*AcGD3) (Mukherjee et al. 2007) are well-established cancer-associated antigens. They influence numerous biological reactions by reacting with specific surface receptors or via masking of carbohydrate recognition sites (Schauer 2000; Mandal et al. 2000). The cellular sialic acid content is metabolically regulated and controlled by several

enzymes, main contributory ones being sialate-*O*-acetyltransferase (SOAT), sialyltransferase, and sialidase (Mandal et al. 2000, 2010; Mondal et al. 2009).

In addition, selectins (L, E, and P; CD62) along with some cell surface adhesion molecules (CAMs), namely, intercellular adhesion molecule (ICAM-1) and vascular cell adhesion molecule (VCAM-1), play fundamental roles in numerous cellular processes like growth, differentiation, embryogenesis, immune cell transmigration, and cancer metastasis (Chowdhury et al. 2007).

With this background information, the main aim of this study has been to explore the status of sialic acids and CAMs, including selectins, on the HSCs isolated from UCB. In parallel, the orchestration of the three main enzymes regulating the overall sialylation of these HSCs has also been investigated. A major characteristic of these HSCs is the phenotypic expression of CD34 antigen (Storms et al. 2005). Therefore, for this investigation, the haematopoietic cells expressing CD34 have been selected as the study population. Since childhood acute lymphoblastic leukaemia (ALL) is an impairment of HSC maturation, the BM of these patients at diagnosis, i.e. before treatment and in clinical remission (CR), has been used for comparison throughout (George et al. 2001).

To the best of our knowledge, this sialoglycomic approach reports for the first time a pattern of signature molecules on the CD34⁺ HSCs of UCB. The lower expression of *O*-acetylated sialoglycoproteins along with the higher expression of α 2,3-linked sialic acids, on these cells, gives an extra level of restriction, forming the blueprint, distinguishing them from the leukaemic cells. This finding has been substantiated by the respective enzymatic activities. Additionally, an enhanced cell surface expression of P- and E-selectins and ICAM-1 along with a diminished expression of L-selectin is observed. Interestingly, these parameters are completely different in diagnostic ALL samples. Taken together, this glycomic template can serve as a potential indicator, reassuring the normal profile of these stem cells, to be used for future transplantation.

21.2 Materials and Methods

21.2.1 Study Subject

Human UCB samples (~20 ml, n = 15) were collected from healthy full-term neonates in Alsevers' solution, immediately after delivery by gravitation. Additionally, BM samples from clinically confirmed childhood ALL patients at diagnosis (BM_{ALL}, n = 15) and in CR (BM_{CR}) were used for comparison. The Institutional Human Ethical Committee as per the protocol of the Indian Council of Medical Research approved the study. Samples were collected with informed consent from parents/guardians.

21.2.2 Flow Cytometric Detection of Sialic Acids and Different Adhesion Molecules in CD34⁺ Cells of UCB

Mononuclear cells (MNCs) were isolated from all different clinical samples separately and processed as described earlier (Chowdhury et al. 2008). Briefly, cells (1×10^6) were incubated with PE-CD34 and FITC conjugated/biotinylated/unconjugated analytical probes comprising a lectin/monoclonal antibody (mAb), at 4 °C for 1 h in dark. Using appropriate FITC secondary antibodies or streptavidin, stained cells were analysed in FACSCalibur using CellQuest Pro software (BD Biosciences, USA). Fifty thousand

events were analysed by gating the nucleated cells (R1, Fig. 21.1a).

FITC conjugated lectin, Achatinin-H having a preferential affinity towards Neu5,9Ac₂α2-6β-D-GalNAc and recognizing Neu5,9Ac₂-GPs, was used (Mandal et al. 2000; Sinha et al. 1999a, 1999b; Pal et al. 2004; Chowdhury et al. 2007, 2008; Chowdhury and Mandal 2009). Additionally, FITC-*Limulus polyphemus* agglutinin (LPA) and two biotinylated plant lectins, namely, *Maackia amurensis* agglutinin (MAA) and *Sambucus nigra* agglutinin (SNA) having specificity towards Neu5Ac, Neu5Acα2-3Gal, and Neu5Acα2-6Gal/GalNAc, respectively, were used (Vector Laboratories). The selectins (L, E, and P), ICAM-1, and VCAM-1 were probed with anti-CD62L, anti-CD62E, anti-CD62P, anti-CD54, and anti-CD106 mAbs, respectively. Anti-CD62E and anti-CD54 were detected using FITC-streptavidin (BD Biosciences, USA). Purified anti-CD62P, anti-CD62L, and anti-CD106 were detected using FITC-anti-murine IgG (Chowdhury et al. 2007).

21.2.3 Functional Characterization of the CD34⁺ Cells of UCB Using Aldehyde Dehydrogenase (ALDH)

Viable CD34⁺ cells expressing cytosolic ALDH were identified by flow cytometry using Aldefluor reagent (Stemcell Technologies Inc., Canada) as

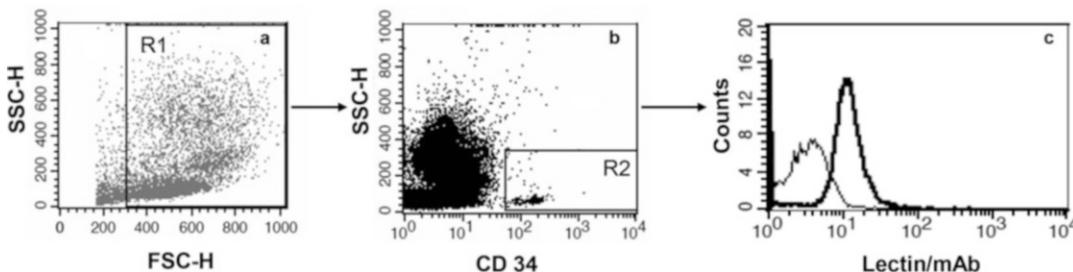


Fig. 21.1 Phenotypic identification of the study population in umbilical cord blood (UCB) showing status of a specific antigen. A representative dot plot with forward (FSC-H) versus side (SSC-H) scatter, showing the region gated for the haematopoietic cells (HSCs), designated as

R1 (a). Dot plot showing cells in R1, gated for positive expression of CD34 antigen (R2, b). Cells in R2 assessed in a representative histogram plot presenting the log fluorescence intensity of a representative probe used for the study (c)

per the manufacturer's instruction. Briefly, MNCs (1×10^6) were suspended in ALDEFLUOR assay buffer. The activated Aldefluor substrate was added, and half of this cell suspension was transferred to a tube containing diethylaminobenzaldehyde (DEAB), a specific inhibitor of ALDH that serves as control. Samples were incubated for 30 min at 37 °C for optimum enzyme activity and analysed in a flow cytometer.

21.2.4 Detection of the Activity of Enzymes Responsible for Sialylation in CD34⁺ Populations of UCB

The activities of the three main enzymes regulating sialylation were determined by isolating the CD34-enriched population from MNCs of UCB samples using magnetic columns (Stemcell Technologies Inc., Canada). For comparison, these assays were repeated in parallel with the CD34⁺ cells of BM_{ALL} and BM_{CR}. The activity was determined using cell lysate prepared by sonication of $1-2 \times 10^6$ cells in the water on ice (Mandal et al. 2009).

21.2.5 Sialate-O-Acetyltransferase (SOAT)

Bovine submaxillary mucin known to contain Neu5,9Ac2 α 2-6 β -D-GalNAc was de-O-acetylated and used as the exogenous acceptor. Cell lysate and [³H]AcCoA were used as enzyme source and donor, respectively. Briefly, cell lysate (60 μ g), de-O-AcBSM, and [3H]AcCoA (10 μ l, 0.05 μ Ci, 2.4 μ M) in 10 μ l buffer containing Tris-HCl (10 mM, pH 7.0), KCl (150 mM), and MgCl₂ (1 mM) in a total volume of 100 μ l were incubated at 37 °C for 1 h. The reaction was stopped with ice-cold perchloric acid (PCA, 10%). After centrifugation the precipitated protein was washed with ice-cold PCA (4%). The washed protein was dissolved in NaOH and incubated overnight at 25 °C. The protein solution was then neutralized, and radioactivity was measured in a scintillation counter (Packard

Bioscience Company, USA). In the control tube, the buffer was used instead of the enzyme source (Mandal et al. 2009).

21.2.6 Sialyltransferase Activity

In this assay (Mondal et al. 2009), the reaction mixture consisting of cell lysate (125 μ g, enzyme source), asialofetuin (acceptor), 0.25 mCi CMP-¹⁴Sia (donor, Amersham Bioscience, Germany), 50 nmol CMP-Sia, 1 mM DANA (2,3-dihydro-2-deoxy-NeuAc, an inhibitor of sialidase, Calbiochem), and 50 mM cacodylate buffer (0.10% triton X-100, 10 mM MnCl₂, 150 mM NaCl, pH 6.5) in a total final volume 100 μ l was incubated at 37 °C for 1 h and processed as above.

21.2.7 Sialidase Activity

The total sialidase activity was determined by using 4-MU-Neu5Ac as the substrate. The reaction mixture of the assay contained cell lysate (100 μ g), 4-MU-Neu5Ac (30 nmole), and BSA (15 μ l, 40 μ g/ml) in sodium acetate buffer (50 mM, pH 4.6). After incubation at 37 °C for 1 h, the reaction was terminated with glycine/NaOH buffer (1.5 ml, 0.2 M, pH 10.8). Assays were performed in triplicate in a final volume of 100 μ l. Fluorescence emission was measured on fluorimeter (PerkinElmer) with excitation at 365 nm and emission at 450 nm as discussed earlier (Mandal et al. 2010).

21.2.8 Statistical Analysis

Statistical analysis was performed using the GraphPad Prism software program (GraphPad Software Inc., CA). Results were expressed as mean \pm SD for each individual set of experiment. Two-tailed *P* value for unpaired *t* test (*P*) < 0.05 was considered significant.

21.3 Results and Discussion

21.3.1 Physical and Functional Parameters Defining the HSCs of UCB

The CD34 antigen is a 110–115 kDa transmembrane sialoglycoprotein, expressed by early haematopoietic progenitor cells with the highest expression on the most immature stem cells (George et al. 2001). Incidentally, a large percentage of acute leukaemias are CD34⁺ (Krause and Van Etten 2007).

Since cell surface CD34 is a well-established marker to identify the HSC population, we have studied exclusively those cells with phenotypic expression of CD34 antigen. The nucleated cells have been gated as R1 (Fig. 21.1a) and analysed in a dot plot where the CD34⁺ cells are designated as R2 (Fig. 21.1b). Flow cytometric analysis of the percentages of CD34⁺ cells revealed considerable statistical differences among the three sets of samples studied. CD34⁺ HSCs of UCB were significantly low (4–10%) as compared to BM_{ALL} (~75%), whereas CD34⁺ cells of BM_{CR} samples were 1–5% as expected.

The phenotypic expression of CD34 has been supported by the co-expression of ALDH in the CD34⁺ cells (Fig. 21.2). Since the activity of intracellular ALDH is highest in the HSCs, in contrast to lymphocytes, the former can be easily identified based on this differential expression

(Storms et al. 2005). Cells in the ALDH⁺ region (R2, Fig. 21.2b) had more than 90% expression of CD34 (Fig. 21.2c), attesting to the functional activity and viability of the selected study population.

21.3.2 Differential Pattern of Sialylation on the CD34⁺ HSCs of UCB as Compared to CD34⁺ Cells from BM_{ALL} and BM_{CR}

Following the characterization of the study population (CD34⁺ALDH⁺ cells, Fig. 21.1c), we investigated the diversity of sialic acid derivatives in these cells (Fig. 21.3; Table 21.1). BM_{ALL} represent the diseased population with which comparison has been drawn. In contrast, the patients in CR are declared to be clinically asymptomatic and have been used in this study, as a substitute for the normal BM.

A close association exists between childhood ALL and Neu5,9Ac₂-GPs. The latter is overexpressed at the onset of the disease, followed by reduced expression with treatment in CR and reappearance with relapse (Mandal et al. 2000; Sinha et al. 1999a, 1999b; Pal et al. 2004; Chowdhury et al. 2007; Chowdhury et al. 2008; Chowdhury and Mandal 2009). In this study, cell surface expression of linkage-specific Neu5,9Ac₂-GPs on CD34⁺ HSCs of UCB is

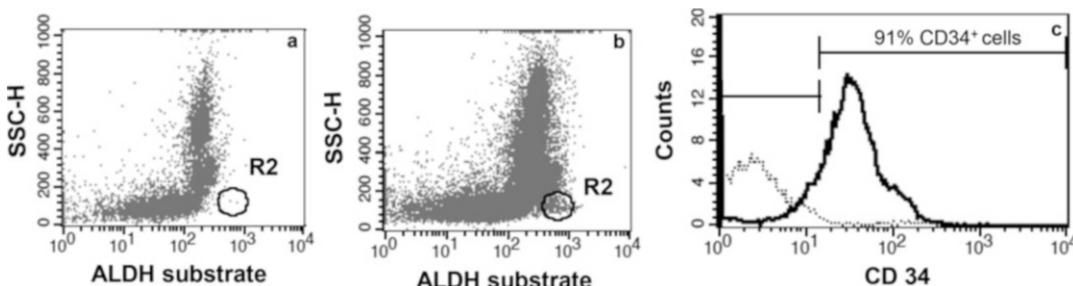


Fig. 21.2 Functional identification of CD34⁺ HSCs of UCB with aldehyde dehydrogenase (ALDH) activity. Cells in R1 (Fig. 21.1a) were analysed in a dot plot with FL1-H versus SSC for control setting of Aldefluor assay, as per manufacturer's instruction. FL1 contains the DAAA, a fluorescent substrate for ALDH, where the

reaction has been blocked by DEAB to adjust R2 such that no events appear in the R2 region. This setting served as a control for subsequent analyses (a). In UCB sample, the R2 region was positive for cells with high ALDH activity (ALDH⁺, b). ALDH⁺ cells in R2 plotted in a histogram, with CD34, revealed >90% CD34⁺ cells (c)

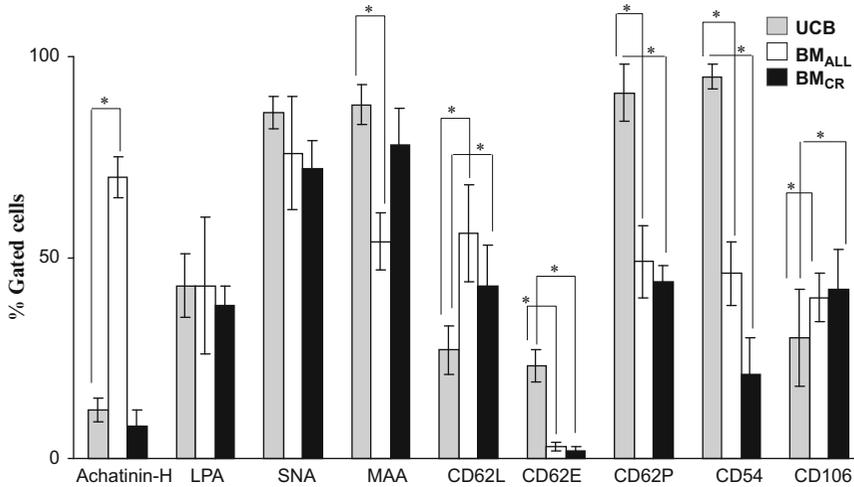


Fig. 21.3 Expression of sialic acid and its derivatives along with cell adhesion molecules on CD34⁺ cells of UCB as compared to BM_{ALL} at diagnosis and BM_{CR} in clinical remission. CD34⁺ cells (gated as shown in Fig. 21.1a–b) from the aforesaid samples were analysed by two-colour flow cytometric analysis. Bar depicts the mean \pm SD of the percentage of cells expressing

sialoglycoproteins and adhesion molecules as evidenced by binding with fluorescence-tagged lectins (Achatinin-H, LPA, SNA, and MAA) and specific mAbs against adhesion molecules (CD62L, CD62E, CD62P, CD54, and CD106). * $P < 0.05$ indicates a significant difference between two test groups

minimal as detected by FITC-Achatinin-H. In contrast, the percentage of Neu5,9Ac₂-GPs⁺ cells was very high in BM_{ALL} (~sixfold more than the former, Table 21.1), while it is significantly low in BM_{CR} as reported earlier [11–14]. Since this expression is comparable to that of BM_{CR}, therefore, the lower expression of this disease-associated antigen is a hallmark describing the CD34⁺ HSCs of UCB.

In contrast to the expression of Neu5,9Ac₂-GPs, the α 2,3-linked sialic acid content (Neu5Ac α 2-3Gal⁺ cells), as identified by MAA, is significantly more (~1.6-fold more) in CD34⁺ cells of UCB samples, as compared to the BM_{ALL} samples, confirming it as a marker with down-regulated expression in BM-associated malignancy, in this case childhood ALL (Table 21.1). Therefore, an elevated level of α 2,3-linked sialic acid can also serve as a potent indicator of the normal CD34⁺ HSCs of UCB.

Contrary to the differential expression of Neu5,9Ac₂-GPs and Neu5Ac α 2-3Gal, the percentage of cells having cell surface sialoglycoproteins with terminal Neu5Ac α 2-6Gal/GalNAc, as detected using SNA, had statistically

insignificant variation between UCB and diseased samples (Table 21.1). Similarly, the total sialic acid content (ranging between 35 and 51%, Table 21.1) in the CD34⁺ cells of UCB/BM_{ALL}/BM_{CR} is not significantly different from each other as detected by FITC-LPA. Therefore, total Neu5Ac or α 2,6-linked sialic acid content does not hold promise as a potential biomarker for normal HSCs.

21.3.3 Differential Expression of CAMs Along with Selectins on the CD34⁺ Cells of UCB, BM_{ALL}, and BM_{CR}

CAMs play a vital role in the initial steps of leukocyte trafficking and can be grouped into four major families including the immunoglobulin (Ig) superfamily CAMs, integrins, cadherins, and selectins. Among these, selectins mainly leukocyte endothelial CAMs (LECAMs) are a family of carbohydrate-binding proteins which bind fucosylated carbohydrates, especially sialylated Lewis^x and mucins. The three selectins are

Table 21.1 Cell surface molecular profile and enzymatic activities of CD34⁺ HSCs of UCB compared to CD34⁺ cells of BM_{ALL} and BM_{CR}

| Parameters | | CD34 ⁺ cells | | |
|---|---|-------------------------|-------------------|------------------|
| | | UCB | BM _{ALL} | BM _{CR} |
| ^a Sialic acids and derivatives | Neu5,9Ac ₂ α2-6β-D-GalNAc | 12 ± 3 | 70 ± 5 | 8 ± 4 |
| | Neu5Ac | 43 ± 8 | 43 ± 17 | 38 ± 5 |
| | Neu5Acα2-6Gal/GalNAc | 86 ± 5 | 76 ± 7 | 72 ± 9 |
| | Neu5Acα2-3Gal | 88 ± 4 | 54 ± 14 | 78 ± 7 |
| ^a Cell adhesion molecules | L-selectin/LECAM-1/CD62L | 27 ± 6 | 56 ± 12 | 43 ± 10 |
| | E-selectin/LECAM-2/CD62E | 23 ± 4 | 3 ± 1 | 2 ± 1 |
| | P-selectin/LECAM-3/CD62P | 91 ± 7 | 49 ± 9 | 44 ± 4 |
| | ICAM-1/CD54 | 95 ± 3 | 46 ± 8 | 21 ± 9 |
| | VCAM-1/CD106 | 30 ± 12 | 40 ± 6 | 42 ± 10 |
| ^b Enzymes | Sialate- <i>O</i> -acetyltransferase (SOAT) (<i>pmole/min</i> × <i>mg</i> protein) | 0.55 ± 0.02 | 0.84 ± 0.03 | 0.46 ± 0.02 |
| | α2,6 sialyltransferase (ST6Gal I) (<i>pmole/min</i> × <i>mg</i> protein) | 0.48 ± 0.03 | 0.57 ± 0.04 | 0.40 ± 0.04 |
| | Sialidase (<i>nmole/min</i> × <i>mg</i> protein) | 2.7 ± 0.1 | 0.3 ± 0.08 | 2.81 ± 0.09 |

^aExpression in terms of percent positive cells; ^benzymes regulating the overall sialylation of cells; UCB umbilical cord blood, BM_{ALL} bone marrow (BM) at diagnosis of childhood acute lymphoblastic leukaemia (ALL), BM_{CR} BM of childhood ALL patients in clinical remission

leukocyte (L)-, endothelial (E)-, and platelet (P)-selectins (Chowdhury et al. 2007).

In addition to the linkage-specific sialic acids, the selectins also provide a different sketch on the CD34⁺ HSCs of UCB (Fig. 21.3, Table 21.1). Among the existing selectins studied here, E-selectin is exclusively expressed on the CD34⁺ HSCs of UCB (~eightfold more) in contrast to negligible expression in BM_{ALL} and BM_{CR} samples. This significantly higher manifestation of E-selectin, therefore, can be utilized as a steadily expressing stem cell antigen.

L-selectin⁺ cells showed considerable difference between all the three sets of samples studied. CD34⁺ HSCs of UCB have the least amount of L-selectin⁺ cells, significantly less (~twofold less) than BM_{ALL} and BM_{CR} samples. Consequently, this basal level of expression of L-selectin on CD34⁺ HSCs of UCB, in contrast to over expression in diseased samples, can serve as an emblem for normal HSCs.

Analogous to the previous selectins, P-selectin does not exhibit a significant variation between BM_{ALL} and BM_{CR} samples. However, this expression becomes twofold more in the CD34⁺ HSCs of UCB rendering it to be another indicator of these cells.

The Ig superfamily CAMs (ICAM-1 and VCAM-1) are calcium-independent transmembrane glycoproteins (Chowdhury et al. 2007). Interestingly, the ICAM-1 expression is extremely high in the CD34⁺ cells from UCB, being twofold and fourfold more than that of BM_{ALL} and BM_{CR}, respectively (Table 21.1). Owing to this extremely significant variation in this expression in UCB, the potential of ICAM-1 as a biomarker of normal HSCs can be ensured. The CD34⁺ cells of UCB had the least expression of VCAM-1 as compared to more CD34⁺ cells in BM_{ALL}, and BM_{CR}, but statistically, insignificant difference rules out this antigen to be used as a marker of normal stem cells.

21.3.4 Lower Sialate-*O*-Acetyltransferase (SOAT) in CD34⁺ Cells of UCB Compared to BM_{ALL}

The nascent sialoglycoconjugates are modified by SOAT which transfer the acetyl group from acetyl-coenzyme A onto sialoglycoconjugates. We have demonstrated that the enhanced activity of SOAT is responsible for the transfer of the *O*-

acetyl group to the sialic acid of glycoproteins in leukaemic cells (Mandal et al. 2009). In this study, the status of the enzymes regulating *O*-acetylated sialic acid was evaluated in all three populations (Fig. 21.4a, Table 21.1). In the CD34⁺ cells of UCB, the SOAT activity was significantly less (~twofold) than that of CD34⁺ cells of BM_{ALL} while almost similar to that of BM_{CR}. This finding supports the previously assured lower expression of cell surface Neu5,9Ac₂-GPs in UCB. Thus both the enzyme activity and the antigen expression show a trait opposite to the leukaemic blasts and hence can be used for the nomenclature of normal CD34⁺ HSCs from UCB.

21.3.5 α 2,6-Sialyltransferase Activity (ST6Gal I) Remains Almost Unaltered in the CD34⁺ Cells

Sialyltransferase belongs to the enzyme class which adds sialic acid residues to sialoglycoproteins and sialoglycolipids during their biosynthesis. β -Galactoside α 2,6-sialyltransferase (ST6Gal I) is the only sialyltransferase having the capability of adding sialic acid in α 2,6-linkage to Gal β 1,4GlcNAc, a sequence commonly found in *N*-linked chains of glycoproteins (Mondal et al. 2009). ST6Gal I activity in CD34⁺ HSCs of UCB

did not exhibit significant variation from the CD34⁺ cells of BM_{ALL} and BM_{CR} samples. Thus, like the total α 2,6-linked sialic acid content, the ST6Gal I activity cannot be used as an indicator of normal HSCs.

21.3.6 Higher Sialidase Activity in CD34⁺ Cells from UCB Compared to BM_{ALL}

Sialidase removes sialic acids during sialoglycoconjugate degradation (Mandal et al. 2010). In the CD34⁺ cells of UCB, the sialidase activity is significantly higher than that of the BM_{ALL} samples while almost comparable with that of BM_{CR}-derived CD34⁺ cells (Fig. 21.4b, Table 21.1). Hence this high activity of the sialidase can be used as a specific indicator of normal HSCs.

Thus, the low expression of Neu5,9Ac₂-GPs is corroborated by the low activity of SOAT in CD34⁺ HSCs of UCB. Similar expression of α 2,6-linked sialic acids in UCB has been supported by analogous sialyltransferase activity while the high activity of sialidase accounts for the comparable sialic acid expression on CD34⁺ HSCs of UCB. Hence, the synchronized activities of the aforesaid enzymes maintain the cell surface

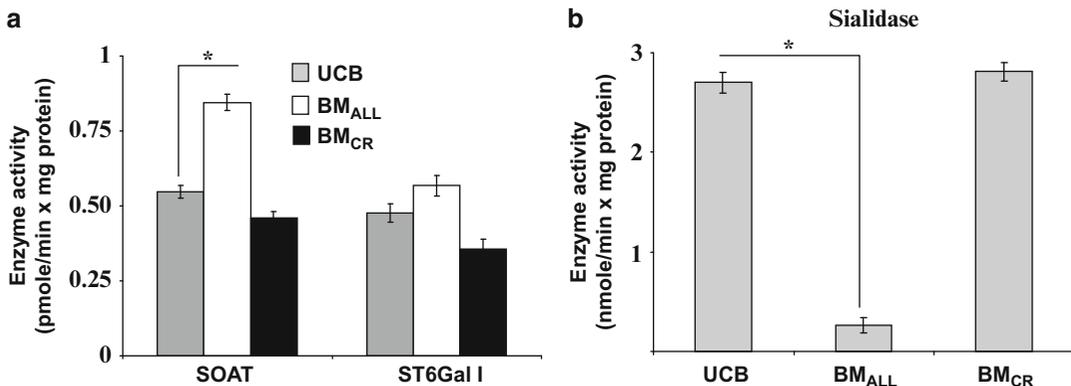


Fig. 21.4 Modulation of activities of sialate-*O*-acetyltransferase (SOAT), α 2,6-sialyltransferase (ST6Gal I), and sialidase in CD34⁺ cells of UCB as compared to BM_{ALL} and in BM_{CR}. Enzyme activities were determined using cell lysates as enzyme sources, and the reactions were performed in duplicate. **P* < 0.05, a

significant difference between two test groups. (a) The enzyme activities were evaluated in pmole/min \times mg protein and represented as mean \pm SEM. (b) The enzyme activity was evaluated in nmole/min \times mg protein and represented as mean \pm SEM

expression of the respective sialic acid derivatives.

21.4 Conclusion

O-Acetylated sialic acids play a multifaceted role in childhood ALL (Pal et al. 2004; Chowdhury et al. 2007; Mukherjee et al. 2008, 2009; Ghosh et al. 2005a, 2005b, 2007). The exclusive expression of two *O*-acetylated sialoglycoproteins (120 and 90 kDa) and their impaired immunological functions reflect their disease association. In contrast, normal lymphocytes have a minimal expression of 144 and 36 kDa Neu5,9Ac2-GPs with the low affinity towards Achatinin-H (Pal et al. 2004). The splendour of the present study is the lower expression of these *O*-acetylated sialoglycoproteins confirmed by the low SOAT activity in the CD34⁺ HSCs of UCB attesting to their normal characteristics. Therefore, the profile of *O*-acetylated sialoglycoproteins in UCB is a unique outcome in this investigation. Additionally, the status of other molecules along with linkage-specific sialic acids on CD34⁺ HSCs of UCB, in contrast to CD34⁺ BM_{ALL}, also reassures their normal profile. Based on these observations, the established sialoglycopattern of normal CD34⁺ HSCs of UCB opens up an unconventional avenue to monitor these cells before transplantation, thereby deserving special attention in clinical therapeutics.

Acknowledgement This work received financial support from the CSIR, New Delhi, Govt. of India. CM sincerely acknowledges the financial support from JC Bose National Fellowship (DST) and Distinguished Biotechnology Research Professor (DBT).

References

Brown JA, Boussiotis VA (2008) Umbilical cord blood transplantation: basic biology and clinical challenges to immune reconstitution. *Clin Immunol* 127:286–297
 Chowdhury S, Mandal C (2009) *O*-acetylated sialic acids: multifaceted role in childhood acute lymphoblastic leukaemia. *Biotechnol J* 4:361–374

Chowdhury S, Bandyopadhyay S, Chandra S, Mandal C (2007) Comparative analysis of differential expression of sialic acids and adhesion molecules on mononuclear cells of bone marrow and peripheral blood in childhood acute lymphoblastic leukaemia at diagnosis and clinical remission. *Indian J Biochem Biophys* 44:357–365
 Chowdhury S, Bandyopadhyay S, Mandal C, Chandra S, Mandal C (2008) Flow-cytometric monitoring of disease-associated expression of 9-*O*-acetylated sialoglycoproteins in combination with known CD antigens, as an index for MRD in children with acute lymphoblastic leukaemia: a two-year longitudinal follow-up study. *BMC Cancer* 8:40
 Chowdhury S, Chandra S, Mandal C (2014) 9-*O*-acetylated sialic acids differentiating normal haematopoietic precursors from leukemic stem cells with high aldehyde dehydrogenase activity in children with acute lymphoblastic leukaemia. *Glycoconj J* 31 (6–7):523–535
 George AA, Franklin J, Kerkof K, Shah AJ, Price M, Tsark E, Bockstoe D, Yao D, Hart N, Carcich S, Parkman R, Crooks GM, Weinberg K (2001) Detection of leukemic cells in the CD34(+)CD38(–) bone marrow progenitor population in children with acute lymphoblastic leukemia. *Blood* 97:3925–3930
 Ghosh S, Bandyopadhyay S, Pal S, Das B, Bhattacharya DK, Mandal C (2005a) Increased interferon gamma production by peripheral blood mononuclear cells in response to stimulation of overexpressed disease-specific 9-*O*-acetylated sialoglycoconjugates in children suffering from acute lymphoblastic leukaemia. *Br J Haematol* 128:35–41
 Ghosh S, Bandyopadhyay S, Mallick A, Pal S, Vlasak R, Bhattacharya DK, Mandal C (2005b) Interferon gamma promotes survival of lymphoblasts overexpressing 9-*O*-acetylated sialoglycoconjugates in childhood acute lymphoblastic leukaemia (ALL). *J Cell Biochem* 95:206–216
 Ghosh S, Bandyopadhyay S, Mukherjee K, Mallick A, Pal S, Mandal C, Bhattacharya DK, Mandal C (2007) *O*-acetylation of sialic acids is required for the survival of lymphoblasts in childhood acute lymphoblastic leukemia (ALL). *Glycoconj J* 24:17–24
 Hollands P, McCauley C (2009) Private cord blood banking: current use and clinical future. *Stem Cell Rev Rep* 5:195–203
 Hough R, Cooper N, Veys P (2009) Allogeneic haemopoietic stem cell transplantation in children: what alternative donor should we choose when no matched sibling is available? *Br J Haematol* 147 (5):593–613
 Krause DS, Van Etten RA (2007) Right on target: eradicating leukemic stem cells. *Trends Mol Med* 13:470–481
 Mandal C, Chatterjee M, Sinha D (2000) Investigation of 9-*O*-acetylated sialoglycoconjugates in childhood acute lymphoblastic leukaemia. *Br J Haematol* 110:801–812

- Mandal C, Srinivasan GV, Chowdhury S, Chandra S, Mandal C, Schauer R, Mandal C (2009) High level of sialate-*O*-acetyltransferase activity in lymphoblasts of childhood acute lymphoblastic leukaemia (ALL): enzyme characterization and correlation with disease status. *Glycoconj J* 26:57–73 and references therein
- Mandal C, Tringali C, Mondal S, Anastasia L, Chandra S, Venerando B, Mandal C (2010) Down regulation of membrane-bound Neu3 constitutes a new potential marker for childhood acute lymphoblastic leukemia and induces apoptosis suppression of neoplastic cells. *Int J Cancer* 126(2):337–349
- Mondal S, Chandra S, Mandal C (2009) Elevated mRNA level of hST6Gal I and hST3Gal V positively correlates with the high risk of pediatric acute leukemia. *Leuk Res* 34(4):463–470
- Mukherjee K, Chowdhury S, Mondal S, Mandal C, Chandra S, Bhadra RK, Mandal C (2007) 9-*O*-acetylated GD3 triggers programmed cell death in mature erythrocytes. *Biochem Biophys Res Commun* 362:651–657
- Mukherjee K, Chava AK, Mandal C, Dey SN, Knip B, Chandra S, Mandal C (2008) *O*-acetylation of GD3 prevents its apoptotic effect and promotes survival of lymphoblasts in childhood acute lymphoblastic leukaemia. *J Cell Biochem* 105:724–734
- Mukherjee K, Chava AK, Bandyopadhyay S, Mallick A, Chandra S, Mandal C (2009) Co-expression of 9-*O*-acetylated sialoglycoproteins and their binding proteins on lymphoblasts of childhood acute lymphoblastic leukemia: an anti-apoptotic role. *Biol Chem* 390:325–335
- Pal S, Ghosh S, Bandyopadhyay S, Mandal C, Bandyopadhyay S, Bhattacharya DK, Mandal C (2004) Differential expression of 9-*O*-acetylated sialoglycoconjugates on leukemic blasts: a potential tool for long-term monitoring of children with acute lymphoblastic leukemia. *Int J Cancer* 111:270–277
- Satomaa T, Heiskanen A, Mikkola M, Olsson C, Blomqvist M, Tiittanen M, Jaatinen T, Aitio O, Olonen A, Helin J, Hiltunen J, Natunen J, Tuuri T, Otonkoski T, Saarinen J, Laine J (2009) The N-glycome of human embryonic stem cells. *BMC Cell Biol* 10:42 and references therein
- Schauer R (2000) Achievements and challenges of sialic acid research. *Glycoconj J* 17:485–499
- Sinha D, Mandal C, Bhattacharya DK (1999a) Identification of 9-*O* acetyl sialoglycoconjugates (9-OAcSGs) as biomarkers in childhood acute lymphoblastic leukaemia using a lectin, AchatininH, as a probe. *Leukemia* 13:119–125
- Sinha D, Mandal C, Bhattacharya DK (1999b) A novel method for prognostic evaluation of childhood acute lymphoblastic leukemia. *Leukemia* 13:309–312
- Storms RW, Green PD, Safford KM, Niedzwiecki D, Cogle CR, Colvin OM, Chao NJ, Rice HE, Smith CA (2005) Distinct hematopoietic progenitor compartments are delineated by the expression of aldehyde dehydrogenase and CD34. *Blood* 106:95–102

Cognizance
The New Vistas of
Education & Psychology

Vol. I

Edited by
Prabir Ghosh



- LOCATING STUDENT VOICE IN UNIVERSITIES:
THE THREE IDEAS OF THE UNIVERSITY AND
EDUCATION FOR DEMOCRACY 99
Monika Maini
- CONTINUOUS AND COMPREHENSIVE
EVALUATION IN MATHEMATICS 109
Medhavi Saini
- AN ATTITUDINAL COMPARISON BETWEEN
INCLUSIVE SCHOOLS AND COLLEGES 120
Dr. Runa Biswas, Roshni Mukherjee
- GENDER AND ECOLOGICAL DIFFERENCE ON
ANXIOUS AND WITHDRAWN DEPRESSED
EMOTIONAL PROBLEMS AMONG KHASI-JAINTIA
ADOLESCENTS OF MEGHALAYA 132
Zebalda Restia Dkhar
- CHILDREN OF SEX WORKERS: THE
VULNERABLE POPULATION 145
Dr. Marisha Chakrabarti
- TECHNICAL EDUCATION IN INDIA AT THE
CROSSROADS 157
Sanchita De
- A STUDY ON JOB SATISFACTION OF SECONDARY
SCHOOL TEACHERS IN RELATION TO THEIR
TEACHING EFFECTIVENESS 164
Munmun Sadhukhan, Prof. Shyamal Uday Chowdhury
- A COMPARATIVE STUDY OF CREATIVITY AND
SOCIAL ADJUSTMENT ABILITY AMONG
STUDENTS STUDYING IN SECONDARY SCHOOLS
OF BURDWAN DISTRICT, WEST BENGAL 176
Poulami Mukherjee, Dr. Tuhin Kumar Samanta

Cognizance The New Vistas of Education & Psychology
Vol. I

First Published : 2019

Copyright © P.A.I.O.L.C.K. 2019

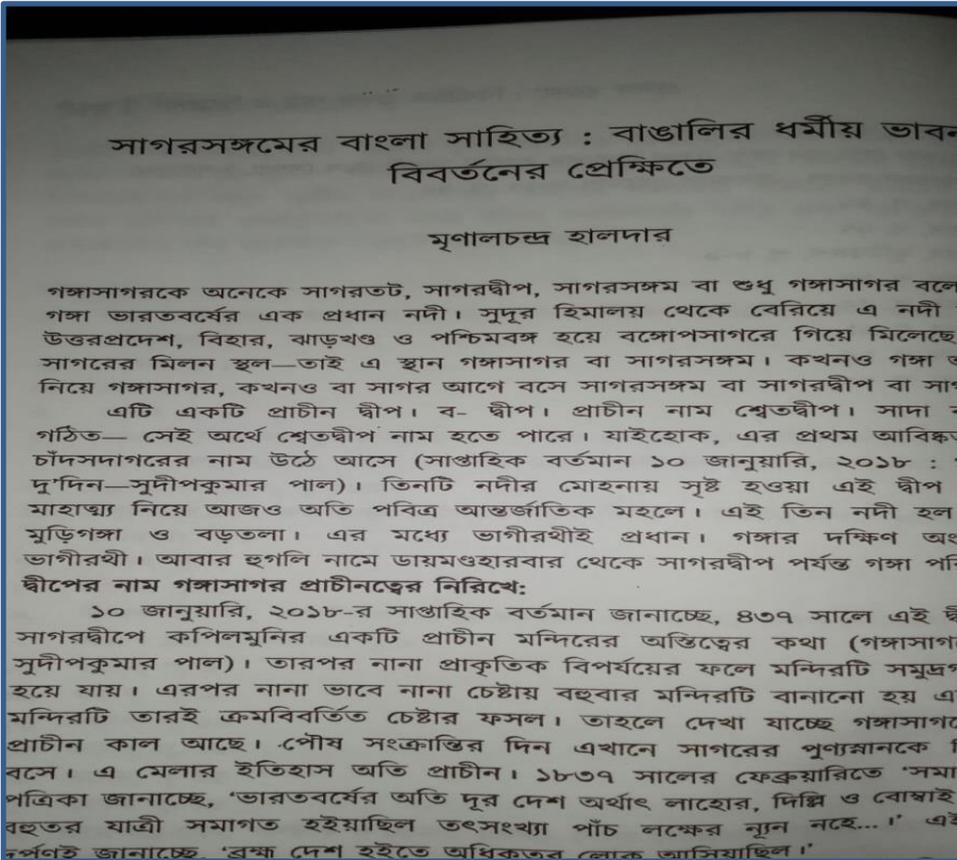
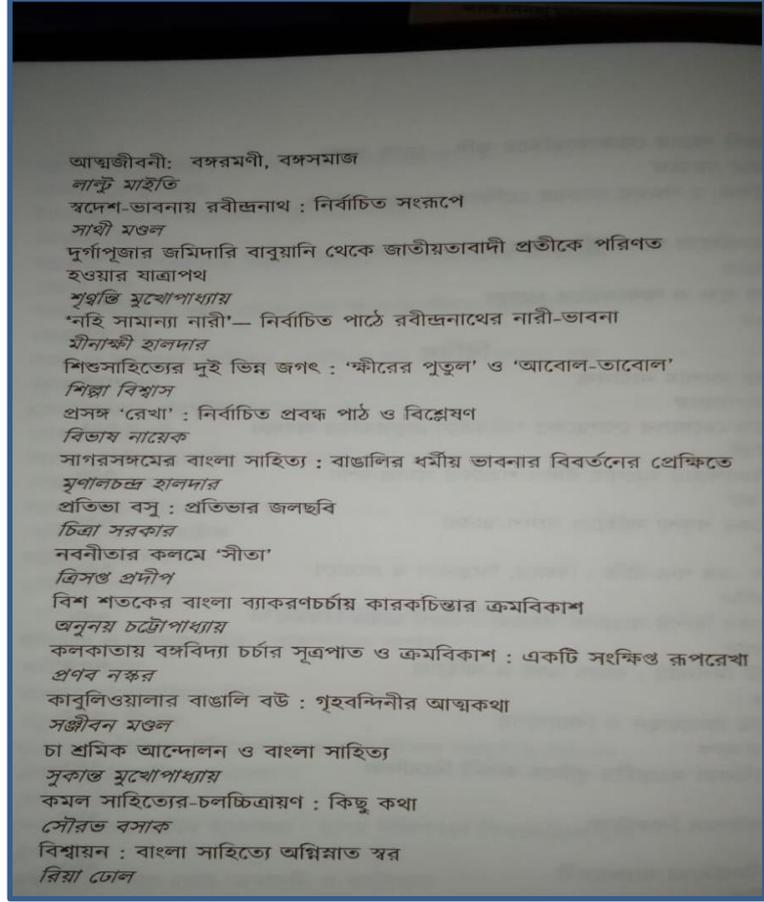
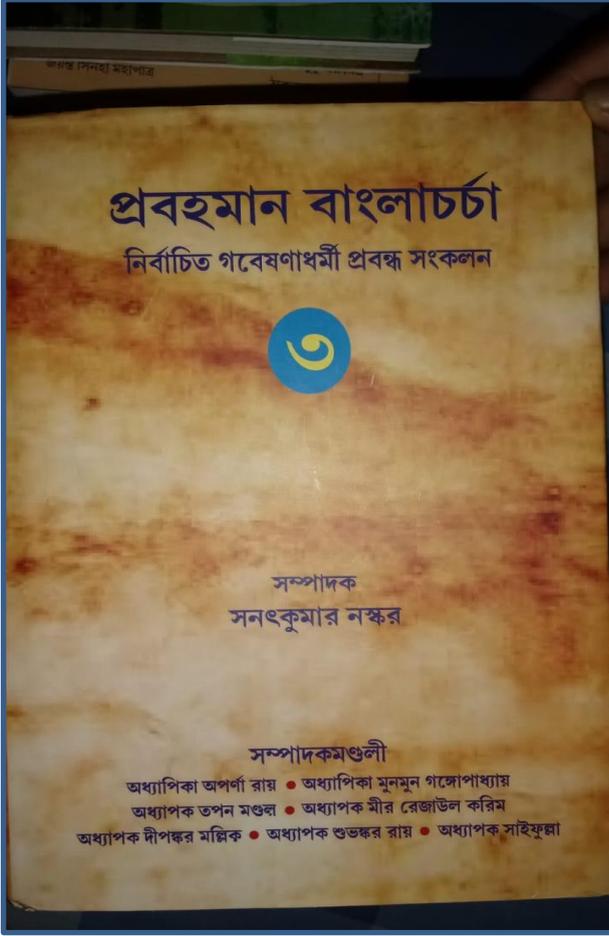
No portion of this publication may be reproduced or transmitted by any means in part or whole by any method of reproduction or copying whether electronic/digital or otherwise, without the express, prior and written permission of the author and the publisher. The responsibility for the facts stated, opinions expressed and conclusions reached is entirely that of the author of the publication and the Paschimbanga Anchalik Itihas O Loksanskriti Charcha Kendra, as a body, accepts no responsibility for them.

ISBN 978-93-88207-26-3

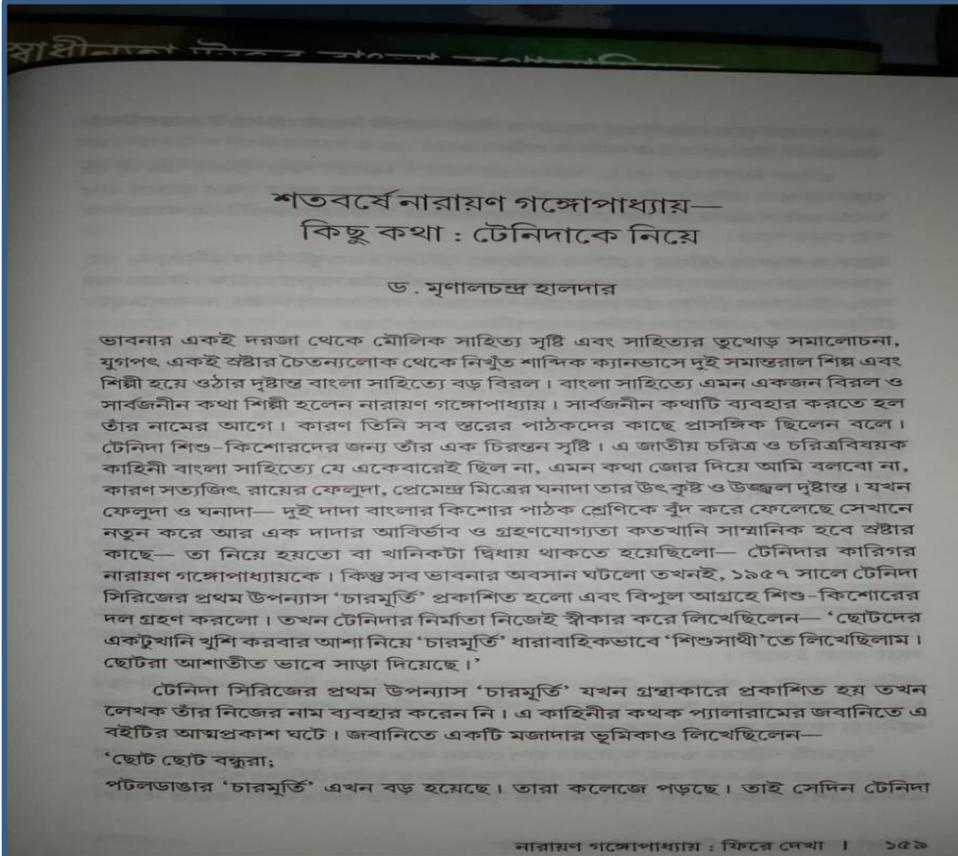
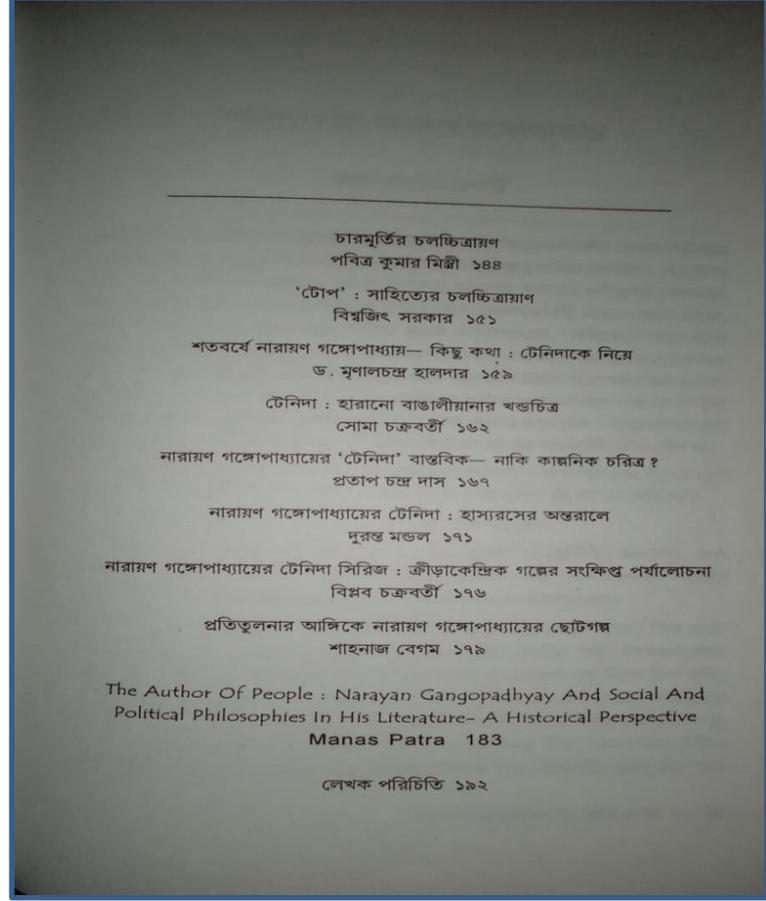
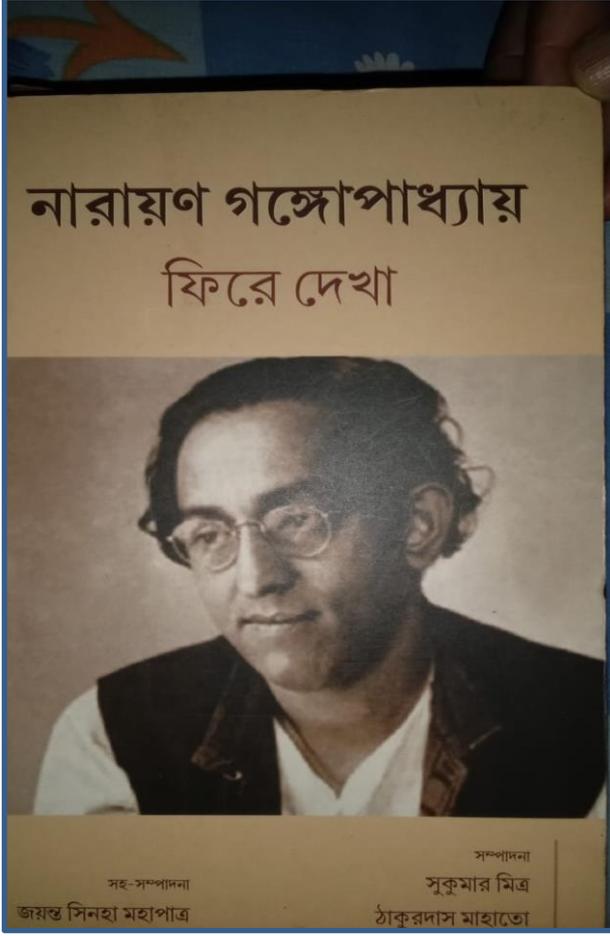
Published by
Malay Das for
P.A.I.O.L.C.K.,
Baruipur, Kolkata - 700 144
anchalikitihhas@gmail.com

Printed at
S. P. Communications Pvt. Ltd,
31b, Raja Dinendra Street, Raja Ram Mohan Roy Sarani,
Kolkata - 700009

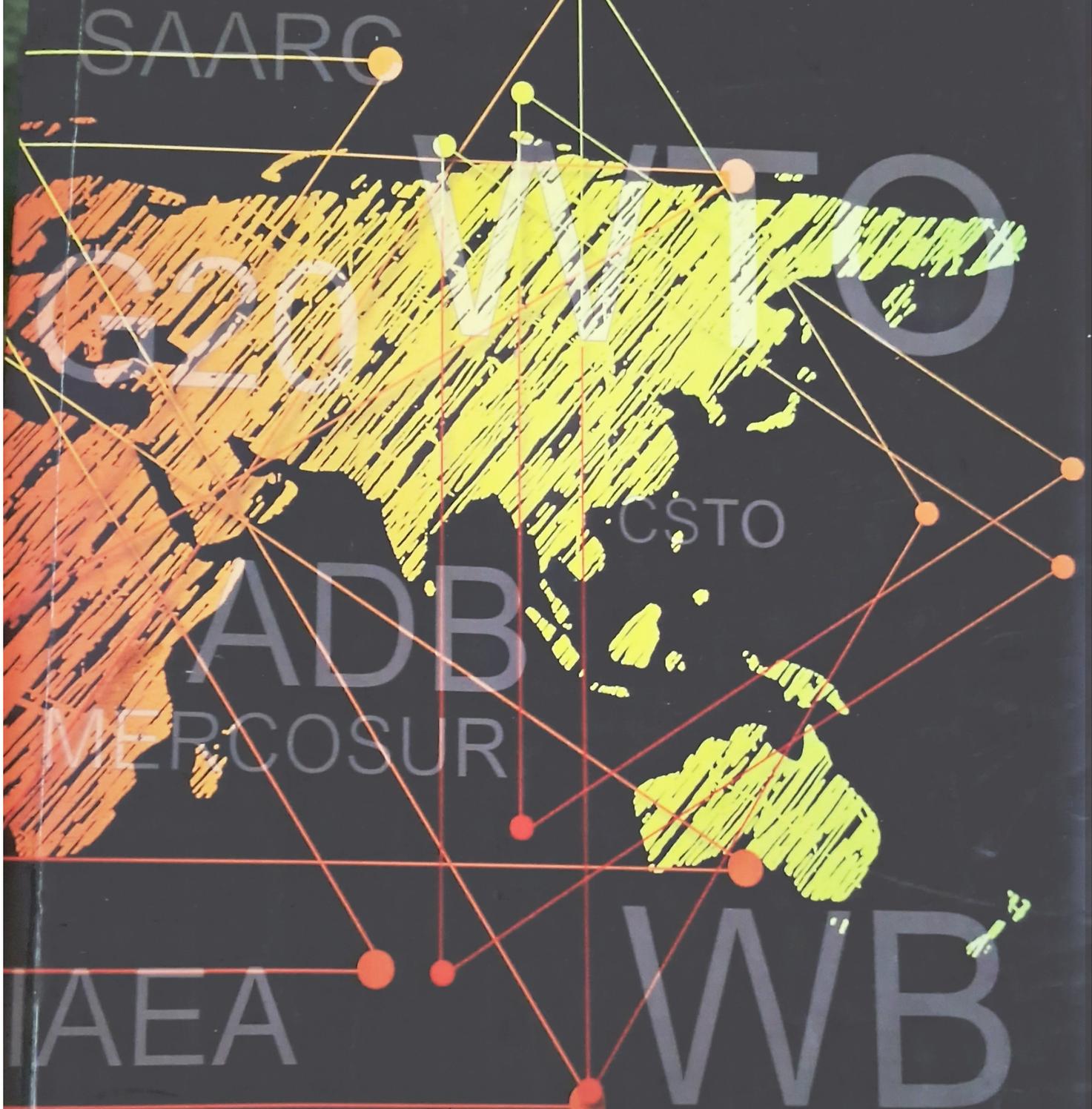
Price
Rs. 900/-



3



ROLE OF INTERNATIONAL ORGANIZATIONS IN WORLD POLITICS



EDITORS

BISWANATH CHAKRABORTY
DEBASISH NANDY





BLUE ROAN PUBLISHING

An independent Publishing Firm
Blue Roan Publishing House LLP
Chandranagar, Paldi,
Ahmedabad, Gujarat - 380 007

All rights reserved

Book Cover Design © Copyright by Blue Roan Publishing House
First Edition, 2019 © Copyright by Debasish Nandy

No part of this publication may be reproduced, transmitted, or stored in a retrieval system, in any form or by any means, without permission in writing from the Author(s).

For permission, suggestions or reviews contact:
debasishnandy.kc@gmail.com

ISBN: 978-81-941874-9-3

Disclaimer: The opinions expressed in our published works are those of the author(s) and do not reflect the opinions of Blue Roan Publishing House. The author of this book shall be solely held responsible for piracy or plagiarism related issues, originality of article and authenticity of information if it arises or any other issue related to the content of the article.

CONTENTS

Preface

Section-I: Universal Organizations

- 1 **The UNO in a Changing World** 1-14
Gautam Mukhopadhyay
- 2 **Security Council of UNO: Evaluation of its Role** 15-18
Md. Shariful Islam

Section-II: Regional Organizations

- 3 **European Union and its Global Impact** 19-23
Rima Chatterjee
- 4 **The Council of Europe in World Politics: An Assessment** 24-31
Debanjali Ghosh
- 5 **Association of Southeast Asian Nations (ASEAN)** 32-35
Ramakrishnan Dharmar
- 6 **The Non-Aligned Movement in the present world order** 36-39
R Radhakrishnan and Assunta Mendonca-Sandhir
- 7 **The Economic Community of West African States (ECOWAS):
Regional Integration and Challenges** 40-44
Rajesh Kumar
- 8 **The Warsaw Pact –Its Evolution and Role in History in World
Politics** 45-47
Lupsy Mahanty Roy
- 9 **SAARC : Development and Challenges** 48-54
Debasis Mahapatra
- 10 **Gulf Cooperation Council: Investigating its Role in Regional and
Global Milieu** 55-59
Debasish Nandy
- 11 **Arab League** 60-62
Anandita Biswas
- 12 **Moving in New Directions: African Union and its Role in
Contemporary World Politics** 63-69
Pradipta Mukherjee
- 13 **The Mekong-Ganga Cooperation** 70-73
Sanjay Pulipaka

THE WARSAW PACT -ITS EVOLUTION AND ROLE IN HISTORY IN WORLD POLITICS

Lupsy Mahanty Roy

The Warsaw Pact is otherwise formally known as the **Treaty of Friendship, Co-operation and Mutual Assistance** was a collective defense treaty signed in Warsaw, Poland with a motto of **Union of Peace and Socialism**. It was signed by the Soviet Union and seven Soviet satellite states of Central and Eastern Europe during the Cold War. It was a program undertaken by Nikita Khrushchev and Nikolay Bulganin. It was a military complement to the **Council for Mutual Economic Assistance (CoMEcon)**, the regional economic organisation for the socialist states of Central and Eastern Europe. It was a reaction to the integration of West Germany into North Atlantic Treaty organisation (NATO)¹ in 1955 as per the London and Paris Conference held in 1954. Moreover the Soviet Union could have control over military forces in Central and Eastern Europe so that Western Europe cannot be taken and retained by America forcibly. The motive was to create a buffer zone.

Speculation about Khrushchev's ambition towards the power of the Communist party may explain the formation of the Warsaw pact – he wanted global domination for Communism. Khrushchev considered his plans of “*de-Stalinization*” to be completely justified and necessary for Soviet prosperity. Additionally, the Communist Soviet Union was finding it increasingly difficult to fulfill its monetary needs and thought that the Warsaw Pact would resolve this problem. One of Khrushchev's main goals was to stimulate the development of the involved Eastern European nations so that they may function on their own.*

It was formed on the 14th of May 1955 at Warsaw, Poland and dissolved on the 1st of July 1991. The headquarter was at Moscow, Russian Soviet Federative Socialist Republic (SFSR), Soviet Union. The members were Albania (withdrew 1968), Bulgaria, Czechoslovakia, East Germany (withdrew in 1990), Hungary, Poland, Romania and Soviet Union. It derived its name from Warsaw, a place in Poland where the treaty was signed. The treaty was meant for the member states to come in defense of any member, which comes under the threat of external attack by any exterior forces. It was set up under the leadership of Marshal Ivan S. Konev of the Soviet Union. The name itself suggested the reason for its existence. It revolved around the issue of remilitarisation of Western Germany and its inclusion in the North Atlantic bloc thus leading to a war-like state and jeopardising the plight, with a threat to national security of the peace-loving states. It was the decision taken by the United States and other members of the North Atlantic Treaty Organisation (NATO) on the 9th of May, 1955, to incorporate West Germany as a member of North

Atlantic Treaty Organisation (NATO) and thus remilitarising it in the due process. The Soviets saw it and took it as a direct threat and thus responded with the Warsaw Pact.

The eight members took pledge to protect each other and mutually defend against external attack. All the members agreed to refrain from mutual intervention in internal affairs, respect each other national sovereignty and political independence. (**Conditions of the treaty included “total equality, mutual non-interference in internal affairs, and respect for national sovereignty and independence.”**) However, all the member states were indirectly controlled, by the Soviet Union. In July 1963, the Mongolian People's Republic was asked to join Warsaw Pact under Article 9² of the treaty. But the Sino-Soviet Split created such a plight that Mongolia had to maintain observer status. The Soviet Government agreed to station troops in Mongolia in 1966.

The Political Consultative Committee and the Unified Command of Pact Armed forces had strings in their hands of the actions performed by the Warsaw Pact and both were centered in Moscow. The latter was in charge of all military activities of the alliance, while the first controlled everything else. One of the presiding conditions was that the leader of both of these committees would be Soviet, so that Communist dominance would remain prevalent.

On the 20th of August 1968, the Operation Danube was carried out and Czechoslovakia was invaded by 250,000 Warsaw Pact troops. Around 108 civilians were killed and another 500 were wounded by the invading troops. Albania and Romania refused to participate in the invasion. East Germany did not send the troops as it was ordered to do so by Moscow. Albania left the Pact over the invasion. The Communist Party leader, Alexander Dubcek had plans to reform Czechoslovakia, which was not the wish of Soviet Union. The invasion was an attempt to overthrow the Communist leader out of power. He wanted to liberalise his economy and bring about necessary reformations but his arrest during invasion ended everything in fiasco. He urged his denizens, not to protest militarily, as it will lead to violence and bloodbath. Thus there were many non-violent protests, which took place throughout the country.

On the 26th of April 1985, Mikhail Gorbachev and leaders of the six Eastern European members of the Warsaw Pact signed a protocol to renew the alliance for further 30 years. A unitary military command was provided and also the maintenance of Soviet military units on the territories of the other participating states was made possible. A communist government continued in Soviet Union. Bulgaria in the first half of 1990 had a reform government based on Socialist Party. In mid June multiparty elections were scheduled to be carried out. None of the leaders realised or expected

¹In 1949, the prospect of further Communist expansion prompted the United States and 11 other Western nations to form the North Atlantic Treaty Organization (NATO).

***Sources:**

“APPENDIX C: THE WARSAW PACT -- Soviet Union.” Library of Congress. 12 May 2008 .

“Foreign Affairs Warsaw Pact 1955-1970.” NWtravel Magazine. 12 May 2008 .

Goldman, Stuart D. “Warsaw Pact.” World Book. 21st ed. Halsall, Paul. Modern History Sourcebook. 1998. The Warsaw Pact, 1955. 12 May 2008

²Article 9. The present treaty is open to be acceded to by other states-irrespective of their social and state systems- which may express their readiness to assist, through participation in the present treaty, in combining the efforts of the peace loving states for the purpose of safeguarding the peace and security, of nations. This act of acceding to the treaty shall become effective, with the consent of the states that are parties to this treaty, after the instrument of accedence has been deposited with the government of the Polish People's Republic.

Copyright © 2019 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved.

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries may photocopy beyond the limits of US copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or republication requests should be addressed to: IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 133, Piscataway, NJ 08855-1331.

The papers in this book comprise the proceedings of the meeting mentioned on the cover and title page. They reflect the authors' opinions and, in the interests of timely dissemination, are published as presented and without change. Their inclusion in this publication does not necessarily constitute endorsement by the editors, the IEEE Computer Society, or the Institute of Electrical and Electronics Engineers, Inc.

BMS Part Number: CFP19067-USB
ISBN-13: 978-1-7281-2695-1

Additional copies may be ordered from:

IEEE Computer Society
Customer Service Center
10662 Los Vaqueros Circle
P.O. Box 3014
Los Alamitos, CA 90720-1314
Tel: +1 800 272 6657
Fax: +1 714 821 4641
<http://computer.org/cps>
cps@computer.org

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Tel: +1 732 981 0060
Fax: +1 732 981 9667
[http://shop.ieee.org/store/
customer-service@ieee.org](http://shop.ieee.org/store/customer-service@ieee.org)

IEEE Computer Society
Asia/Pacific Office
Watanabe Bldg., 1-4-2
Minami-Aoyama
Minato-ku, Tokyo 107-0062
JAPAN
Tel: +81 3 3408 3118
Fax: +81 3 3408 3553
tokyo.ofc@computer.org

Editorial production by Randall S. Bilof
Cover art production by Annie Jiu



IEEE Computer Society
Conference Publishing Services (CPS)
<http://www.computer.org/cps>

Latency Aware Fault Tolerant Cache in Multicore using Dynamic Remapping Clusters

Avishek Choudhury
Computer Science, New Alipore College,
Kolkata 700053, India
Email: avishek.nac.cs@gmail.com,

Brototi Mondal
Computer Science, Sammilani Mahavidyalaya,
Kolkata- 700094, India
Email: brototi.snp@gmail.com

Biplab K Sikdar
Computer Science and Tech.,
IEST, Shibpur, Howrah 711103
Email: biplab@cs.iests.ac.in

Abstract—This work proposes a re-usability aware fault remapping scheme for multicore NUCA cache. It replicates data in non-reusable blocks to ensure full error coverage and minimum latency, by forming dynamic remapping clusters around the home tiles. Simulations in Multi2Sim 5.0 claim up to 18.64% increase in hit ratio and 20.79% decrease in latency in last-level cache over the existing techniques with 3.17% area, 5.35% leakage power and 3.34% dynamic power overheads.

Keywords-Multicore, Cache, Fault, Remapping, Latency

I. INTRODUCTION

Aggressive voltage scaling causes exponential cell failures in SRAM. Error resilience schemes are proposed in multiple levels. SRAM cells [1], error correcting codes (ECC) [2], disabling faulty sub-blocks [3] and redundancy based techniques [4] have been reported. But none of them ensures full error coverage with minimum latency where this work concentrates in.

II. PROPOSED FAULT REMAPPING SCHEME

The proposed work detects hard errors using BIST in low power and a fault map is generated. Blocks addressed on faulty lines are remapped on non-conflicting faulty or non-reusable healthy blocks in the same set or in the nearest neighbour tile with lowest manhattan distance, forming remapping clusters that expand and shrink dynamically depending on the cache pressure. An access map is then generated to track the replications. Re-usability is measured as defined in [5].

The simulation is done with Multi2Sim 5.0 using SPLASH-2 and PARSEC 3.0 suites. Overheads are calculated using CACTI 6.5 and power components are calculated using McPAT. A fault model has been followed as in [6]. The hit ratio and latency of the proposed scheme for fft benchmark are shown in Figure 1 and 2 respectively showing consistently higher hit ratio and lower latency achieved by the proposed scheme.

III. CONCLUSION

This work proposes a latency aware complete in-place fault remapping policy with 18.64% improvement of hit ratio and 20.79% improvement in latency in L_2 cache with 3.17% area, 5.35% leakage power and 3.34% dynamic power overheads.

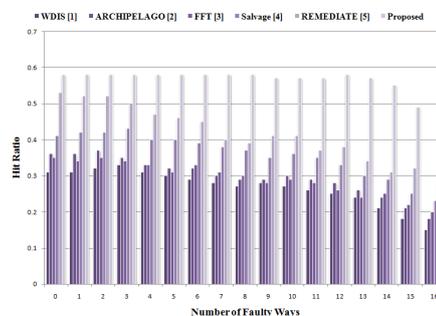


Fig. 1. Comparison of L_2 hit ratio of the proposed work with others

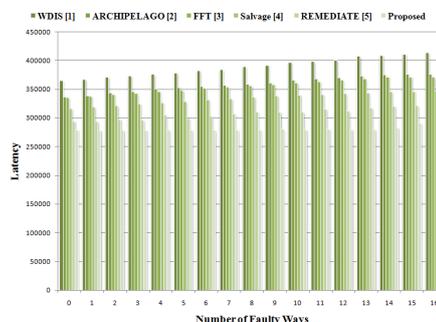


Fig. 2. Comparison of L_2 latency of the proposed work with others

REFERENCES

- [1] F. Moradi, D. Wisland, S. Aunet, H. Mahmoodi, and T. Cao. 65nm sub-threshold 11t-sram for ultra low voltage applications. Intl. Symposium on System-on-a-Chip, pages 113118, Sept. 2008.
- [2] I. Kim, et al. Multi-bit Error Tolerant Caches Using Two-Dimensional Error Coding. In Proc. MICRO, 2007.
- [3] S. Ozdemir et al., Yield-Aware Cache Architectures, Proc. Of Intl. Symposium on Microarchitecture, 2006.
- [4] H.T. Vergos and D. Nikolos., Performance Recovery in Direct- Mapped Faulty Caches via the Use of a Very Small Fully Associative Spare Cache, Proc. of Intl. Computer Performance and Dependability Symposium, 1995.
- [5] G. Keramidas, P. Petoumenos, and S. Kaxiras, Cache replacement based on reuse-distance prediction in Proceedings of the 25th International Conference on Computer Design, 2007.
- [6] D. Sanchez, Y. Sazeides, J. Cebrian, J. M. Garcia, J. L. Arago N, Modeling the Impact of Permanent Faults in Caches, ACM Transactions on Architecture and Code Optimization, Vol. 10, No. 4, Article 29, Publication date: December 2013.

INDIA'S CONNECT CENTRAL ASIA POLICY

Emerging Security and Economic Dimensions

Raj Kumar Kothari
Sukanya Mukherjee



PROGRESSIVE PUBLISHERS
37A, College Street : : Kolkata-700 073



© R. Kothari & S. Mukherjee
Publication and Sales Right : Progressive Publishers

First Published : June, 2019

Jacket Design : Ritodip Ray

D.T.P. Compose
Progressive Publishers
37A, College Street
Kolkata-700 073

Price : ₹ 100
Rupees One hundred only
\$: 4.75
£ : 4.30

ISBN : 978-81-8064-289-0

PRINTED IN INDIA

Published by Sri Kamal Mitra for Progressive Publishers
37A, College Street, Kolkata-700 073 and printed at
Narayan Printing, 3, Muktarambabu Lane, Kolkata-700 007



INDIA'S CONNECT CENTRAL ASIA POLICY

Emerging Security and Economic Dimensions

Raj Kumar Kothari
Sukanya Mukherjee



PROGRESSIVE PUBLISHERS
37A, College Street : : Kolkata-700 073

Contents

| | |
|---|----|
| List of Abbreviations | 13 |
| CHAPTER-I • Introduction : A Conceptual Framework | 15 |
| CHAPTER-II • Post-Soviet Developments in Central Asia | 21 |
| Historical Background | |
| Recent Developments | |
| CHAPTER-III • Geo-Strategic Importance of Central Asia in Indian Foreign Policy Framework | 38 |
| India-Central Asia Relations in Retrospect | |
| Drug Trafficking | |
| Energy Security | |
| Enriched Uranium | |
| Trade and Commerce | |
| Geo-Strategic Significance and Resource Potentiality of CARs | |
| Security Interests | |
| Military Cooperation | |
| CHAPTER-IV • Implications of India's 'Connect Central Asia' Policy | 59 |
| Investment Potential | |
| Involvement of External Players : | |
| Russia, China, USA, Afghanistan and Pakistan | |
| The SCO Factor | |
| CHAPTER-V • Conclusion | 83 |
| APPENDIX-I • Ministry of External Affairs Government of India | 89 |
| APPENDIX-II • Tej Kadam : India-Kazakhstan Joint Statement | 95 |

| | |
|---|-----|
| APPENDIX-III • List of Agreements/MoUs exchanged during the State Visit of President of Kyrgyz Republic to India | 102 |
| APPENDIX-IV • Joint Statement of Afghanistan, India and Iran Trilateral Meeting on Implementation of Chabahar Agreement | 105 |
| APPENDIX-V • India Joins the Ashgabat Agreement | 107 |

Select Bibliography 108

Index 117

List of Tables

| | |
|--|----|
| Table 1 : Energy Potentials of Central Asian Countries | 43 |
| Table 2 : Issues/Subjects highlighted in India's 'Connect Central Asia' Policy | 61 |
| Table 3 : India-Central Asia Trade from 2010-2017 | 62 |

List of Maps

| | |
|--|----|
| Map 1 : Central Asia : Political Map | 23 |
| Map 2 : Central Asia's Energy Infrastructure | 71 |

প্রবহমান বাংলাচর্চা

নির্বাচিত গবেষণাধর্মী প্রবন্ধ সংকলন



সম্পাদক
সনৎকুমার নস্কর

সম্পাদকমণ্ডলী

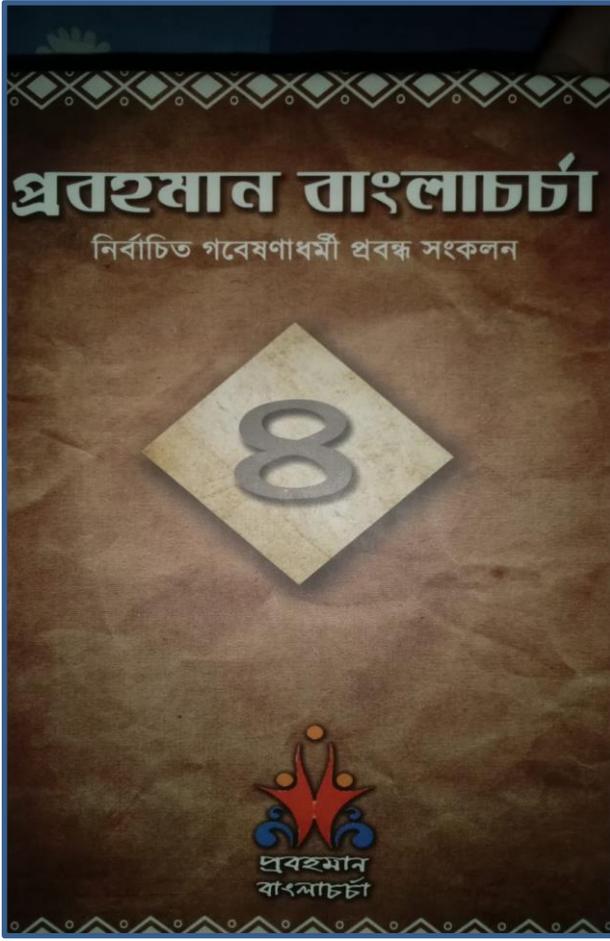
অধ্যাপিকা অপর্ণা রায় • অধ্যাপিকা মুনমুন গঙ্গোপাধ্যায়
অধ্যাপক তপন মণ্ডল • অধ্যাপক মীর রেজাউল করিম
অধ্যাপক দীপকর মল্লিক • অধ্যাপক শুভকর রায় • অধ্যাপক সাইফুল্লা

রবীন্দ্রনাথ ও বিষ্ণুপুর ঘরানা

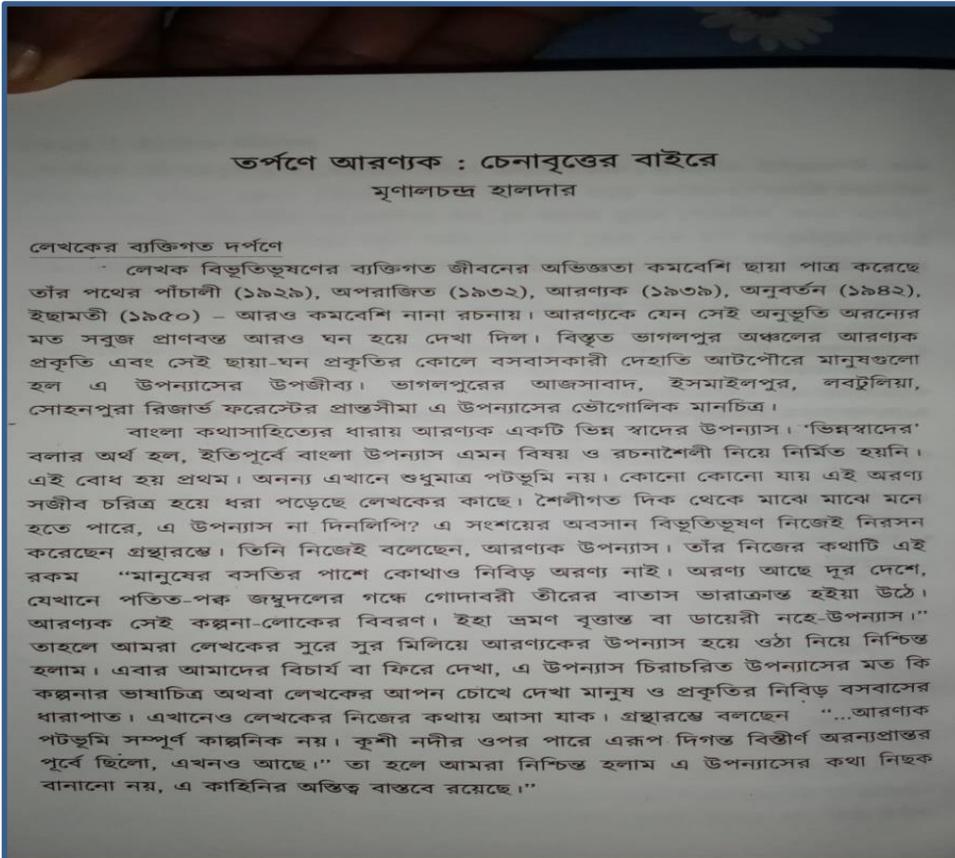
কল্পরী কর

“গানের ভিতর দিয়ে যখন দেখি ভুবনখানি/ তখন তারে চিনি আমি, তখন তারে জানি/
তখন সে যে বাহির ছেড়ে, অন্তরে মোর আসে/ তখন আমার হৃদয় কাঁপে তারি ঘাসে”। আদিম যুগে মানুষ পাখির ডাক শুনে তা অনুকরণ করত নিজেদের সুর ও
কথার মাধ্যমে। সরল ছন্দে একটি বা দুটি স্বর দিয়ে সে সাজাতো গানের ডালি। পরে
সভ্যতার অগ্রগতির সঙ্গে সঙ্গে বিবর্তনের মাধ্যমে তাতে নব নব রূপ সজ্জিত হল।
রবীন্দ্রনাথ তাঁর গ্রন্থ “সংগীত চিন্তা”তে বলেছেন “আমাদের সংগীতশাস্ত্র নাকি মৃত শাস্ত্র,
শাস্ত্রের ভাবটা আমরা নাকি আয়ত্ত করতে পারি না, এইজন্য বাদী ও বিবাদী সুরের
ব্যাকরণ নিয়ে মহা কোলাহল করি, আমার ইচ্ছা যে কবিতার সহচর সঙ্গীতকে শাস্ত্রের
লৌহ কারা থেকে মুক্ত করে উভয়ের মধ্যে বিবাহ দেয়া হোক।” তাঁর কাছে ওস্তাদদের
ভীষণ মুখশ্রী বিকাশ করে গলদঘর্ম হয়ে গান করাটা ছিল অত্যন্ত পীড়াদায়ক ব্যাপার।
কারণ তাতে গানের ভাবের আর কিছু অবশিষ্ট থাকত না। তিনি চাইতেন সঙ্গীতবিদরা
বিশেষ মনোযোগ সহকারে কী কী রাগিণীতে কী কী ভাব আছে তা আবিষ্কার করেন
তাহলেই সংগীতের যথার্থ উপকার হতে পারে। আর তাই অনুসন্ধিৎসু রবীন্দ্রনাথ সর্বত্রই
বিচরণ করেছেন নিত্য নতুন রাগ রাগিণী ও তার ভাবের খোঁজে। কখনও পাশ্চাত্য
সংগীত কখনও শাস্ত্রীয় সংগীত আবার কখনও সহজিয়া লোকসংগীতের বিবিধ
রত্নভাণ্ডার থেকে তিনি মণিমুক্ত আহরণ করে গেছেন।

বিষ্ণুপুরে মল্লরাজ পৃথ্বীমল্লর রাজত্বকালে খ্রিস্টীয় চতুর্দশ শতাব্দীতে প্রথম
সংগীতশাস্ত্রের আলোচনা আরম্ভ হয়েছিল। সংগীতশাস্ত্রের উন্নতির জন্য তাঁরা দিল্লি
থেকে মুসলমান ওস্তাদদের এনে বিষ্ণুপুরের প্রজাবর্গের শিক্ষার সুব্যবস্থা করার উদ্দেশ্যে
বহু অর্থ ব্যয় করেন। দ্বিতীয় রঘুনাথ সিং, বাহাদুর খাঁ ও পীরবক্সকে উচ্চ বেতনে দিল্লি
থেকে নিয়ে আসেন। এঁদের প্রথম শিষ্য ছিলেন গদাধর চক্রবর্তী। তাঁর বংশধরেরাই
সংগীতকে বৃত্তিরূপে গ্রহণ করেছিলেন। আর এইভাবে পূর্ব ভারতের বিষ্ণুপুরই হয়ে
ওঠে শাস্ত্রীয় সংগীত চর্চার প্রাণকেন্দ্র, গড়ে ওঠে বিষ্ণুপুর ঘরানা। গদাধর চক্রবর্তী
ছিলেন মল্লরাজার রাজসভার সংগীতচার্য। তাঁর শিষ্যদের মধ্যে উল্লেখযোগ্য কৃষ্ণমোহন
গোস্বামী। গদাধর চক্রবর্তীর পর রাজা চৈতন্য সিংহের সভাপায়ক হিসাবে সংগীতগুরু
আচার্য রামশঙ্কর ভট্টাচার্য নিযুক্ত হন। ইনি নিজের বাড়িতে বিনা বেতনে অন্নদান করে
ছাত্রদের সংগীত শিক্ষা দিতেন। তাঁর বিখ্যাত ছাত্রদের একজন ছিলেন বিখ্যাত গায়ক
ক্ষেত্রমোহন গোস্বামী, যাঁর দুটি বিখ্যাত গ্রন্থ “কথাকৌমুদী” ও “সঙ্গীতসার”। ইনি



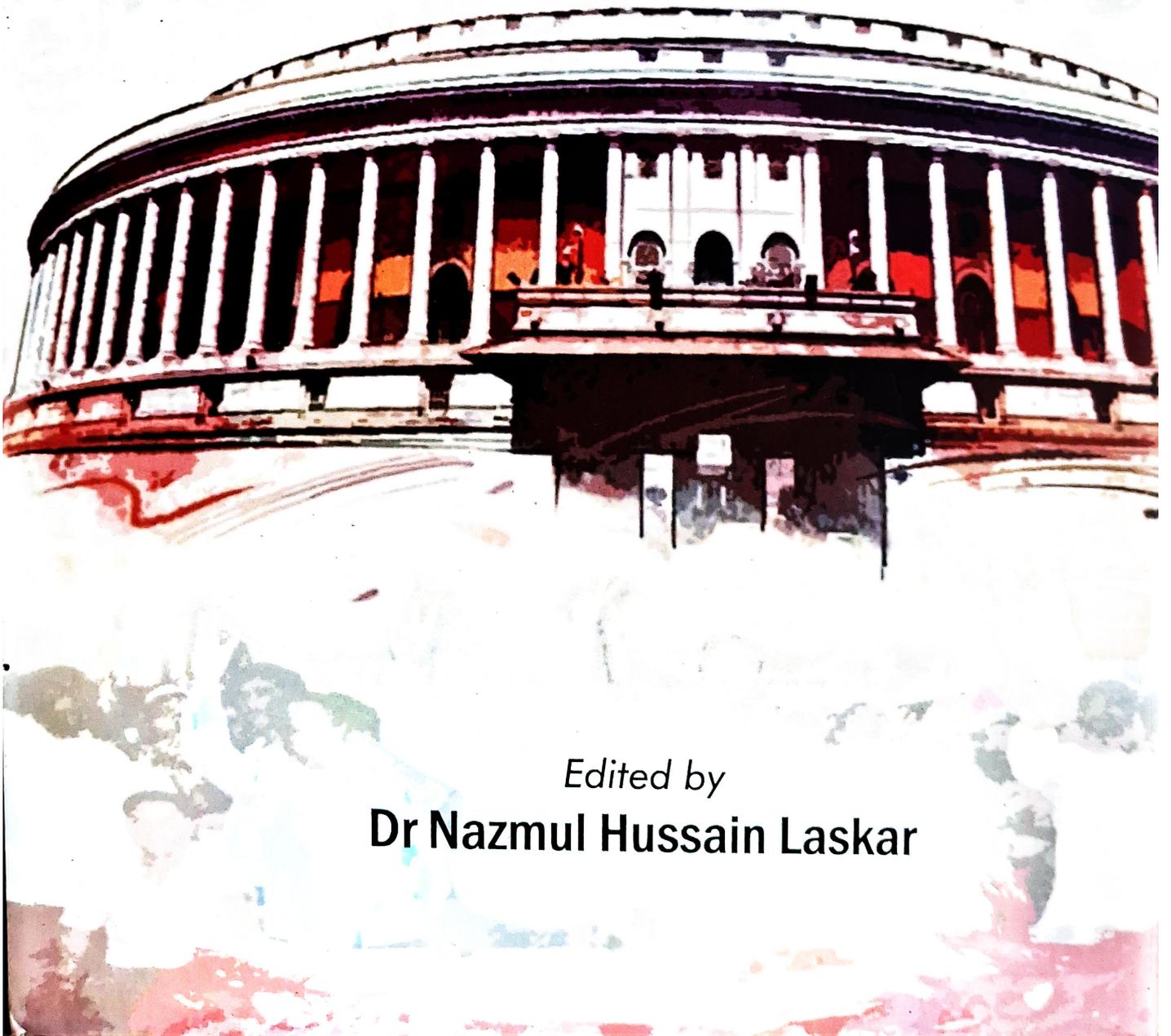
| | |
|---|-----|
| তর্পণে আরণ্যক : চেনাবুস্তের বাইরে | ৪০৪ |
| মৃগালচন্দ্র হালদার | |
| 'পথের পাঁচালী'র খাদ্যপ্রসঙ্গ ও সমসাময়িক বাংলার গ্রামীণ সমাজ | ৪১০ |
| সায়নী হাজারা | |
| সময়ের বিবর্তনে ধীবরপল্লীর কাহিনি : 'পদ্মানদীর মাঝি' ও 'মুক্তমাছ' | ৪১৭ |
| শিল্পা বিশ্বাস | |
| তিতাস একটি নদীর নাম : প্লটের অভিনব বিন্যাস | ৪২৬ |
| মির্জা দেব | |
| শরদিন্দু বন্দ্যোপাধ্যায়ের 'তুলুভদ্রার তীরে' : ইতিহাসের | ৪৩২ |
| প্রেক্ষাপটে রোমান্টিক প্রণয়ের শাস্ত্র ইতিবৃত্ত | |
| মোঃ মহব্বত আলী | |
| নারায়ণ গঙ্গোপাধ্যায়ের উপন্যাসে সমাজ ও ইতিহাস ভাবনা | ৪৪০ |
| শহীদ ইকবাল | |
| মনোজ বসুর 'জলজঙ্গল' : বাদাবনের মানুষের অস্তিত্বের সংগ্রাম | ৪৬২ |
| শ্রাবন্তী রায় | |
| অমিয়ভূষণের 'মধুসাধুখাঁ' : নভেলেটের আকারে ইতিহাসচেতনা | ৪৬৯ |
| আশিস দেবনাথ | |
| মধুসাধুখাঁ : মধ্যযুগীয় প্রথার নব নির্মাণ | ৪৭৮ |
| কল্যাণচন্দ্র বর্মণ | |
| এপার গঙ্গা ওপার গঙ্গা মহাজীবনের অপর নাম : | ৪৮২ |
| অর্পিতা রায়চৌধুরী | |
| প্রথম প্রতিশ্রুতি : সংস্কার ও আধুনিকতার দ্বন্দ্ব | ৪৮৭ |
| জয় দাস | |
| হাজার চুরাশির মা : সুজাতার চেতনার বহুমাত্রিকতা | ৪৯৪ |
| ঈশ্বর চন্দ্র বর্মণ | |
| মহাশ্বেতা দেবীর উপন্যাসে আদিবাসী শ্রম ও শিক্ষাব্যবস্থার পণ্য | ৫০৯ |
| সমাচার | |
| সোমনাথ চ্যাটার্জী | |





WORKING OF DEMOCRACY IN INDIA

Major Issues



Edited by
Dr Nazmul Hussain Laskar

Worldwide Circulation through Authorspress Global Network

First Published in 2020

by

Authorspress

Q-2A Hauz Khas Enclave, New Delhi-110 016 (India)

Phone: (0) 9818049852

E-mail: authorspressgroup@gmail.com

Website: www.authorspressbooks.com

Working of Democracy in India: Major Issues

ISBN 978-93-90155-91-0

Copyright © 2020 Dr. Nazmul Hussain Laskar

Concerned authors are solely responsible for their views, opinions, policies, copyright infringement, legal action, penalty or loss of any kind regarding their articles. Neither the publisher nor the editor will be responsible for any penalty or loss of any kind if claimed in future. Contributing authors have no right to demand any royalty amount for their articles.

Printed in India at Thomson Press (India) Limited

PART IV. GEO-POLITICS

23. Environment Protection and Sustainable Development:
Government Initiatives 239
Maitri Pandit
24. The Magnitude and Determinants of
Deforestation in India: An Economic Analysis 251
Antara Dutta
25. Impact of Education on Sustainable Development:
A Study 266
Samim Ara Begum and Md Sarwar Hossain
26. The Politics of Climate Change and Indian
Foreign Policy 274
Alik Naha
27. Environmental Governance and the Issue of Biodiversity
Management in Assam 285
Abhilesh Buragohain

PART V. ETHNIC STUDIES

28. Ethnic Groups in Assam: An Overview 297
Malamoni Dutta
29. Traditional Hunting Methods of the Vaiphei Tribe 308
Lalthamuan Neihzial
30. Ethnic Conflicts in Bodoland Territorial Area Districts of
Assam: Complexities, Causes and Consequences 323
Jwngsa Basumatary
31. Policies and Schemes for Tribal Development in Post-
independent India 331
Surojit Mallick

PART VI. COVID-19 PANDEMIC & INDIA

32. Covid-19 and the Growing Importance of
Digital Library 343
Nazmul Hussain Laskar
33. Covid-19 Pandemic and its Impact 353
Lpsy Mohanty Roy

Covid-19 Pandemic and its Impact

Lypsy Mohanty Roy

Corona: The Open Secret

It's quite interesting, also known to all that, there was a fable on a child from village who visited an urban area, anxiously asked his father, "Where are all the people of this town going?" To utter surprise of father, the child was worried, it will become empty. Yes it's true indeed we all were suffering from 'hurry or rush syndrome', suddenly the outbreak of Corona has made everything go topsy-turvy, a sudden halt from the cut throat rat race competition. The virus that came from Wuhan Laboratory IV was thought to be brought under control in China but gradually it spread in such a manner that everything got upside down. It was realised that with absence of intervention, the major health crisis can lead to 7.0 billion infections with 40 million deaths globally in 2020. The immediate mitigation measure adopted is social distancing, special care for elderly and the most vulnerable. Social distancing and Lockdown will lower the transmission rate. There are flexible working arrangements, lop sided division of labour in household chores and child care.

In the aftermath of Second World War, it is one of the greatest predicaments that have jeopardised the entire race of *Homo sapiens*. It is a calamity and hazard of the worst kind faced in this century. It is in the later part of 2019; a new infectious respiratory disease emerged in Wuhan, Hubei province, China and was called coronavirus disease 2019 or Covid-19 by the World Health

INTERNATIONAL RELATIONS



Emerging Issues

Edited by

Dr Nazmul Hussain Laskar



Worldwide Circulation through Authorspress Global Network

First Published in 2020

by

Authorspress

Q-2A Hauz Khas Enclave, New Delhi-110 016 (India)

Phone: (0) 9818049852

E-mail: authorspressgroup@gmail.com

Website: www.authorspressbooks.com

International Relations: Emerging Issues

ISBN 978-93-90459-62-9

Copyright © 2020 Editor

Concerned authors are solely responsible for their views, opinions, policies, copyright infringement, legal action, penalty or loss of any kind regarding their articles. Neither the publisher nor the editor will be responsible for any penalty or loss of any kind if claimed in future. Contributing authors have no right to demand any royalty amount for their articles.

Printed in India at Thomson Press (India) Limited

| | |
|--|-----|
| 8 • International Relations: Emerging Issues | 109 |
| 13. India and Her Neighbors in the 21 st century: Strategies and Challenges Arjun Sarader | 126 |
| 14. India-ASEAN Relations: Trade and Connectivity Debasree Pal | 130 |
| 15. India-Iran Relations: Emerging Issues, Cooperation and Challenges Mahirul Islam | 139 |
| 16. Dynamic Nature of India China Relation in 21 st Century Surojit Mallick | 147 |
| 17. Chabahar: India's New Geo-Political Strategic Gateway in International Politics Subhadip Mukherjee | |
| PART II: COVID-19 AND WORLD POLITICS | |
| 18. COVID-19 and Social Responsibility of the Youths: A Perspective from Bangladesh Nasrin Jabin | 159 |
| 19. Covid-19 and Its Impact on Women: A Study Satyajit Saha | 166 |
| 20. Covid-19 Pandemic: Role of the SAARC Manasi Pandit | 174 |
| PART III: CONTEMPORARY GLOBAL ISSUES | |
| 21. Combating Climate Change in India: Issues, Challenges and Mitigation Mitrajit Chatterjee | 183 |
| 22. Sustainable Solid Waste Management in South Asian Countries with Special Focus on India and Bangladesh Krishna Gopal Mohanto | 193 |
| 23. Quest for Better Life through Sustainable Development Goals Lupsy Mohanty Roy | 203 |
| 24. Resilience is the Key to Combat Radicalisation: An Argumentative Analysis Tanzimul Islam and Nasrin Jabin | 211 |
| 25. Islamic Revivalism in Tajikistan: The Major Role of External Actors Amina Bibi | 221 |
| 26. Neo-realism in International Relations: Theoretical Extensions and Relevance Shyamashree Roy | 234 |
| 27. Quality of Life in Urban India: An Assessment from Environmental Perspective Santosh. N. Hubballi | 247 |

Quest for Better Life through Sustainable Development Goals

LUPSY MOHANTY ROY

Development as Sustainable Process

Development per se is quite encompassing and pervasive. It is be-all and end-all of any socio-economic structure of the society. It is a process that brings in major metamorphosis in multi-dimensional sectors leading towards growth, progress and amelioration. The main purport is to provide and enhance the quality of human life without compromising on the limited resources of the environment. It is tangible and not necessarily immediate as it might bear fruits after prolonged effort. It was only in the second half of the twentieth century that 'development' gained weightage in the International Fora. There was urgency to formulate policies to channelise the resources towards better life. It has multifarious connotations but Amartya Sen's "capability approach" stated it is a tool to attain the highest level of ability through liberty of action. The Human Development Index (HDI) which was coined by the United Nations Development Program (UNDP) in 1990 was prioritised by the approach and thus became the basis for the measurement of development. Even Martha Nussbaum emphasised the empowerment of women as a development tool by introducing the abilities approach in the ambit of 'Gender'. Jeffrey Sachs and Paul Collier grappled with various poverty traps then Sachs promoted 'Sustainable Development'. Development has to cater to the needs of present generation without compromising on the demands of the posterity. The Bretton Woods organisations and the International Monetary Fund (IMF) in the aftermath of World War II were basically established to provide International aid and fiscal assistance to countries shattered due to war. It was during the 1980s developing countries faced budgetary deficit and the aforementioned organisations provided credit under alternative terms i.e. opened the path towards development.

Connecting Asia

*Understanding Foreign Relations, Organizations and
Contemporary Issues*

Edited By:
Debasish Nandy

Foreword by:
Professor Sharad K. Soni



KUNAL BOOKS

New Delhi - 110002. (India)



KUNAL BOOKS

4648/21, 1st Floor, Ansari Road,

Daryaganj, New Delhi - 110002.

Phones: 011-23275069,9811043697

E-mail: kunalbooks@gmail.com

Website: www.kunalbooks.com

Connecting Asia Understanding Foreign Relations, Organizations and Contemporary Issues

A publication of Centre for Studies of South and South-East-Asian Societies
Kazi Nazrul University, Asansol, West Bengal, India

© Editor

First Published 2020

ISBN: 978-93-89224-94-8

[All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, mechanical, photocopying, recording or otherwise, without prior written permission of the publisher].

Published in India by Prem Singh Bisht for Kunal Books, and printed at
Trident Enterprises, Noida, (U.P.).



Connecting Asia

Understanding Foreign Relations, Organizations and
Contemporary Issues

Edited By:
Debasish Nandy

Foreword by:
Professor Sharad K. Soni



KUNAL BOOKS

New Delhi - 110002. (India)

Contents

| | |
|---|------|
| Foreword | vii |
| Preface | ix |
| Review Report of the Manuscript | xi |
| List of Contributors | xvii |
| Introduction | xx |
| Abbreviations | xxix |
| 1. Island Chains & India's Maritime Goodwill Curve: Revisiting Mackinder's Round World <i>Dr. R. P. Pradhan and Capt. Harinder Singh</i> | 1 |
| 2. India's "Knight' Move" to Central Asia <i>Dr. Abdugani Mamadazimov</i> | 19 |
| 3. Spirit and of Strategic Partnership of India and Uzbekistan <i>Dr. Farkhod Tolipov</i> | 32 |
| 4. The Role of Arab League in World Politics <i>Dr. Naved Jamal and Ayoob Salah</i> | 41 |
| 5. India's Geopolitical Interests in Afghanistan and Security Implications for Pakistan <i>Dr. Asifa Jahangir</i> | 54 |
| 6. Financial Crimes: A Comparative Study of South Asian Countries <i>Chander Mohan Gupta and Monika Thakur</i> | 83 |
| 7. China's Belt and Road Initiative and the Development-Environmental Nexus <i>Dr. Christain Ploberger</i> | 100 |
| 8. India-Kazakhstan Relations: A Growing Engagement for Shared Future <i>Dr. Pravesh Kumar Gupta</i> | 118 |

9. Indo-Bhutan Relations: Prospects and Challenges in the
Backdrop of Contemporary
Dr. Sanjit Pal 133
10. India's Policy Options in West Asia:
Challenges and Opportunities
Dr. Debasish Nandy 156
11. India-Afghanistan Relations (2001-2016)
Gulab Mir Rahmany 174
12. Indo-China Relations-A Prospective Future Alliance
Dr. Samindra Mohan Biswas 190
13. Marine Pollution and The Role of IMO in The 21st Century:
Focus On Indian Ocean
Dr. Sukanya Mukherjee 200
14. Alliance of Small Island States (AOSIS)
Renu Mann 210
15. Popular Conceptions of Democracy and Public Governance:
Some Preliminary Points
Dr. Ganga Thapa 220
16. Changing Dimensions of State Sovereignty:
Does ICL has a Role in Demise of State Sovereignty?
Ambrina Khan 249
17. Functions and Role of NSG in the Nuclear Age:
The Indian Perspective
Kalyanasis Bhattacharyya 272
18. Paternity Leave: An Emerging Issue in Bangladesh
Md. Zakir Hossen, Marufa Rahman and Sajal Roy 283
19. Myanmar: From Military Regime to Democracy
Nasrin Jabin 302
20. Human Trafficking in South East Asia: Focus On
Women and Children
Dr. Anupama Ghosal 317
21. Imagining Post-COVID-19 World: Concerns and Perspectives
Dr. Asis Mistry 331

(xv)

| | |
|--|-----|
| 22. Contemporary Trends of Human Security in Bangladesh: An Appraisal <i>Debtanu Majee</i> | 338 |
| 23. Politics of Nationalism in Bangladesh <i>Dr. Tulshi Kumar Das</i> | 351 |
| 24. Global Warming a Breakneck Impedence to the Environment: Study of the Impact of Global Warming on Environment with Special Reference to India and Maldives <i>Dr. Anil Kumar Biswas</i> | 355 |
| <i>Bibliography</i> | 368 |
| <i>Index</i> | 373 |

Marine Pollution and The Role of IMO in The 21st Century: Focus On Indian Ocean

Dr. Sukanya Mukherjee

Introduction

Maritime security is one of the latest additions to the vocabulary of international security. In the phase of globalization, the concept has received growing attention due to the increasing significance in recent years of the so-called 'blue economy' and issues relating to maritime environmental protection and resource management (Bueger & Edmunds, 2017). Since the 1970s, world seaborne trade has grown due to market globalization. Generally speaking, from ancient times up to the present day, the transportation of goods by sea has remained one of the cheapest ways of shipping and the world seaborne trade has been growing steadily, particularly after the Second World War. The number and size of merchant ships have increased due to major technological breakthroughs, yet the maritime industry has remained a dangerous workplace (Galic, Lusic, & Skoko, 2014). As a result, the environmental impacts from ocean shipping are several, and they can be summarized in different contexts. Some pollution related to ocean shipping is not directly from the ships but from efforts to serve the ocean shipping sector through port infrastructure maintenance and fleet modernization (Corbett & Winebrake, 2008: 20). Added with this, the rapid population growth and enormous urban and coastal development in many of the world's coastal regions have also responsible for the degradation of the marine ecosystem. In this context, if we focus on the study of the Indian Ocean Region we can see the effects of pollution in the marine environment began to be felt recently, although these activities are continuing for a long time. It had always been felt to establish an international body which would promote maritime safety (from all perspective) more effectively. The role of IMO (International Maritime Organization) in this regard is needed to be mentioned here.

In this context, the present paper attempts to focus on two major areas - firstly, to study the role of the International Maritime Organization (IMO)

বেদগ্রন্থমালা

(বাংলা অনুবাদ)

ত্রয়োদশ খণ্ড

শুক্লযজুর্বেদ

শতপথ-ব্রাহ্মণ

সপ্তম ভাগ

অনুবাদ

অধ্যাপক পার্থ সারথি ভট্টাচার্য

অধ্যাপক সীতানাথ দে

সম্পাদনা

অধ্যাপিকা শান্তি ব্যানার্জী



রামকৃষ্ণ মিশন ইনস্টিটিউট অব কালচার

গোলপার্ক, কলকাতা - ৭০০ ০২৯

প্রকাশক
স্বামী সুপর্ণানন্দ
রামকৃষ্ণ মিশন ইনস্টিটিউট অব কালচার
গোলপার্ক, কলকাতা - ৭০০ ০২৯

প্রথম সংস্করণ :
কল্পতরু উৎসব ১৪২৬ (১ জানুয়ারি ২০২০)

© সর্বস্বত্ত্ব সংরক্ষিত

R M I C Cataloguing-in-Publication Data

বেদ

বেদগ্রন্থমালা। কলকাতা : রামকৃষ্ণ মিশন ইনস্টিটিউট অব
কালচার, ২০২০ খ্রিঃ।

খণ্ড। সেমি।

টীকা : বেদ বঙ্গানুবাদ

১৩শ খণ্ড, শুক্রযজুর্বেদ : শতপথ-ব্রাহ্মণ, সপ্তম ভাগ

পার্শ্ব সারথি ভট্টাচার্য ও সীতানাথ দে অনূদিত এবং শান্তি ব্যানার্জী সম্পাদিত।

ISBN 978-93-88542-20-3 (VOL. XIII, PART-VII)

ISBN 978-93-81325-67-4 (SET)

১। বেদ ২। শতপথ-ব্রাহ্মণ, সপ্তম ভাগ

294.5921 — dc 23

মূল্য : তিনশো টাকা

*This book is being published with
financial assistance from the Department of Higher Education,
Government of West Bengal.*

মুদ্রক

স্বপ্না প্রিন্টিং ওয়ার্কস প্রাইভেট লিমিটেড
৫২ রাজা রামমোহন রায় সরণি, কলকাতা- ৭০০ ০০৯

শতপথ-ব্রাহ্মণ

॥ দ্বাদশ কাণ্ড ॥

প্রথম অধ্যায়

প্রথম ব্রাহ্মণ^১

(দ্বাদশাহ যাগে দীক্ষাক্রম^২)

এই কাণ্ডের প্রতিপাদ্য বিষয়সমূহ হল— দীক্ষাক্রম, সত্র, পৃষ্ঠ্য (ষড়হ), অভিলব, স্বরসাম, বিষুবৎ, মহাব্রত (ইত্যাদি)-এর ব্যাখ্যা, (তাছাড়াও) গবাময়ন, অগ্নিহোত্র, প্রায়শ্চিত্ত, মৃতকাগ্নিহোত্র, মৃতের দাহ (এই সমস্ত বিষয়গুলির বর্ণনা)।

অয়ং বৈ যজ্ঞো যোংয়ম্পবতে। তমেতং ঈক্ষন্তি যে সংবৎসরায় দীক্ষন্তে তেষাং গৃহপতিঃ
প্রথমো দীক্ষতেংযস্মৈ লোকো গৃহপতিরস্মিন্মৈ লোকং ইদং সর্বস্প্রতিষ্ঠিতং গৃহপতাংউ বৈ
সুসত্রিণঃ প্রতিষ্ঠিতা প্রতিষ্ঠায়ামেবৈতং প্রতিষ্ঠায় দীক্ষন্তে ॥১॥

এই সেই যজ্ঞ (গবাময়ন) বাতাসের মতো নিত্য বহমান। তাকে করতে ইচ্ছুক যারা, তারা একবৎসরের জন্যে দীক্ষা গ্রহণ করবেন, তাদের মধ্যে গৃহপতি-ই প্রথম দীক্ষিত হন।^৩ (কারণ) গৃহপতিই এই জগৎ এবং এই জগতের উপরই সবকিছু প্রতিষ্ঠিত। সেই হেতু তার মধ্য দিয়েই (বা মাধ্যমেই) অন্যান্য যজ্ঞকারীরা প্রতিষ্ঠিত হবেন (বা যজ্ঞকার্যে নিয়োজিত হবেন)। তাই তারা (যজ্ঞীয় ভূমিতে) দৃঢ়ভাবে প্রতিষ্ঠিত হবার পরেই যজ্ঞের জন্যে দীক্ষিত হবেন^৪ ॥১॥

১. শুক্লযজুর্বেদ বা বাজসনেয়ী সংহিতার ব্রাহ্মণের নাম শতপথ ব্রাহ্মণ। এই ব্রাহ্মণের দুটি শাখা উপলব্ধ হয় কাণ্ড ও মাধ্যন্দিন। তার মধ্যে কাণ্ড শাখার ১০৪টি অধ্যায় মাধ্যন্দিন শাখায় ১০০টি অধ্যায় বিদ্যমান। এই ব্রাহ্মণের মোট ১৪টি কাণ্ড। প্রতিটি কাণ্ড কতগুলি অধ্যায়ে, প্রতিটি অধ্যায়ে কতপয় প্রপাঠকে, প্রতিটি প্রপাঠক কতগুলি “ব্রাহ্মণ” নামক অংশে, আবার ব্রাহ্মণগুলি কতগুলি কণ্ডিকা নামক খণ্ডে বিভক্ত। (অর্থাৎ, অধ্যায় > প্রপাঠক, ব্রাহ্মণ > কণ্ডিকা)। মাধ্যন্দিন শাখায় শতপথ ব্রাহ্মণ ও ৭৬২৮ টা কণ্ডিকা আছে। (যোগীরাজ বসুঃ ২০০৫: পৃঃ ২১)। আমাদের আলোচ্য অংশটি দ্বাদশ কাণ্ডের প্রথম অধ্যায়ের প্রথম ব্রাহ্মণ।

মাধ্যমে) তিনি দেবলোকে দেবতাদের কৃতজ্ঞতা জানান এবং এই কৃতজ্ঞতা প্রদানের মাধ্যমে দেবতারাও তাঁকে তুষ্ট করেন এবং ফলত তিনি দেবলোক জয় করতে সমর্থ হন ॥১৪॥

দক্ষিণেংগেগ্নী সুরাগ্ৰহাঞ্জুহুতি। দক্ষিণেংগেগ্নী পাবযন্তি পবিত্রাভিস্বিষ্ণুযুক্তাভিঃ পিতৃনেব তংপিতৃলোকে প্ৰীণাতি তংত্রনম্প্রীতা প্ৰীণন্ত্যথো পিতৃলোকমেব জয়তি ॥১৫॥

দক্ষিণাগ্নিতে তিনি সুরাপূর্ণ গ্রহের মাধ্যমে আত্মি প্রদান করেন। সেই দক্ষিণাগ্নির নিকটে তিনি তিনবার 'পবিত্র' নামক ছাঁকনির দ্বারা সুরাকে পরিশুদ্ধ করেন। ফলত সেই পিতৃগণকে, পিতৃলোকে তিনি তুষ্ট করেন এবং তারাও তুষ্ট হয়ে বিনিময়ে তাকেও কৃতার্থ করেন। এর ফলে তিনি পিতৃলোকও জয় করেন ॥১৫॥

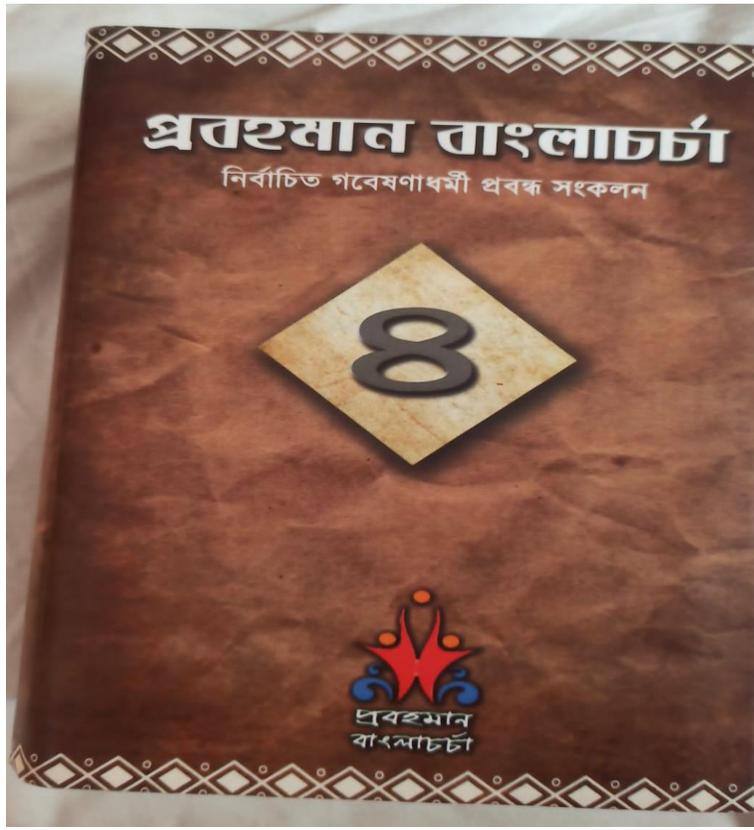
স বা ২এষং আত্মৈব যৎসৌত্রামণী। তস্মাৎসা নিরুক্তা নিরুক্তো হ্যাত্মা লোকো বয়োধাস্তস্মাৎসোহনিরুক্তোহনিরুক্তো হি লোকংআত্মা বৈ যজ্ঞস্য সৌত্রামণী বাহুংএন্দ্রশ্চ বয়োধাশ্চ তদ্যদেতাবভিতঃ পশু ভবতস্তস্মাদিমাবাত্মানমভিতো বাহু যথো বৈ পশুরেবং যুপস্তদ্যদেতং সৌত্রামণিকং যুপমেতৌ যুপাবভিতো ভবতস্তস্মাদিমাবাত্মানমভিতো বাহু ॥১৬॥

এই যে সৌত্রামণী যাগ তা হল স্বয়ং আত্মা (বা শরীর)। এই কারণে সৌত্রামণী নিরুক্ত অর্থাৎ নির্দিষ্টভাবে প্রকাশযোগ্য আবার শরীরও নিরুক্ত। লোক (ইন্দ্র বা ইন্দ্রিয়) হল বয়োধ অর্থাৎ শক্তির মূল আধার, সেহেতু এই সমগ্র লোক অনিরুক্ত অর্থাৎ সংজ্ঞায়িত করার যোগ্য নয় তেমনভাবে তিনিও হলেন অনিরুক্ত বা ভালোভাবে প্রকাশ করা সম্ভব হয় না যেখানে। সৌত্রামণী হল যজ্ঞের আত্মা এবং শক্তি বৃদ্ধিকারক ঐন্দ্র পশুদ্বয় হল বয়োধ বা তার দুই বাহু। যেহেতু সৌত্রামণী যাগেও উভয়দিকেই এক এক করে দুটো পশুকে উৎসর্গীকৃত করা হয় সেজন্য এই দুই হাত হল শরীরের দুই দিকে। যেমন যজ্ঞীয় পশু তেমনি যজ্ঞীয় যুপ। এই যজ্ঞীয় পশুর মতোই যজ্ঞে ব্যবহৃত দুই যুপকাষ্ঠ থাকে যেখানে বলি দেওয়া হয় এবং এই দুই যুপকাষ্ঠ সৌত্রামণী যাগে দুই দিকেই অবস্থান করে সেইহেতু এই দুই হাত শরীরের দুই দিকে অবস্থান করে ॥১৬॥

নবম অধ্যায়ে তৃতীয় ব্রাহ্মণ সমাপ্ত।

নবম অধ্যায় সমাপ্ত।

দ্বাদশ কাণ্ড সমাপ্ত।



রাজা জনজীবনে লোকবিশ্বাস ও লোকাচারের ভূমিকা কল্পিত কর

হাজার লোকবিশ্বাসের ক্ষেত্রে রোগবাণি বা সামাজিক পারিবারিক অন্যান্য বিপদ বিপর্যয়ের জন্য কোনো না কোনো অশুভ শক্তিকে চিহ্নিত করা হয় এবং তার ত্রুষ্টি বিধানের জন্য পূজা বা প্রায়শ্চিত্তের মাধ্যমে বিশেষ বাণি বা বিপদ থেকে নিস্তার পাওয়ার চেষ্টা করা হয়। রাজা জনগোষ্ঠীর অন্যান্য গোষ্ঠীর মতো বিশ্বাস করে যে মঙ্গলকারী দেবতার বাস করেন দেবতাদের বাসভূমি দেবলোকে যাকে তারা রাং কাং বলে কিন্তু অপদেবতা বা অশুভ শক্তির মানুষের বাসভূমিতে, নদী, নালা, বৃক্ষ বা প্রস্তর খণ্ডে যেকোনো ভাবে বসবাস করে এবং সামান্য কারণেই ক্রুপিত হয়ে মানুষের ক্ষতি করার জন্য উন্মুখ হয়ে থাকে। রাজা জনগোষ্ঠী বিচ্ছিন্নভাবে বসবাস করার কারণে তাদের বিশ্বাস লোকাচার লোকচক্রের অন্তরালে থেকে গেছে। পরবর্তীকালে চা বাগান পুস্তন, বনাঞ্চলকে সংরক্ষিত এলাকা হিসেবে ঘোষণা করা প্রভৃতি কারণে শান্তিপূর্ণ রাজাগোষ্ঠী অন্যান্য প্রতিবেশী গোষ্ঠীর সঙ্গে মিলেমিশে পাশাপাশি বসবাস করতে অভ্যস্ত হয়ে পড়ে। এর ফলে তাদের জীবিকার যেমন পরিবর্তন ঘটে তেমনি তাদের চিরায়ত লোকবিশ্বাস ও লোকাচারের ক্ষেত্রেও গুরু হয় গ্রহণ-বর্জনের প্রক্রিয়া। তারা একদিকে যেমন নিজেদের লোকবিশ্বাস ও লোকাচারের কোনো কোনো বিষয়কে পরিত্যাগ করেছে তেমনি প্রতিবেশী লোকবিশ্বাসের দ্বারা নানাভাবে প্রভাবিত হয়েছে। রাজাদের লোকবিশ্বাসগুলোকে কয়েকটা ভাগে ভাগ করে আলোচনা করা যেতে পারে।

বাদ্যযন্ত্র সম্পর্কিত লোকবিশ্বাস :

রাজাদের কিংবদন্তি অনুসারে দুঃসাহসী পূর্বপুরুষ জংশনাবেং তিনি প্রথম বাঁশের তৈরি সুরেলা বাদ্যযন্ত্র ব্রাঁংছি বা বাঁমছি পৃথিবীতে স্বর্গ থেকে আনেন আর কাঠ থেকে তৈরি রাজাদের সবচেয়ে প্রিয় যন্ত্র হেম বা ঢোলের প্রচলন করেন।

কৃষিকেন্দ্রিক লোকবিশ্বাস :

এরা কৃষিজীবী হওয়ার ফলে এদের সমাজে কৃষিকে কেন্দ্র করে নানা রকম লোকবিশ্বাস গড়ে উঠেছে। রাজাদের বিশ্বাস অনুসারে তাদের খোকছি বা বায়খো পূজা, লাংমা পূজা

প্রবহমান বাংলাচর্চা | ২০৩

ইত্যাদি পূজা উপলক্ষে যে তান্ত্রিক নৃত্যের আয়োজন তারা করে যার ফলে তারা মনে করে যে উৎপাদনশীলতা বাড়ে। যে জন্য রাজা যুবকরা বর্ষার শুরুতে তাদের শস্য ক্ষেতে নানা প্রকার নৃত্যানুষ্ঠান করে থাকেন। রাজারা পশু বলি দেয়। জমিতে ধান বোনার সময় ও নবায়নের সময় তারা প্রকৃতি ও বিভিন্ন দেব-দেবীর তৃষ্টিবিধানের জন্য মোরণ বলি দিয়ে পূজা করে। তাদের বিশ্বাস যে ফসলের জমিতে রক্তপাত হলে অধিক ফলন পাওয়া যায়। প্রকৃতির ধীলা সম্পর্কেও তাদের কিছু সৌক বিশ্বাস রয়েছে যেমন তারা বিশ্বাস করে যদি অনেক ব্যাঙ একসঙ্গে ডাকে কিংবা গর্তের কেঁচো বেরিয়ে আসে বা উইপোকা কাঁক বেঁধে উঠতে থাকে তাহলে প্রবল বর্ষণ হওয়ার সম্ভাবনা দেখা দেয়। আবার যদি অসময়ে শেয়াল ডাকে যদি কাঁকড়া তার গর্তের মূল মাটি দিয়ে বন্ধ করে দেয় তাহলে খরার সম্ভাবনা দেখা দেয়। ফড়িং আকাশে উড়তে থাকে তাহলে দেশে দুর্ভিক্ষ দেখা দেয়, তেমনি বাঁশ গাছে যদি ফুল দেখা দেয় তাহলে দেশে দুর্ভিক্ষ দুর্দশা দেখা দেয়।

যাত্রা শুভ অশুভ :

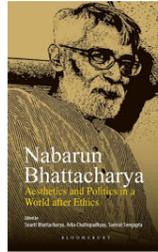
যাত্রা কথাটি ব্যাপক অর্থে উত্তর-পূর্বাঞ্চলে বা উত্তরবঙ্গের ব্যবহৃত হয়। এক স্থান থেকে অন্যত্র শুভ কাজে যাওয়াকে সাধারণভাবে যাত্রা বলে। এছাড়া এই অঞ্চলে হাতি ধরার মাহুতফান্দি, শিকার ও মৎস্য শিকারে যাওয়া যাত্রা হিসাবে প্রচলিত। এই ধরনের জীবিকা সম্পর্কিত যাত্রাতে কেউ কেউ পৃথকভাবে বিশেষ বিশেষ দেবতার পূজা দিয়ে থাকেন এই পূজাকে বলা হয় যাত্রা পূজা। তাদের বিশ্বাস যে যাত্রা পূজা প্রদানের ফলে তারা যে ঝুঁকিপূর্ণ অভিযানে যাচ্ছে সেখানে ওই দেবী তাদের রক্ষা করবেন। কিছু ক্ষেত্রে পশু বা পাখি বলি দেবার প্রথাও আছে। এছাড়া যাত্রা বলতে বোঝায় হাল যাত্রা, বিদেশ যাত্রা, বিবাহ বা অন্য কোন পুণ্য কাজের উদ্দেশ্যে যাত্রা। এধরনের যাত্রা পথে মৃতদেহ শ্মশানে নিয়ে যেতে দেখা, বিয়ের পাত্রীর বাড়িতে ধান শুকোতে দেখা, সেই বাড়িতে কাপড় বুনতে, পান নারকেল বা কলার কাঁদি পড়ে আছে দেখলে যাত্রা শুভ হয় বলে রাজাদের লোকবিশ্বাস। অন্যদিকে বিবাহের কাজে যাবার পথে যদি শ্মশানে মৃতদেহ দেখা যায়, কন্যার ঘর কাদামাটি দিয়ে নিকোতে দেখা যায়, পথে যদি কোন বক্যা নারী বা মাকুন্দ পুরুষের দেখা পাওয়া যায় তবে তা অশুভ অশুভ লক্ষণ বলে মনে করা হয়।

Nabarun Bhattacharya

Aesthetics and Politics in a World after Ethics

Sourit Bhattacharya (Volume Editor) , Arka Chattopadhyay (Volume Editor) , Samrat Sengupta (Volume Editor)

ADDITIONAL RESOURCES AVAILABLE



| | |
|---------------------|--------|
| Hardback | £85.00 |
| Ebook (Epub & Mobi) | £76.50 |
| Ebook (PDF) | £76.50 |

Quantity In stock

£53.55 RRP ~~£76.50~~ Website price saving £22.95 (30%)

ADD TO BASKET



ADD TO WISHLIST

i There's 30% off this title in our Christmas sale! Runs until midnight on the 10th December.

Read on any device, including Android, Apple & Kindle

Description

The book aims to introduce the Bengali writer (1948-2014) to a global audience through some of his short stories and poems in English translation and a series of critical essays on his works. A political commitment to literature frames Nabarun Bhattacharya's aesthetic project and the volume wishes to tease out the various perspectives on this complex meeting of politics and aesthetics. Be it the novel on dogs or those on petro-pollution and the machine, the political question in Nabarun echoes significant contemporary issues, such as animal rights, global warming and techno-capitalism. This opens up the possibility of questioning the traditional paradigm of humanist values in a world of catastrophic and violent encounters such as nuclear war or holocaust, which keeps returning in Nabarun's works.

Table of Contents

Foreword by Supriya Chaudhuri

Preface by Tathagata Bhattacharya

Acknowledgements

Nabarun Bhattacharya and His World: An Introduction by Sourit Bhattacharya, Arka Chattopadhyay and Samrat Sengupta

Part I: Nabarun Bhattacharya's Works in Translation

Short Stories

Immersion, translation by *Rijula Das*

Scarecrow, translation by *Rijula Das*

Fyataru in Spring Festival, translation by *Debadrita Bose*

4+1, translation by *Arka Chattopadhyay*

Toy, translation by *Arka Chattopadhyay*

Leopard-Man, translation by *V. Ramaswamy*

Terrorist, translation by *V. Ramaswamy*

American Petromax, translation by *V. Ramaswamy*

Nuclear Winter, translation by *Sourit Bhattacharya*

Poems

This Valley of Death Is Not My Country, translation by *Atindriya Chakrabarty*

With the Moonlight with Rifles on Chandeliers, translation by *Atindriya Chakrabarty* and *Melina Bhattacharya*

▼ Show all

Product details

| | |
|-----------|-----------------------|
| Published | 30 Sep 2020 |
| Format | Ebook (Epub & Mobi) |
| Edition | 1st |
| Extent | 314 |
| ISBN | 9789388630511 |
| Imprint | Bloomsbury India |
| Publisher | Bloomsbury Publishing |

About the contributors

SB

VOLUME EDITOR

Sourit Bhattacharya

Dr. Sourit Bhattacharya is Lecturer in Postcolonia...

AC

VOLUME EDITOR

Arka Chattopadhyay

Arka Chattopadhyay is Assistant Professor in the D...

SS

VOLUME EDITOR

Samrat Sengupta

Samrat Sengupta, Ph.D. is Associate Professor, Dep...

Reviews

“

This is an exceptional and painstaking work of rare dedication that is structurally expansive and conceptually rigorous. Most significant translators, interviewers and critical essayists have elegantly woven a complex tapestry of aesthetics, politics and ethics that committed and intricate authors of our time. The book radiantly brings to light the myriad trajectories through which Nabarun express the deepest undertones of our overwrought times.

Beneath that tale lies another layer—that, like all true political prophets, Bhattacharya could presciently prefigure and predict the future, the contours of which continue to remain spectral and contingent.

Professor Prasanta Chakravarty, Department of English, University of Delhi

”



Dr. Samrat Sengupta

'The Unknown Something': Objects beyond the Economy of Use in Nabarun's Short Stories

Authors Samrat Sengupta

Publication date 2020/9/30

Journal Nabarun Bhattacharya: Aesthetics and Politics in a World after Ethics

Pages 237

Publisher Bloomsbury Publishing

Description Nabarun Bhattacharya, a Bengali writer from India coming from Marxist lineage, wrote in a style that deviates majorly from traditional concepts of realism. In this chapter, I delineate his departure from conventional realist depictions of difference and alienation in society through his use of objects in short stories. In the modern realist form of thinking, objects generally appear either as background of the human world or as a part of man's own economy of use, his phenomenological experience of being and belonging. Objects are no longer enchanted or magical or carry some deep inexplicable meaning in modernity. They are understood only in terms of human experience and ways of looking. The word 'object' also leads to the word 'objectivity', where man can measure his relationship with his non-self dispassionately and in terms of what value they carry to man's experience and knowledge. Looking from a western enlightenment tradition objective, knowledge can lead us towards progress and a better form of existence. Marxist thought follows the same trajectory of understanding the real relationship of man with other things to move towards a more just society. Both socialist and critical realism appear to affirm the role of human mind in understanding reality as objective artefacts. My point is to show how Nabarun's stories employ objects not in terms of human use and understanding, but as wasted things inexplicable to human understanding. They effect the form of his writing as well as content. The shifting importance of things as they become more than a setting

Scholar articles ['The Unknown Something': Objects beyond the Economy of Use in Nabarun's Short Stories](#)

S Sengupta - Nabarun Bhattacharya: Aesthetics and Politics in a ..., 2020

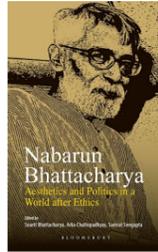
[Related articles](#)

Nabarun Bhattacharya

Aesthetics and Politics in a World after Ethics

Sourit Bhattacharya (Volume Editor) , Arka Chattopadhyay (Volume Editor) , Samrat Sengupta (Volume Editor)

ADDITIONAL RESOURCES AVAILABLE



| | |
|---------------------|--------|
| Hardback | £85.00 |
| Ebook (Epub & Mobi) | £76.50 |
| Ebook (PDF) | £76.50 |

Quantity In stock

£53.55 RRP ~~£76.50~~ Website price saving £22.95 (30%)

ADD TO BASKET



ADD TO WISHLIST

i There's 30% off this title in our Christmas sale! Runs until midnight on the 10th December.

Read on any device, including Android, Apple & Kindle

Description

The book aims to introduce the Bengali writer (1948-2014) to a global audience through some of his short stories and poems in English translation and a series of critical essays on his works. A political commitment to literature frames Nabarun Bhattacharya's aesthetic project and the volume wishes to tease out the various perspectives on this complex meeting of politics and aesthetics. Be it the novel on dogs or those on petro-pollution and the machine, the political question in Nabarun echoes significant contemporary issues, such as animal rights, global warming and techno-capitalism. This opens up the possibility of questioning the traditional paradigm of humanist values in a world of catastrophic and violent encounters such as nuclear war or holocaust, which keeps returning in Nabarun's works.

Table of Contents

Foreword by Supriya Chaudhuri

Preface by Tathagata Bhattacharya

Acknowledgements

Nabarun Bhattacharya and His World: An Introduction by Sourit Bhattacharya, Arka Chattopadhyay and Samrat Sengupta

Part I: Nabarun Bhattacharya's Works in Translation

Short Stories

Immersion, translation by *Rijula Das*

Scarecrow, translation by *Rijula Das*

Fyataru in Spring Festival, translation by *Debadrita Bose*

4+1, translation by *Arka Chattopadhyay*

Toy, translation by *Arka Chattopadhyay*

Leopard-Man, translation by *V. Ramaswamy*

Terrorist, translation by *V. Ramaswamy*

American Petromax, translation by *V. Ramaswamy*

Nuclear Winter, translation by *Sourit Bhattacharya*

Poems

This Valley of Death Is Not My Country, translation by *Atindriya Chakrabarty*

With the Moonlight with Rifles on Chandeliers, translation by *Atindriya Chakrabarty* and *Melina Bhattacharya*

▼ Show all

Product details

| | |
|-----------|-----------------------|
| Published | 30 Sep 2020 |
| Format | Ebook (Epub & Mobi) |
| Edition | 1st |
| Extent | 314 |
| ISBN | 9789388630511 |
| Imprint | Bloomsbury India |
| Publisher | Bloomsbury Publishing |

About the contributors

SB

VOLUME EDITOR

Sourit Bhattacharya

Dr. Sourit Bhattacharya is Lecturer in Postcolonia...

AC

VOLUME EDITOR

Arka Chattopadhyay

Arka Chattopadhyay is Assistant Professor in the D...

SS

VOLUME EDITOR

Samrat Sengupta

Samrat Sengupta, Ph.D. is Associate Professor, Dep...

Reviews

“

This is an exceptional and painstaking work of rare dedication that is structurally expansive and conceptually rigorous. Most significant translators, interviewers and critical essayists have elegantly woven a complex tapestry of aesthetics, politics and ethics that committed and intricate authors of our time. The book radiantly brings to light the myriad trajectories through which Nabarun express the deepest undertones of our overwrought times. Beneath that tale lies another layer-that, like all true political prophets, Bhattacharya could presciently prefigure and predict-a future, the contours of which continue to remain spectral and contingent.

Professor Prasanta Chakravarty, Department of English, University of Delhi

”



Dr. Samrat Sengupta

Nabarun Bhattacharya and his world: an introduction

Authors Sourit Bhattacharya, Arka Chattopadhyay, Samrat Sengupta

Publication date 2020/10/6

Book Nabarun Bhattacharya: Aesthetics and Politics in a World after Ethics

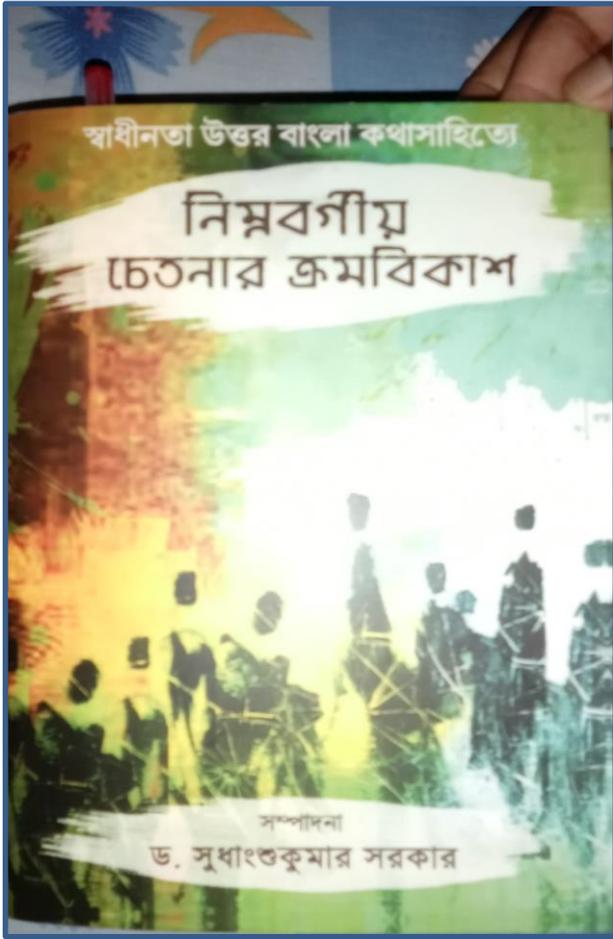
Pages xvii-xxviii

Publisher Bloomsbury

Description Nabarun Bhattacharya and his world: An introduction — University of Edinburgh Research Explorer Skip to main navigation Skip to search Skip to main content University of Edinburgh Research Explorer Home University of Edinburgh Research Explorer Logo Help & FAQ Home Research output Profiles Research Units Projects Datasets Prizes Activities Press / Media Equipment Search by expertise, name or affiliation Nabarun Bhattacharya and his world: An introduction Sourit Bhattacharya, Arka Chattopadhyay, Samrat Sengupta School of Literatures, Languages and Cultures Research output: Chapter in Book/Report/Conference proceeding › Chapter Overview Research output (2) Original language English Title of host publication Nabarun Bhattacharya Subtitle of host publication Aesthetics and Politics in a World after Ethics Editors Sourit Bhattacharya, Arka Chattopadhyay, Samrat Sengupta Publisher ...

Scholar articles [Nabarun Bhattacharya and his world: an introduction](#)
S Bhattacharya, A Chattopadhyay, S Sengupta - Nabarun Bhattacharya: Aesthetics and Politics in a ..., 2020
[All 3 versions](#)

5



উচ্ছ্বাস সমস্যায় নিম্নবর্গীয় সূচাঁদ : নির্বাসন থেকে পুনর্বাসন
 শ্যামলি মুখোপাধ্যায় ১৩৭
 শবর চরিত (১ম খণ্ড) : এক উপজাতির উপাখ্যান
 মৃগালচন্দ্র হালদার ১৪০
 হরিশঙ্কর জলদাসের উপন্যাসে প্রাপ্ত জনগোষ্ঠীর জীবনভেদ
 আজু মনোয়ারা বেনজির চৌধুরী ১৪৭
 অনিতা অগ্নিহোত্রী-র 'কাণ্ডে'— নিম্নবর্গীয় চেতনার ক্রমবিকাশ
 শ্রীতা মুখার্জী ১৫২
 নিম্ন আমি তুচ্ছ নই
 রোমিও সরকার ১৫৯
 আবু ইসহাকের ছোটোগল্প 'বিষ্ফোরণ' : নিম্নবর্গীয় চেতনার ক্রমবিকাশ
 অর্পিতা মাসান্ত ১৬৪
 মহাশ্বেতা দেবীর গল্পে নিম্নবর্গীয় চেতনা
 অঙ্কিতা গুহ ১৬৯
 মহাশ্বেতা দেবীর 'ভাত' : বঞ্চনার আড়ালে স্পন্দিত জীবন
 সুমন চ্যাটার্জী ১৭২
 সাধন চট্টোপাধ্যায়ের ছোটোগল্পে নিম্নবর্গ ভাবনা
 মহাদেব মণ্ডল ১৮০
 সাধন চট্টোপাধ্যায়ের ছোটোগল্প : প্রান্তিক মানুষের স্বর ও সংকট
 প্রসেনজিৎ রায় ১৮৭
 সুশীল জানার ছোটোগল্পে নিম্নবর্গীয় ভাবনা
 মহঃ মহকান্ত জালী ১৯৪
 স্বপ্নময় চন্দ্রের উপাখ্যান

শবর চরিত (১ম খণ্ড) : এক উপজাতির উপাখ্যান
 মৃগালচন্দ্র হালদার

দুই খণ্ডে সম্পূর্ণ রচিত 'শবর চরিত' (১৯৯৬-২০০৫) আধুনিক কথাসাহিত্যে মহাকাব্যিক উপন্যাস। নলিনী বেরার এই শবর উপাখ্যান এক ভিন্নধর্মের উপন্যাস বলার অপেক্ষা রাখে না। এ উপন্যাসে শুধু কাহিনি বর্ণনা করা হয়নি, একটি অরন উপজাতির জীবন-জীবিকা, আচার-বিচার, সংস্কার এক কথায় তাদের সামগ্রিক জীবন একটা ছবি এখানে এসেছে নলিনী তাঁর নিপুণ হাতে। নলিনী নিজেও পিছিয়ে পড়া অস্তাজ শ্রেণির মানুষ। এমন মানুষ-এর কলমে প্রাণবন্ত হবে আর এক অরন্যত গর্বে-মানুষ সেটাই স্বাভাবিক।

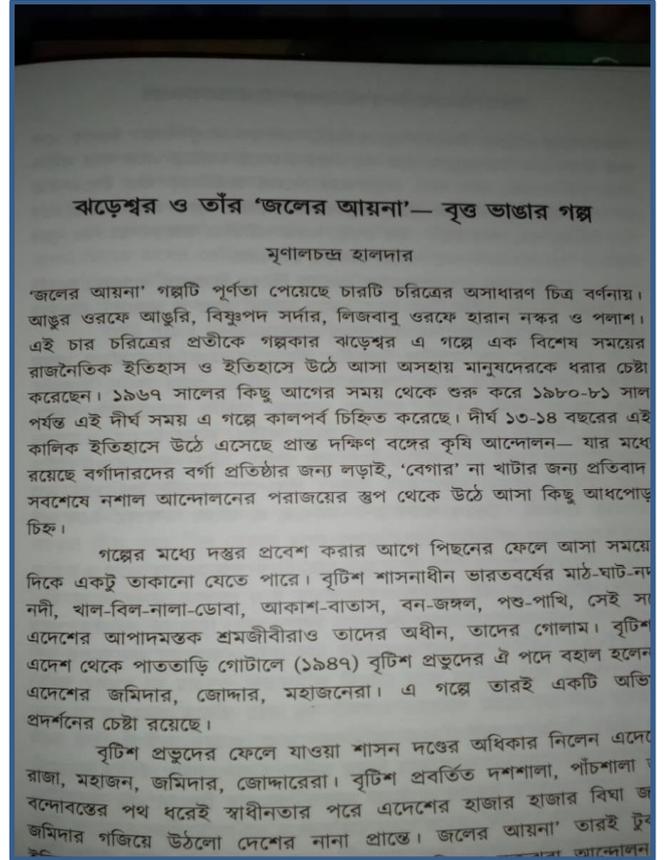
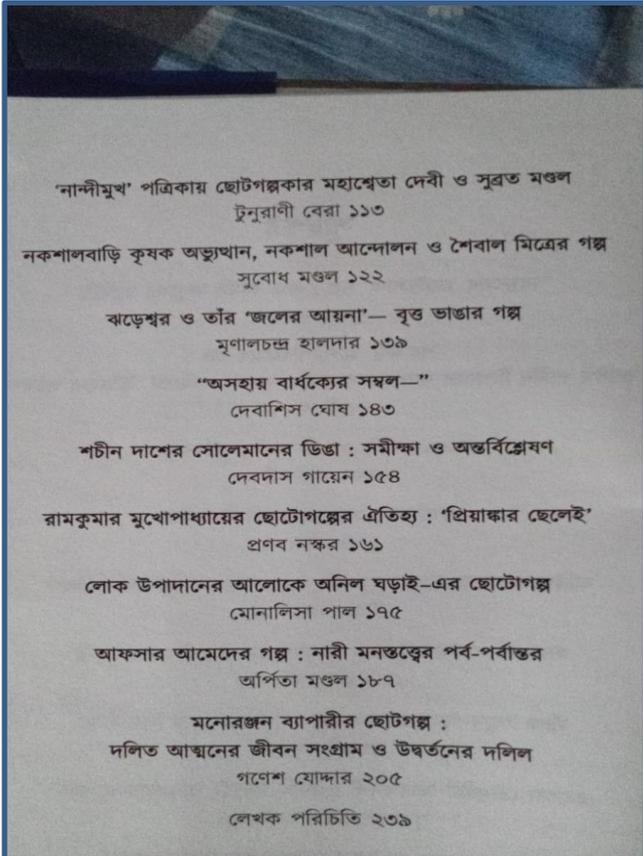
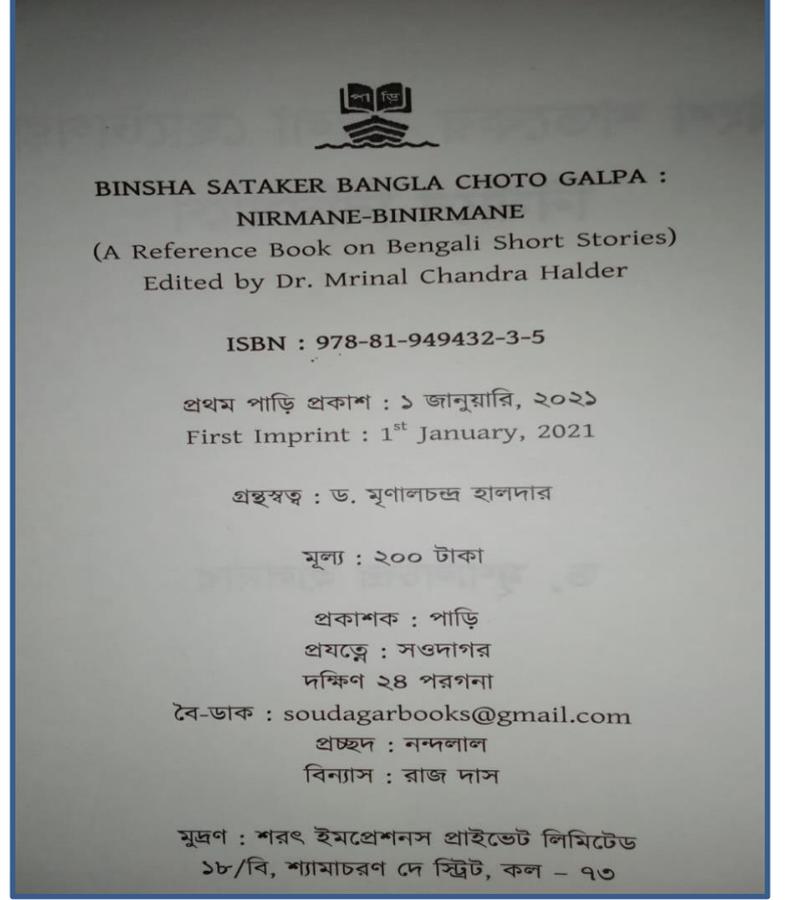
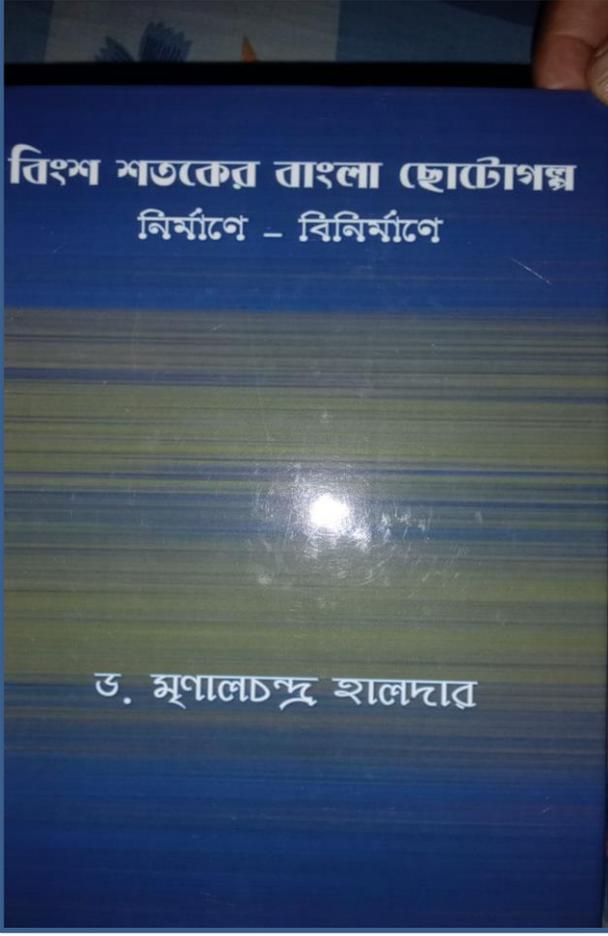
নলিনীর শবর উপন্যাসের শবররা বর্তমানে দুটি শাখায় বিভক্ত— লোখা শ ও খেড়িয়া শবর। কেউ গর্বের সঙ্গে বলে তারা লোখা, কেউ-বা জেনার নিজেই বলে বলে। শবর চরিতের প্রাচীন-উভয়কে একত্রে ধরে তাঁর Epic Novel 'শবর চরিত' নির্মাণ করেছেন— প্রায়-এক দশক ধরে ঘাম করানো শ্রমের বিনিময়ে, উপন্যাসে হৃদয়ের মহলে দস্তুর প্রবেশের পূর্বে শবর জনজাতির প্রাচীন ও বর্তমান পরিচিতি অবস্থান সম্পর্কে বিস্তারিত আভাস তুলে ধরা গেলো, যার জিহ্নে কাহিনি স্পর্শে পর উপন্যাসের অন্য শবর জনজাতিটি সম্পর্কে হল্প হলেও একটা ধারণা তৈরি করা সম্ভব হবে বলে আমার মনে হয়।

বাংলা সাহিত্যের প্রাচীন ও লিখিত নির্দেশন হল চর্যাপদ। প্রামাণিক সত্য বলে শবরপাদ। শবরপাদ রচিত দুটি গানের সন্ধান পেয়েছেন টীকাকার। প্রথম দুই চরণ এখানে তুলে ধরা গেলো :

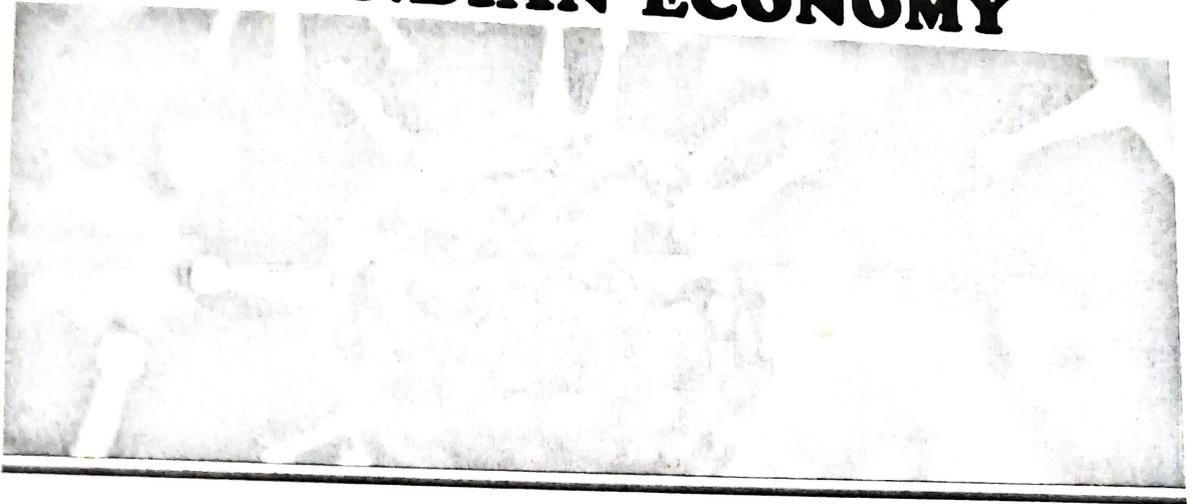
উপা উপা পাবত তঁহি বসই সবরী সাজী
 মোরঙ্গি পীচ্ছ পরহিণ সবরী গিবত গুঞ্জরী মালী। (২৮ মং পদ)

শবর পাদের এই গানটির মধ্যে সাহিত্যের ভঙ্গিমা

Book



IMPACT OF COVID-19 ON DIFFERENT SECTORS OF INDIAN ECONOMY



Editors

JANMEJOY KHUNTIA, Ph. D

*Associate Professor, Department of Economics,
School of Open Learning
University of Delhi, Delhi*

SARABJEET KAUR, Ph. D

*Assistant Professor, Zakir Hussain Delhi College (Evening)
University of Delhi, Delhi*



Academic Publication

Delhi-110090

All rights reserved. No part of this publication May be reproduced, stored in a retrieval system or Transmitted, in any form or by any means, mechanical or Photocopying, recording and otherwise, without Prior written permission of the author and the publisher.

Published by

ACADEMIC PUBLICATION

B-578, Street No-8,

Near Shanti Palace, 1st Pusta,

Sonia Vihar, Delhi- 110090

Tel.: 9811966475,9811966603

E-mali : academicpublicationsdelhi@gmail.com

E-mali : academic2014@gmail.com

www : academicpublication.in

Ghaziabad office

C-21 Nishant Colony Pavi Loni

Sadak Pur Ghaziabad-201002

First Edition Published 2021

ISBN : 978-93-83931-19-4

Laser Typesetting by : Tamalika Computers

Printed at : Nagri Printers, Delhi

PUBLISHED IN INDIA

Published by Academic Publication, Delhi-110090

LIST OF CONTRIBUTORS

| Sl. No. | Name | Institution | |
|---------|--------------------------------|--|---|
| 1. | Uma Nijhawan, P.hd | Assistant Professor, Bhagini Nivedita College, University of Delhi, Delhi |  |
| 2. | Kulwinderkaur | SGTB Khalsa College, University of Delhi, Delhi |  |
| 3. | Parmod Kumar Aggarwal, P.hd | Deptt. of Economics, Punjabi University, Patiala |  |
| 4. | Mamta Chaudhary, P.hd | Assistant Prof, Satyawati College, University of Delhi, Delhi |  |
| 5. | Anchal Jamdagni | Hindu Girls College, Sonapat |  |
| 6. | T. Kumaran, P.hd | Muslim Arts College, Kanyakumari |  |
| 7. | Ruchi Gupta, P.hd | Assistant Professor, Iswar Saran Degree College, Allahabad, UP |  |
| 8. | Lupsy Mohanty Roy | Assistant Professor, Sammilani Mahavidyalaya, Kolkata |  |
| 9. | Shubham Chavriya | Assistant Professor Fairfield Institute of Management, GGSIP, Delhi |  |
| 10. | Chandni Bisht | M.Com, School of Open Learning, University of Delhi, Delhi |  |

CONTENT

- Preface (ix)
- Acknowledgement (xi)
- Editorial : Economies in Quarantine : Janmejoy Khuntia (xiii)

| Chapter | Title | Name of Author | Pages |
|---------|--|--|-------|
| 1. | Covid-19: Lockdown-Induced Reverse Migration Drives Deep Chronic Poverty | Uma Nijhawan | 1 |
| 2. | Covid 19 – Its Impact on The Informal Sector of Indian Economy | Kulwinder Kaur and Parmod Kumar Aggarwal | 17 |
| 3. | Impact of Covid-19 on Agriculture Sector in India | Mamta Chaudhary | 30 |
| 4. | Impact of Covid'19 On Economic Activities | Anchal Jamdagni | 38 |
| 5. | Impact of Pandemic Covid-19 Outbreak on Marketing and Exporting Fish and Fishery Products from India | T. Kumaran | 50 |
| 6. | Changing Landscape of E-Commerce in India During Covid 19: From Bricks to Clicks | Ruchi Gupta | 55 |
| 7. | Fighting Out Covid-19 and Its Multidimensional Impact | Lypsy Mohanty Roy | 65 |
| 8. | Sustainable Development of Indian It Companies Post Covid-19 Era: A Profitability Analysis | Shubham Chavriya And Chandni Bisht | 71 |
| 9. | Effect of Covid-19 Pandemic on Environment- Real Picture Awaited | Poonam Mothsra | 90 |
| 10. | Covid - 19: An Overview of Opportunities of E-Commerce in Guwahati, Assam | Manab Jyoti Gogoi | 101 |

FIGHTING OUT COVID-19 AND ITS MULTIDIMENSIONAL IMPACT

ABSTRACT

Lupsy Mohanty Roy

The end of 2019 saw the outbreak of flu like disease called COVID-19 caused by corona virus which is suspected to have come from the wet market of a Chinese province or caused from animals like bat or pangolin etc. The chapter on "Fighting out Covid-19 and its Multidimensional Impact" is an academic exercise in order to make people realize that COVID-19, the viral disease is going to stay for couple of years with post recovery complications till mid 2021 as stated by the World Health Organization (WHO) in early September 2020. It's an attempt to probe the impact on socio-economic trajectory of the international order. Basically the first part will focus on its genesis and how it impinged mankind with an optimistic conclusion about new normal and vaccination.

The multi dimensional impact denotes the havoc created in different sectors of the economy with repercussion and paradigmatic shift in international relations and world politics. The chapter tries to dissuade the think tank towards critical examination of peril jeopardizing the human life and initiated a debate on life vis-a-vis livelihood. Still the new normal has equipped, the adaptive men to combat the invisible enemy. Life is not easy but it's possible amidst the predicament.

INTRODUCTION

No wonder people never realized that COVID-19 which started in late 2019 as an epidemic will become a global pandemic by the 11th of March as declared by the World Health Organization (WHO). The deadly virus which started its journey from the Laboratory IV of Wuhan Institute of Virology, Chinese Academy of Sciences (CAS) is subject to myriad conspiracy theories but there is absence of proof against any kind of scientific discrepancy. It is not clear whether the attempt was deliberate to release the micro-organism or accidental leak during various experiments being carried out for medicinal

INDIAN ADMINISTRATION

Institutions and Issues

Edited by

Dr. Nazmul Hussain Laskar



AUTHORS P R E S S

Contents

| | |
|--|----|
| <i>Preface</i> | 5 |
| 1. Good Governance in India: A Critical Study Mahbubur Rahman Laskar | 11 |
| 2. Governance in Higher Education Institutions of India: Major Issues and Problems Tapasi Sinha | 15 |
| 3. Ethics in Governance Lypsy Mohanty | 21 |
| 4. Good Governance in North East India Ananya Bose | 27 |
| 5. E-Governance: Positive Impact in India Angkita Borpatra Gohain | 34 |
| 6. Does Governance Exist? A Quest for Theory and Practice Saptarshi Mondal | 44 |
| 7. Good Governance: An Analysis Dip Jyoti Bhuyan | 49 |
| 8. Women in Panchayats: The Story of India Deepshikha Bhattacharjee | 52 |
| 9. Women Empowerment: Role of Panchayati Raj Institutions Md. Hefjullah | 56 |
| 10. Women Participation in the Panchayati Raj System in West Bengal: An Analysis SK.Raj Ali | 62 |
| 11. Criminalisation of Politics: A Biggest Threat to the Indian Democracy Suvarun Goswami | 69 |
| 12. Working of Indian Democracy: Role of Media Amit Kumar Mandal | 75 |

Worldwide Circulation through Authorspress Global Network
First Published in 2021

by

Authorspress

Q-2A Hauz Khas Enclave, New Delhi-110 016 (India)

Phone: (0) 9818049852

E-mail: authorspressgroup@gmail.com

Website: www.authorspressbooks.com

Indian Administration: Institutions and Issues

ISBN 978-93-90891-81-8

Copyright © 2021 Dr. Nazmul Hussain Laskar

Concerned authors are solely responsible for their views, opinions, policies, copyright infringement, legal action, penalty or loss of any kind regarding their articles. Neither the publisher nor the editor will be responsible for any penalty or loss of any kind if claimed in future. Contributing authors have no right to demand any royalty amount for their articles.

Printed in India at Thomson Press (India) Limited

Ethics in Governance

Lpsy Mohanty

Divorced from Ethics, Leadership is reduced to Management and Politics to Mere Technique. – James MacGregor Burns

Ethics has to be the guiding light to attain the goal of 'Good Governance'. This polemic piece will explore – 'what is ethics' and 'how ethics in governance' acts as a catalyst to bring about effective public administration and public management. The nexus between governance and ethics will be examined trying to comprehend the fiasco it will be led to if at all the authority is not abided by science of morality.

Ethics Per se

Public Administration broadly deals with implementation of governmental policies and efficacious management of public affairs. The optimum utilisation of scarce resources is also dealt with effectively. No doubt this sub field of 'Political Science' stresses upon policy analysis and evaluation research. Ethics is one of the six pillars of Public Administration namely human resources, organisational theory, policy analysis and statistics and budgeting.

'Ethics' is interchangeably used with 'morality'. It is basically derived from Greek word '*ethikos*' which means associated with '*ones character*' or '*arising from habit*'. Some thinkers opine it has its genesis from Latin word '*ethicus*' means '*character*'. It is essentially part of philosophy, normative studies, utilitarianism, hedonism, consequentialism, deontology etc. Utilitarianism is essentially a strand of consequentialist ethics emphasising on "greatest good of greatest number". Utility being one of the determining factors in case of Utilitarianism. Consequentialism is all about moral theories, consequences of any particular action which acts as a basis of valid moral judgement made about the said action. Duty or obligation based ethics is called Deontological ethics. The rightness or wrongness of actions is seen than rightness or wrongness of the consequences of those actions.

It is an interdisciplinary topic and also inter-related with various other disciplines in post-modern epoch. Philosophers, great thinkers, political scientist, intellectuals, statesman of different ages have been critically analysing and contemplating on the

EDUCATION IN A COMPETITIVE AND GLOBALIZING WORLD

REFUGEE EDUCATION IN SOUTH ASIA

policies, Practices, and Implications



Mahbub Alam Prodip
Goutam Roy
Debasish Nandy
Editors

NOVA

Complimentary Contributor Copy

CONTENTS

| | | |
|-----------------|--|------|
| Foreword | <i>Dr. Johanna Garnett</i> | xi |
| Acknowledgments | | xiii |
| Abbreviations | | xv |
| Chapter 1 | Refugee Education as a Human Right: A South Asian Perspective <i>Mahbub Alam Prodip</i> | 1 |
| Chapter 2 | Religious Education for Rohingya Refugee Children in Bangladesh: Purposes, Prospects, and Problems <i>Iqthyer Uddin Md Zahed and Mahbub Alam Prodip</i> | 19 |
| Chapter 3 | Educational Status of Bihari Refugees in Bangladesh <i>Nasrin Jabin and Tanzimul Islam</i> | 55 |

| | | |
|--------------------------|---|------------|
| Chapter 4 | Formulation of Teacher's Competency Framework in the Context of Rohingya Refugee Education in Bangladesh: Lessons Learned <i>Happy Kumar Das, M. Shahriar Shafiq and G M Rakibul Islam</i> | 87 |
| Chapter 5 | Refugee Child Education in India: In Search of Governmental Policy <i>Debasish Nandy, Mahbub Alam Prodip, Anil Kumar Biswas and Golam Rabbani</i> | 117 |
| Chapter 6 | Understanding Refugee Education: An Assessment of Afghan Refugees in Pakistan and India through Policy Analysis <i>Sukanya Mukherjee</i> | 145 |
| Chapter 7 | Role of Education in Social Integration: A Case Study of Bhutanese Refugees of Nepal in Australia <i>Shafi Md Mostofa and Baki Md. Murtoza</i> | 171 |
| Chapter 8 | Access to Higher Education for Refugees in South Asia <i>M. Mahruf C. Shohel, Goutam Roy, Muhammad Shajjad Ahsan and Dev Raj Acharya</i> | 187 |
| Chapter 9 | Education for Refugees in South Asia: Aid or Development? <i>Goutam Roy, Mahbub Alam Prodip and Debasish Nandy</i> | 223 |
| About the Editors | | 231 |
| About the Authors | | 233 |
| Index | | 239 |

Chapter 6

**UNDERSTANDING REFUGEE EDUCATION:
AN ASSESSMENT OF AFGHAN REFUGEES
IN PAKISTAN AND INDIA THROUGH
POLICY ANALYSIS**

*Sukanya Mukherjee**

Department of Political Science,
Sammilani Mahavidyalaya, Kolkata, West Bengal, India

ABSTRACT

Education for Refugee children is one of the most sensitive issues in the world today. Due to conflict and persecution, Refugee children usually drop out of schools as they are forced to seek refuge in other countries. Refugees in some countries face numerous restrictions on their entrance in national schools and have access solely to unregistered, non-formal and informal schools. As a result, they are deprived of receiving the formal secondary and tertiary level of education. The emerging issues related to Afghan refugee education are also no exception in this regard. There are

Chapter 6

**UNDERSTANDING REFUGEE EDUCATION:
AN ASSESSMENT OF AFGHAN REFUGEES
IN PAKISTAN AND INDIA THROUGH
POLICY ANALYSIS**

Sukanya Mukherjee*

Department of Political Science,
Sammilani Mahavidyalaya, Kolkata, West Bengal, India

ABSTRACT

Education for Refugee children is one of the most sensitive issues in the world today. Due to conflict and persecution, Refugee children usually drop out of schools as they are forced to seek refuge in other countries. Refugees in some countries face numerous restrictions on their entrance in national schools and have access solely to unregistered, non-formal and informal schools. As a result, they are deprived of receiving the formal secondary and tertiary level of education. The emerging issues related to Afghan refugee education are also no exception in this regard. There are

* Corresponding Author's E-mail: sukanya.kgp@gmail.com.

For CBCS B.A, M.A & NET/SET

রাষ্ট্রতত্ত্ব : দৃষ্টিভঙ্গি ও বিতর্ক

সম্পাদনা

জয়প্রকাশ মণ্ডল

সুবীর গায়েন



এভেনেল প্রেস



Rastratattwa : Drishtibhangi O Bitarka,
Edited by Joyprokash Mondal & Subir Gayen

প্রথম সংস্করণ : অক্টোবর, ২০২১

© ছায়াপথ

প্রকাশক এবং স্বত্বাধিকারীর লিখিত অনুমতি ছাড়া এই বইয়ের কোনও অংশেরই কোনও পুনরুৎপাদন বা প্রতিলিপি করা যাবে না। কোনও যান্ত্রিক উপায়ের (গ্রাফিক, ইলেকট্রনিক বা অন্য কোনও মাধ্যম যেমন ফোটোকপি, টেপ বা পুনরুদ্ধারের সুযোগ সম্বলিত তথ্য সঞ্চয় করে রাখার কোনও পদ্ধতি) মাধ্যমে প্রতিলিপি করা যাবে না। কোনও ডিস্ক, প্লেট, পারফোরেটেড বা কোনও তথ্য সংরক্ষণের যান্ত্রিক পদ্ধতিতে পুনরুৎপাদন করা যাবে না। এই শর্ত লঙ্ঘিত হলে আইনি ব্যবস্থা গ্রহণ করা যাবে।

ISBN : 978-93-90873-68-5

এভেনেল প্রেসের পক্ষে সুভাষনগর, মেমারী, পূর্ব বর্ধমান থেকে অঞ্জন সাহা কর্তৃক প্রকাশিত এবং শরৎ ইম্প্রেশন প্রাইভেট লিমিটেড, ১৮ বি শ্যামাচরণ দে স্ট্রিট, কলকাতা-৭৩ থেকে মুদ্রিত।

email : avenelindia@gmail.com ; info@avenelpress.com ;
avenelpress34@gmail.com

website : www.avenelpress.com

অক্ষর বিন্যাস : আর. কম্পোজিং

প্রচ্ছদ চিত্র : রমেশ সরকার

প্রচ্ছদ : বাবুল দে



সূচিপত্র

- ১৩ ভূমিকা : রাষ্ট্রতত্ত্ব ও বিতর্ক
—জয়প্রকাশ মণ্ডল
- ২১ নীতিমানবাচক দৃষ্টিভঙ্গি : রাষ্ট্রদর্শনের মূল্যমানগত পর্যালোচনা
—সুবীর গায়ের
- ৩৪ আইনি-প্রাতিষ্ঠানিক দৃষ্টিভঙ্গি : রাষ্ট্র ও রাজনীতির প্রাতিষ্ঠানিক
অনুশীলন
—নন্দন সাহা
- ৪১ অভিজ্ঞতাবাদ : রাষ্ট্রবিজ্ঞান চর্চার বিজ্ঞান নির্ভর তত্ত্ব অনুসন্ধান
—সংযুক্তা রায়
- ৫১ আচরণবাদ ও উত্তর-আচরণবাদ : রাষ্ট্রবিজ্ঞান চর্চার বৈজ্ঞানিক
যুক্তিবাদিতা ও মূল্যমানতার সংযুক্তি
—অভিক ধর
- ৬৩ ব্যবস্থাজ্ঞাপক তত্ত্ব : রাষ্ট্রবিজ্ঞান চর্চায় বিশ্লেষণমূলক দৃষ্টিভঙ্গি
—অর্ণব কয়াল
- ৯১ কাঠামো-কার্যবাদ : রাজনৈতিক ব্যবস্থার কাঠামো পর্যালোচনা
—অনুপম পাত্র
- ১১৩ যোগাযোগ তত্ত্ব : রাজনীতির সাইবারনেটিক্ পর্যালোচনা
—পরিতোষ বর্মণ
- ১২৩ উদারনীতিবাদ : তত্ত্ব ও ব্যাখ্যার আলোকে
—সুদেষ্ণা দাস
- ১৫৬ সমাজ কল্যাণবাদ : রাষ্ট্রের জনকল্যাণমুখী দৃষ্টিভঙ্গি
—নির্বীর মুখার্জী

- ১৭১ উত্তরউপনিবেশবাদ : প্রাচ্য পাঠের সন্দর্ভ
—অরিজিৎ চৌধুরী
- ১৮২ নারীবাদ : তত্ত্ব ও বাস্তবতা
—জয়িতা পাল
- ২১৭ উত্তর-আধুনিকতাবাদ : রাষ্ট্র-সমাজ-রাজনীতির বহুমাত্রিক দৃষ্টিকোণ
—সুবীর গায়েন
- ২৩২ বহুসংস্কৃতিবাদ : দৃষ্টিভঙ্গি ও বিতর্ক
—ড. প্রদীপ্ত মুখার্জী ও মনীষা ঘোষ
- ২৪১ রাজনীতিশাস্ত্রে পরিবেশবাদ : একটি তাত্ত্বিক ও প্রায়োগিক রূপরেখা
—অনিবার্ণ মুখার্জী
- ২৫৯ সমাজতন্ত্র : তাত্ত্বিক অভিমুখ পর্যালোচনা
—জয়প্রকাশ মণ্ডল
- ২৬৯ দ্বন্দ্বমূলক বস্তুবাদ
—অভিষিক্তা পাল
- ২৮১ ঐতিহাসিক বস্তুবাদ
—ড. তুলিকা চক্রবর্তী
- ২৯৭ মার্কসীয় দৃষ্টিতে রাষ্ট্র
—বিকাশ নস্কর
- ৩২২ শ্রেণি ও শ্রেণিসংগ্রাম তত্ত্ব
—কল্যাণ কুমার সরকার
- ৩৩৯ উদ্বৃত্ত মূল্যের তত্ত্ব
—শঙ্কর ভূঁইয়া
- ৩৫০ মার্কসের বিচ্ছিন্নতা তত্ত্ব
—প্রণব কুমার জানা

- ৩৬১ প্রসঙ্গ গণতন্ত্র : মার্কসের ধ্যানবিন্দু বিশ্লেষণ
—জয়প্রকাশ মণ্ডল
- ৩৬৮ স্বাধীনতা সম্পর্কিত মার্কসীয় ধারণা ও দৃষ্টিভঙ্গি
—দেবশীষ সরকার
- ৩৮৩ পার্টি সম্পর্কে মার্কসীয় দৃষ্টিভঙ্গি : লেনিন-লুক্সেমবুর্গ বিতর্ক
—ড. সুকন্যা মুখার্জী
- ৩৯১ লেনিনের বিপ্লব তত্ত্ব : মার্কসবাদের বাস্তব প্রয়োগ
—নারায়ণ সামন্ত
- ৪১৯ মাও জে দং-এর বিপ্লব তত্ত্ব : মার্কসবাদের নয়া গণতান্ত্রিক অনুশীলন
—কার্তিক ভূঁইয়া
- ৪৩৭ সাম্রাজ্যবাদ : 'হবসন-লেনিন থিসিস' পর্যালোচনা
—জয়প্রকাশ মণ্ডল ও সুবীর গায়ের
- ৪৫৭ হেজিমনি : গ্রামশির ধারণা ও দৃষ্টিভঙ্গি
—অর্ণব কয়াল
- ৪৭০ পুর সমাজ সম্পর্কে গ্রামশি-র ধারণা
—ড. চৈতালী বসু
- ৪৭৫ ক্রিটিক্যাল থিওরি
—জয়প্রকাশ মণ্ডল
- ৪৯০ উত্তর-মার্কসবাদ : একটি সংক্ষিপ্ত বিশ্লেষণ
—নির্ঝার মুখার্জী
- ৫০৭ Bibliography
- ৫১৬ বর্ণানুক্রমিক সূচি

পার্টি সম্পর্কে মার্কসীয় দৃষ্টিভঙ্গি : লেনিন-লুক্সেমবুর্গ বিতর্ক

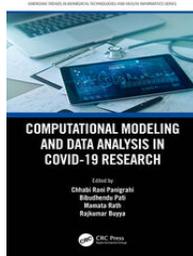
ড. সুকন্যা মুখার্জী

১৯৯১ সালে পূর্বতন সোভিয়েত ইউনিয়নের পতন ও তদানুকালীন বিশ্বরাজনৈতিক পরিস্থিতি মার্কসবাদী চিন্তাধারার অনুকল্পিত চিন্তাধারাগুলিকে রাজনৈতিক আলোচনার মূলস্রোতে আসতে সাহায্য করেছিল। আর সে কারণেই রাষ্ট্রবিজ্ঞান পাঠের জগতে মার্কসবাদ আলোচনা প্রসঙ্গে যে সকল উত্তর-মার্কসবাদীদের নাম উঠে আসে, তাদের মধ্যে রোজা লুক্সেমবুর্গ (১৮৭১-১৯১৯) অন্যতম।

জন্মসূত্রে পোলিশ রোজা লুক্সেমবুর্গ-র রাজনৈতিক জীবনের প্রাথমিক পর্যায়টি পোল্যান্ডের শ্রমিক আন্দোলনকে ঘিরেই আবর্তিত হয়েছিল। আর তারই ফলশ্রুতি ছিল ১৮৯৩ সালের মার্কসীয় চিন্তাধারাপুষ্টি SDKP বা Social Democracy of the Kingdom of Poland রাজনৈতিক দলটির প্রতিষ্ঠা, যা পরবর্তীকালে পোল্যান্ডের কমিউনিস্ট শ্রমিক দলের সঙ্গে যুক্ত হয়। বলা বাহুল্য, রোজা লুক্সেমবুর্গ-র রাজনৈতিক চিন্তাধারার মূল বা প্রধান সত্ত্ব (essence) টি জার্মান সোশ্যাল ডেমোক্রেটিক পার্টি (এস.ডি.পি)-র বৈপ্লবিক সমাজতন্ত্র ও পরবর্তীকালে ১৯১৯ সালে রোজা ও তাঁর সহযোগী কার্ল লীবখেনশট্ (Karl Liebknecht)-এর সহায়তায় প্রতিষ্ঠিত জার্মান কমিউনিস্ট পার্টির কার্যকলাপকে কেন্দ্র করে আবর্তিত হয়েছিল।

রোজা লুক্সেমবুর্গ-র দার্শনিক দৃষ্টিভঙ্গির অন্তর্গত যে বিষয়গুলি বর্তমানকালেও অত্যন্ত গুরুত্বের সাথে আলোচিত হয়ে থাকে, তার মধ্যে উল্লেখযোগ্য হল, সমাজবাদ এবং গণতন্ত্র সম্পর্কে তাঁর স্বচ্ছ ধারণা এবং বিপ্লবের সাথে এই দুইয়ের সম্পর্ক। উল্লেখ্য, বিপ্লব, সমাজতন্ত্র, গণতন্ত্র, সাংগঠনিক কার্যকলাপের আদর্শবাদী চিন্তা রোজা লুক্সেমবুর্গ-কে যেমন এস.পি.ডি থেকে বেরিয়ে এসে স্বতন্ত্র জার্মান কমিউনিস্ট পার্টি গঠনে সহায়তা করেছিল, তেমনই তা লেনিন-রোজা বিতর্ককেও পুষ্ট করেছিল।

Book



Computational Modeling and Data Analysis in COVID-19 Research

Edited By *Chhabi Rani Panigrahi* (</search?contributorName=Chhabi Rani Panigrahi&contributorRole=editor&redirectFromPDP=true&context=ubx>), *Bibudhendu Pati* (</search?contributorName=Bibudhendu Pati&contributorRole=editor&redirectFromPDP=true&context=ubx>), *Mamata Rath* (</search?contributorName=Mamata Rath&contributorRole=editor&redirectFromPDP=true&context=ubx>), *Rajkumar Buyya* (</search?contributorName=Rajkumar Buyya&contributorRole=editor&redirectFromPDP=true&context=ubx>)

| | |
|-----------------|---|
| Edition | 1st Edition |
| First Published | 2021 |
| eBook Published | 10 May 2021 |
| Pub. Location | Boca Raton |
| Imprint | CRC Press |
| DOI | https://doi.org/10.1201/9781003137481 (https://doi.org/10.1201/9781003137481) |
| Pages | 270 |
| eBook ISBN | 9781003137481 |
| Subjects | Bioscience, Engineering & Technology, Health and Social Care |

Share

Citation

ABSTRACT



TABLE OF CONTENTS



(<https://www.taylorfrancis.com>)

Policies



Journals



Corporate



Help & Contact



Connect with us



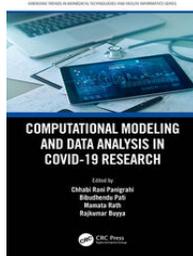
(<https://www.linkedin.com/company/taylor-&-francis-group/>) (<https://twitter.com/tandfnewsroom?lang=en>) (<https://www.facebook.com/TaylorandFrancisGroup/>) (<https://www.youtube.com/user/TaylorandFrancisGroup>)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG

© 2023 Informa UK Limited

< Computational Modeling and Data Analysis in COVID-19 Research (<https://www.taylorfrancis.com/books/edit/10.1201/9781003137481/computational-modeling-data-analysis-covid-19-research-chhabi-rani-panigrahi-bibudhendu-pati-mamata-rath-rajikumar-buyya>) [Show Path](#) ▾

Chapter



Analysis of COVID-19 Data Using Consensus Clustering Technique

By [Arko Banerjee](#) ([/search?contributorName=Arko Banerjee&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Arko%20Banerjee&contributorRole=author&redirectFromPDP=true&context=ubx)), [Sunandana Mukherjee](#) ([/search?contributorName=Sunandana Mukherjee&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Sunandana%20Mukherjee&contributorRole=author&redirectFromPDP=true&context=ubx)), [Chhabi Rani Panigrahi](#) ([/search?contributorName=Chhabi Rani Panigrahi&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Chhabi%20Rani%20Panigrahi&contributorRole=author&redirectFromPDP=true&context=ubx)), [Bibudhendu Pati](#) ([/search?contributorName=Bibudhendu Pati&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Bibudhendu%20Pati&contributorRole=author&redirectFromPDP=true&context=ubx)), [Rajib Mall](#) ([/search?contributorName=Rajib Mall&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Rajib%20Mall&contributorRole=author&redirectFromPDP=true&context=ubx))

Book [Computational Modeling and Data Analysis in COVID-19 Research](https://www.taylorfrancis.com/books/edit/10.1201/9781003137481/computational-modeling-data-analysis-covid-19-research-chhabi-rani-panigrahi-bibudhendu-pati-mamata-rath-rajikumar-buyya) (<https://www.taylorfrancis.com/books/edit/10.1201/9781003137481/computational-modeling-data-analysis-covid-19-research-chhabi-rani-panigrahi-bibudhendu-pati-mamata-rath-rajikumar-buyya>)

| | |
|-----------------|---------------|
| Edition | 1st Edition |
| First Published | 2021 |
| Imprint | CRC Press |
| Pages | 12 |
| eBook ISBN | 9781003137481 |

[Share](#)

ABSTRACT

< [Previous Chapter](https://www.taylorfrancis.com/chapters/edit/10.1201/9781003137481-1/machine-learning-implementations-covid-19-kabita-kumari-pahuja-sanjeev-kumar?context=ubx) (chapters/edit/10.1201/9781003137481-1/machine-learning-implementations-covid-19-kabita-kumari-pahuja-sanjeev-kumar?context=ubx) [Next Chapter](https://www.taylorfrancis.com/chapters/edit/10.1201/9781003137481-3/mobmgan-rajashree-nayak-bunil-ku-balabantaray-dipti-patra?context=ubx) > (chapters/edit/10.1201/9781003137481-3/mobmgan-rajashree-nayak-bunil-ku-balabantaray-dipti-patra?context=ubx)



(<https://www.taylorfrancis.com>)

[Policies](#)

Journals



Corporate



Help & Contact



Connect with us



(<https://www.linkedin.com/company/taylor-&-francis-group/>) (<https://twitter.com/tandfnewsroom?lang=en>) (<https://www.facebook.com/TaylorandFrancisGroup/>) (<https://www.youtube.com/user/TaylorandFrancisGroup>)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG

© 2023 Informa UK Limited

বিংশ শতকের বাংলা ছোটগল্প নির্মাণে – বিনির্মাণে

ড. মৃগালচন্দ্র হালদার

শরদিন্দু বন্দ্যোপাধ্যায়ের গল্প : আদিম; প্রাচীন মিশরের দাম্পত্য সম্পর্ক ও সমাজ সাহিত্যে ইতিহাস অন্বেষণ

কল্পিত কর

প্রাচীন মিশরীয় সমাজ সংস্কৃতির প্রেক্ষাপটে শরদিন্দু বন্দ্যোপাধ্যায়ের আদিম গল্প যেন আজ থেকে পাঁচ হাজার বছর আগের মিশরীয় সমাজের এক টুকরো জীবন্ত দলিল। আজকের মত সেই সমাজে বিবাহ নামক প্রতিষ্ঠানটি অতীব গুরুত্বপূর্ণ ছিল। যেটি পারস্পরিক বিশ্বাস ও শ্রদ্ধার ভিত্তিতে গড়ে ওঠে। আবার আজন্ম লালিত সেই পুরুষতন্ত্র, যৌনতার ধ্যান-ধারণা, দাসত্ব, অলৌকিক শক্তির ব্যবহার এই বিষয়গুলি ও চমৎকারভাবে উঠে এসেছে এই গল্পে। ঐতিহাসিক গুরুত্ব বিচারে এই গল্পটি লেখকের সার্থক প্রয়াস।

ঐতিহাসিক গল্পে মূলত বিশেষ কোন সময়ের বা ঘটনার পটভূমিতে চরিত্র গুলির কথোপকথনের মাধ্যমে কাহিনীর বিন্যাস ঘটানো হয়। লেখক ভাষা ও শব্দপ্রয়োগকে যুগপোয়োগী করে সেই বাস্তবতাকে প্রাঞ্জল করে তোলেন। শরদিন্দু বন্দ্যোপাধ্যায়ের আদিম এরকমই একটি ঐতিহাসিক গল্প। গল্পটির কেন্দ্রভূমি আজ থেকে পাঁচ হাজার বছর আগেকার মিশর। গল্পটির বিষয়বস্তু মরুভূমির পরপারে মহারাজা সূর্যশেখর শত্রু রাজ্য জয় করে ধনরত্ন ও সহস্র বন্দী বন্দি নিজে নিজ রাজ্যে ফিরছেন। যার মধ্যে একশত বন্দি ও বন্দিনী তিনি নিজে বেছে নেন এবং বাকি যারা থাকবে তাদের প্রধান সেনাপতি থেকে নিম্নতম নায়ক পর্যন্ত সকলে পদমর্যাদা অনুযায়ী ভাগ করে নেবে, ধনরত্ন ও ভাগ বাটোয়ারা হবে। প্রাচীন মিশরের ইতিহাসে বিশেষ করে নিউ কিংডম এর সময় অর্থনীতির একটি গুরুত্বপূর্ণ বৈশিষ্ট্য ছিল এই দাস ব্যবস্থা। সাধারণত যুদ্ধবন্দীরাই দাস হিসেবে ব্যবহৃত হতো। তাদের সম্পত্তি বা পণ্য হিসাবে কেনাবেচা চলত। আবার কখনও কখনও মহাজনের ঋণের জালে আবদ্ধ হয়েও দাস হিসেবে তারা জীবন কাটাতো। এবং এরা প্রভুর বাড়িতে কাজ করতো। আবার কোন দাসের যদি বিশেষ কোনো দক্ষতা থাকত তাহলে সে আলাদা করে গুরুত্ব পেত। তারা কখনো কারিগর হিসেবে, লেখাপড়া জানা থাকলে প্রভুর এস্টেটের ম্যানেজার হিসেবে, আবার কখনো খনিতে কাজ করে জীবন নির্বাহ

বিংশ শতকের বাংলা ছোটগল্প : নির্মাণে-বিনির্মাণে

করতো। দাসকে যেকোনো কাজে যেভাবে খুশি ব্যবহার করা যেত, তাদের কোন স্বাধীন জীবন ছিল না।

এই কাহিনীর মুখ্য চরিত্র সোমভদ্র নামে এক কনিষ্ঠ সেনানী, যার “বয়স একুশ বাইশ, বলিষ্ঠ দেহ, তাম্র ফলকের ন্যায় দেহবর্ণ : সুন্দর আকৃতি।” রাজার সাথে এই প্রথমবার সেও যুদ্ধযাত্রা করেছিল। যুদ্ধে তাঁর অসীম পরাক্রমে সে রাজা সহ প্রধান সেনানায়কদের যথেষ্ট প্রশংসা পেয়েছে। পরদিন তারা লুণ্ঠিত দ্রব্যের অংশ এবং দু-একটি দাস-দাসী পেয়ে মহানন্দে গৃহে ফিরবে। কিন্তু আমরা দেখি সোমভদ্রের মনের অবস্থা অন্যরকম। তার মন চঞ্চল। “সম্মুখে নীয়মান পতাকার ন্যায় তাহার মন পিছন দিকে তাকাইয়া আছে।” তার অন্যতম কারণ ঐ বন্দিনী দের মধ্যে মেরুকা নামে এক বন্দিনী আছে, যাকে সোমদেবের ভাগ্যে লেগেছে। যদিও সে কথা পরিষ্কার করে তাকে বলা হয়নি তার। এরকম অবস্থায় সোমভদ্র মেরুকার সাথে দেখা করে, নিষ্ঠুর নিয়তির পরিণতিতে নিমজ্জিত অসহায় হতাশাগ্রস্ত মেরুকাকে ভগিনী সম্বোধন করে, তাকে বিয়ের প্রস্তাব দেয় এবং জানায় নিয়ম অনুযায়ী বিজয়ী সেনানীর একটি বন্দিনী প্রাপ্য, সেই মতো সে মেরুকাকেই বেছে নেবে, তারপর বাড়ি নিয়ে গিয়ে তাকে বিয়ে করবে। এখানে বলে রাখা প্রয়োজন বিবাহ নামক প্রতিষ্ঠানটি সমাজে খুবই গুরুত্বপূর্ণ ছিল। মিশরীয় সমাজ ছিল স্ত্রীবিন্যস্ত। যার ওপরে ছিল রাজা, তারপর অভিজাত ও সাধারণ মানুষ। এক বিবাহ সমাজে গুরুত্ব পেলেও রাজা ও অভিজাত পরিবারে বহু বিবাহে কোন বাধা ছিল না বরং সেটাই ছিল স্বাভাবিক দস্তুর। যৌনতা সম্পর্কে প্রাচীন মিশরীয়দের ধারণা বেশ আকর্ষণীয়। তাদের মধ্যে কুমারীত্বের ধারণা কিন্তু দেখা যায় না এবং নারী বা পুরুষ উভয়ই বিবাহ পূর্ব সম্পর্কে লিগু থাকতে পারতো। এ নিয়ে সমাজে কোনো বাধা-নিষেধ ছিল না। যদিও বিবাহ পরবর্তী বিবাহ বহির্ভূত সম্পর্ক সমাজে নিষিদ্ধ ছিল।

প্রাচীন মিশরে নারীকে ভগিনী হিসেবে সম্বোধন করার প্রথা ছিল এবং বিশেষ করে রাজকীয় পরিবারে ও অভিজাত পরিবারের সহোদর সহোদরার বিবাহ রীতি প্রচলিত ছিল। এর একটা কারণ সম্পত্তি যাতে নিজেদের মধ্যেই থাকে এবং দ্বিতীয়ত যে কারণটি সেটি হল, তারা মনে করত বিয়ের ফলে ভূমিষ্ট শিশু জননীর রক্তধারা পায়, তাই সে কারণে তারা পরিবারের বাইরে অন্যত্র বিবাহে উৎসাহী ছিল না। যদিও সাধারণের ক্ষেত্রে এই নিয়মটা সব সময় খাটতো না।

গল্পে দেখি রীতি অনুযায়ী জন্ম থেকেই সোমভদ্রের বোন তার জন্য স্ত্রী হিসেবে ঠিক করা। যুদ্ধে কীর্তি অর্জন করে সোমভদ্র বাড়ি ফিরেছে, পিতা মাতা

| | |
|--|-----|
| 13. Caste as Decisive and Integrative Factor in India: A Socio Legal Approach | |
| Gargi Singh | 165 |
| 14. Non-discrimination on the Basis of Caste: A Constitutional Mandate | |
| Debabrata Basu | 179 |
| 15. Regionalism and Social Transformation in India | |
| Dr. Sadhna Gupta | 189 |
| 16. Constitutional Text as a Means of Social Change | |
| Sayantani Bagchi | 205 |
| 17. Constitutional Amendment and Social Transformation | |
| Lupsy Mohanty Roy | 223 |
| 18. Law and Society: Reflection & Refraction | |
| Dr Subhra Bakul Karmakar | 239 |
| 19. Working of the Constitution for Social Transformation | |
| Bratin Ghosh | 259 |
| 20. Constitutional Perspectives of Social Transformation Reflected in the Fundamental Duties | |
| Dr. Somnath Roy | 275 |
| 21. Crime Against Women: A Critical Analysis on the Transgression and Villainy Faced by Indian Women and the Remedial Mechanism Available for their Protection in India | |
| Upala Basu | 289 |
| 22. Crimes Against Children | |
| Madhubanti Sadhya | 307 |
| 23. Rights of Senior Citizens in India: An Inexplicable Conundrum | |
| Prattyay Chakrabarty | 329 |
| 24. Karma Chameleon: A Song About the Terrible Fear of Alienation | |
| Indrajeet Dey | 341 |
| 25. Democratic Decentralization and Local Self Government – A Study in the Light of Role of LSG During Covid-19 Pandemic | |
| Dr. Pratim Sarkar | 357 |
| 26. Modernisation and Development: Contemporary Social Legal Changes in India | |
| Dr. Chandrani Chatterjee | 371 |

© Dr. Sangeeta Roy (Maitra) 2022

This book is under copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of the Author.

Although every care has been taken in publishing the book, the author, publisher and printer shall not be responsible for any loss or damage caused to any person on account of errors or omissions which might have crept in. The publisher shall be obliged if mistakes are brought to their notice for carrying out corrections in the next edition. Submit all inquiries and requests to the publisher: SATYAM LAW INTERNATIONAL, NEW DELHI, INDIA.

ISBN: 978-93-91345-86-0

Published by : Satyam Law International, 2/13, Ansari Road, Daryaganj,
New Delhi-110002, India

Phones : 0091-11-40391920, 23242686, 23245698

Email : satyambooks@hotmail.com
satyamlawi@gmail.com

Web : www.satyam-books.com

Printed in India

LAW & SOCIAL TRANSFORMATION



DR. SANGEETA ROY (MAITRA)

**SATYAM LAW
INTERNATIONAL**

CONSTITUTIONAL AMENDMENT AND SOCIAL TRANSFORMATION

Lupsy Mohanty Roy*

Introduction

Constitution is a pulsating written document with codified rules and regulations. It is the supreme law of land which governs various organs of the government. Dr. Bhima Rao Ambedkar, the father of the constitution along with other members of Constituent Assembly made provision for amendment of the constitution to keep in tandem with changing needs of the hour. The Article 368 in Part XX was inserted to the constitution which provides that “Any part of the constitution may be amended by adopting appropriate procedure except destroying the *basic structure* of the constitution”. Our constitution is neither rigid as in USA nor flexible as in UK rather it is a queer amalgamation of both.

The Indian Parliament is bestowed with constituent power i.e. add, repeal or alter any provision of the constitution in accordance with procedure laid down for the said purport. Only the “*basic structure of the constitution*” has to remain untouched. It tries to maintain an equilibrium between governmental power and functions along with the aspirations of *en masse*.

I. Procedure for Amendment

The Constitution of India can be amended mainly in three ways:-

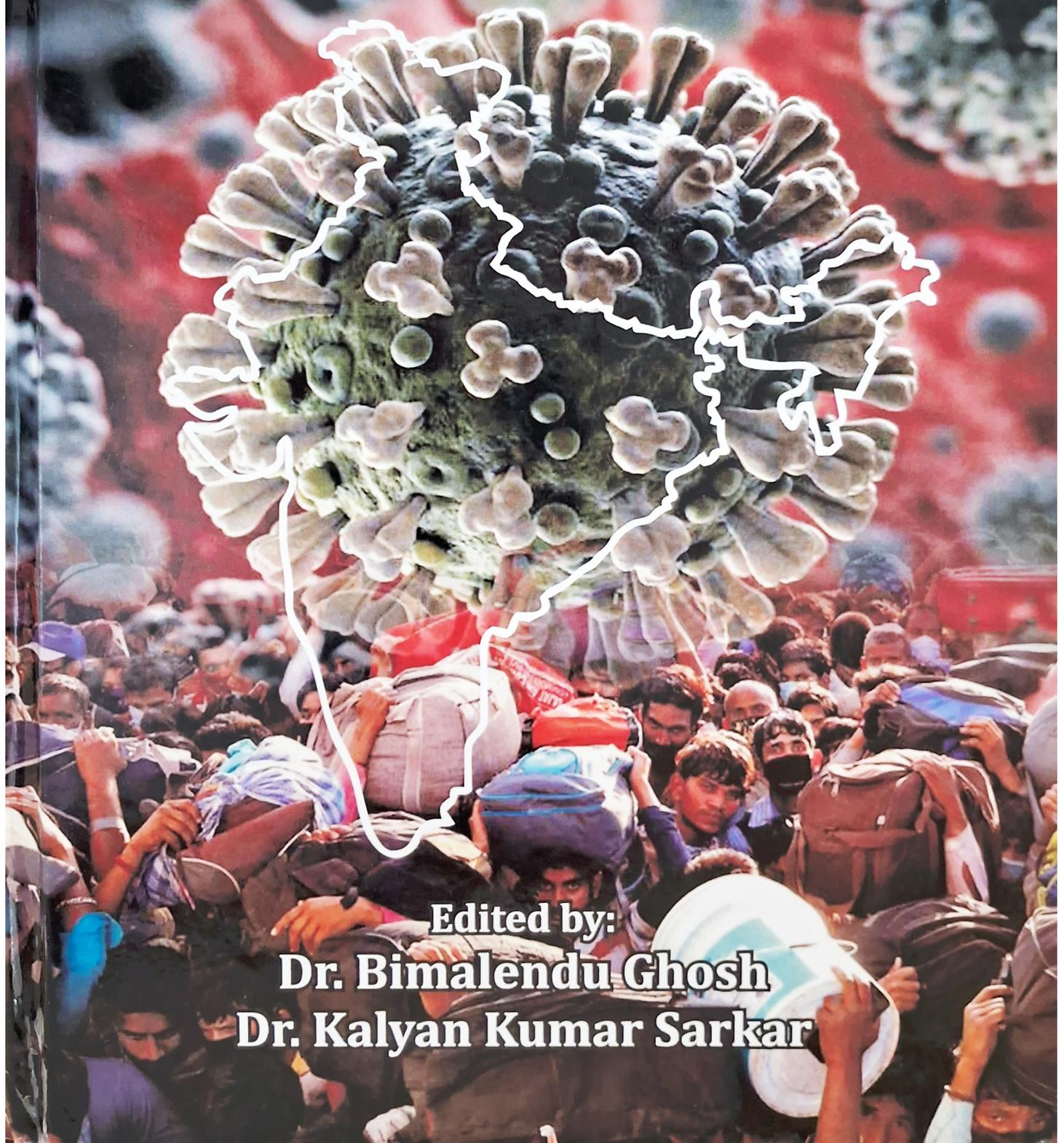
- by simple majority of the Parliament
- by special majority of the Parliament and
- by special majority of the parliament and the ratification of half of the state legislatures

It is laid down in the concerned Article that a bill relating to the amendment of the constitution has to be introduced in either House of Parliament and not in the

* Assistant Professor and Head, Department of Political Science, Sammilani Mahavidyalaya

INDIA IN THE FIRST TWO DECADES OF THE 21st CENTURY

SOCIETY, POLITY AND COVID-19



**Edited by:
Dr. Bimalendu Ghosh
Dr. Kalyan Kumar Sarkar**

KUNAL BOOKS

4648/21, 1st Floor, Ansari Road,

Daryaganj, New Delhi-110002.

Phones: 011-23275069, 9811043697

E-mail: kunalbooks@gmail.com

Website: www.kunalbooks.com

*India in the First Two Decades of The 21st Century : Society,
Polity and Covid-19*

© **Editors**

First Published April 2022

ISBN: 978-93-91908-97-3

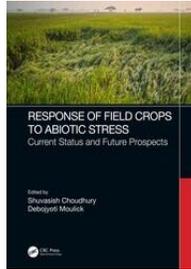
[All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, mechanical, photocopying, recording or otherwise, without prior written permission of the publisher].

The opinions and views expressed are exclusively those of the authors/ contributors and in no way the editors or publisher is responsible

Published in India by **Prem Singh Bisht** for **Kunal Books** and
printed at Trident Enterprises, Noida, U.P.

10. **Indian Judiciary and Interference of Political Party According to Landmark Judgement: An Analysis of Some Selected Cases** 82
Kishor Joarder
11. **Society and Polity in India in the Present Day Scenario Focussing on Indian Culture** 91
Lypsy Mohanty Roy
12. **Measuring Voting Behaviour of India: A Problematic and Thematic Study** 98
Dr. Mintu Mondal
13. **Vaccine for the Indian Education System** 107
Dr. Mousumi De Sarker
14. **The Current Position of Scheduled Castes and Scheduled Tribes in Indian Politics** 116
Pabitra Biswas
15. **Manoeuvring Caste in Commerce: Seths and Basaks of Calcutta in Eighteenth Century** 131
Md Salim Shahzada
16. **Exclusion on the Road to Inclusiveness: Perspectives towards Inclusive Democracy** 145
Dr. Satarupa Pal
17. **Threats and Future of Indian Democracy** 153
Dr. Bhaswati Chakraborty
18. **Political Problem: Language** 161
Dr. Sayanti Halder
19. **The Problem of Ethnic Groups in the Indian Political Situation** 169
Samit Ghosh
20. **Women's Empowerment by Participation in the 21st Globalised Era: An Indian Perspective** 178
Subhadip Mukherjee
21. **Contemporary Challenges Facing India's Democracy in 21st Century** 193
Sudip Mandal

Book



Response of Field Crops to Abiotic Stress

Current Status and Future Prospects

By *Shuvasish Choudhury* ([/search?contributorName=Shuvasish Choudhury&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Shuvasish+Choudhury&contributorRole=author&redirectFromPDP=true&context=ubx)), *Debojyoti Moulick* ([/search?contributorName=Debojyoti Moulick&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Debojyoti+Moulick&contributorRole=author&redirectFromPDP=true&context=ubx))

| | |
|-----------------|---|
| Edition | 1st Edition |
| First Published | 2022 |
| eBook Published | 15 December 2022 |
| Pub. Location | Boca Raton |
| Imprint | CRC Press |
| DOI | https://doi.org/10.1201/9781003258063 (https://doi.org/10.1201/9781003258063) |
| Pages | 332 |
| eBook ISBN | 9781003258063 |
| Subjects | Environment & Agriculture |

 Share

 Citation

ABSTRACT

TABLE OF CONTENTS

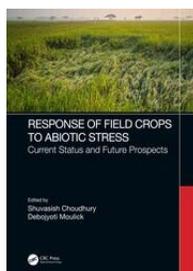


(<https://www.taylorfrancis.com>)

Policies



Chapter



Availing Engineered and Biosynthesized Metal-Based Nanoparticles to Alleviate Abiotic Stress

By *Monolina Sarkar* ([/search?contributorName=Monolina Sarkar&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Monolina+Sarkar&contributorRole=author&redirectFromPDP=true&context=ubx)), *Anindita Paul* ([/search?contributorName=Anindita Paul&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Anindita+Paul&contributorRole=author&redirectFromPDP=true&context=ubx)), *Debapriya Rajlakhmi Das* ([/search?contributorName=Debapriya Rajlakhmi Das&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Debapriya+Rajlakhmi+Das&contributorRole=author&redirectFromPDP=true&context=ubx))

Book [Response of Field Crops to Abiotic Stress \(https://www.taylorfrancis.com/books/mono/10.1201/9781003258063/response-field-crops-abiotic-stress?refId=bc904197-d8e2-4709-9569-6aad253bf66b&context=ubx\)](https://www.taylorfrancis.com/books/mono/10.1201/9781003258063/response-field-crops-abiotic-stress?refId=bc904197-d8e2-4709-9569-6aad253bf66b&context=ubx)

| | |
|-----------------|---------------|
| Edition | 1st Edition |
| First Published | 2022 |
| Imprint | CRC Press |
| Pages | 19 |
| eBook ISBN | 9781003258063 |

 Share

ABSTRACT



< [Previous Chapter \(chapters/edit/10.1201/9781003258063-1/abiotic-stress-management-elemental-biofortification-field-crops-sudhakar-srivastava-vartika-jain-kritika-sinha-nigam?context=ubx\)](https://www.taylorfrancis.com/chapters/edit/10.1201/9781003258063-1/abiotic-stress-management-elemental-biofortification-field-crops-sudhakar-srivastava-vartika-jain-kritika-sinha-nigam?context=ubx)

Next Chapter > ([chapters/edit/10.1201/9781003258063-3/arsenic-stress-sensitivity-adaptation-mitigation-strategies-field-crops-madhu-tiwari-neelam-gautam-yuvraj-indoliya-debasis-chakrabarty?context=ubx](https://www.taylorfrancis.com/chapters/edit/10.1201/9781003258063-3/arsenic-stress-sensitivity-adaptation-mitigation-strategies-field-crops-madhu-tiwari-neelam-gautam-yuvraj-indoliya-debasis-chakrabarty?context=ubx))



(<https://www.taylorfrancis.com>)

Policies



Journals



Corporate



Help & Contact



Connect with us



(<https://www.linkedin.com/company/taylor-&-francis-group/>)



(<https://twitter.com/tandfnewsroom?lang=en>)



(<https://www.facebook.com/TaylorandFrancisGroup/>)



(<https://www.youtube.com/user/TaylorandFrancisGroup>)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG

© 2023 Informa UK Limited



ব্রিটিশ বিরোধী আন্দোলনের এক নির্ভীক যোদ্ধা সুনীতি চৌধুরী : ফিরে দেখা কস্তুরী কর

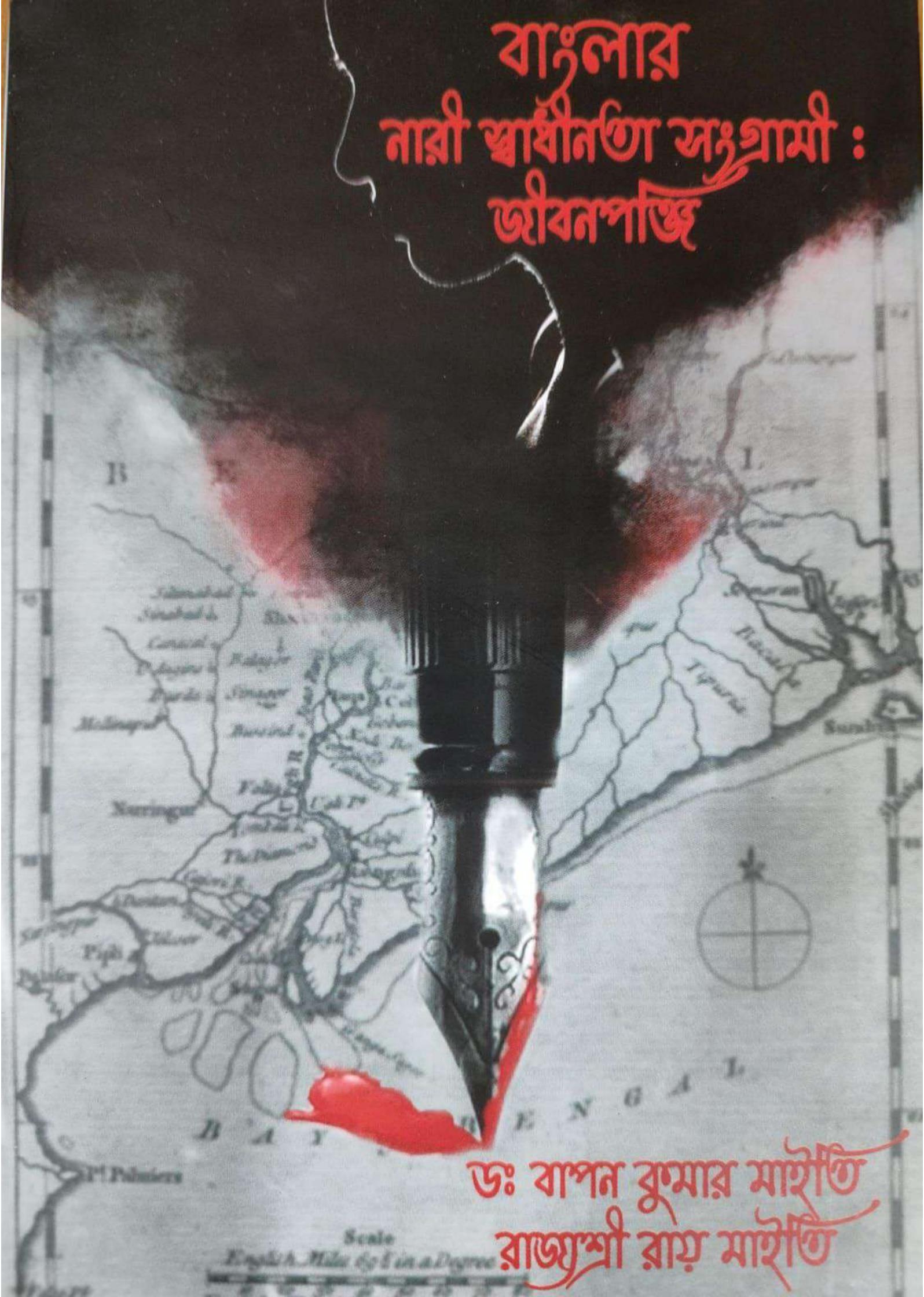
সারাংশ :

বৃটিশ বিরোধী আন্দোলন এদেশে নানান ধারায় যেমন প্রবাহিত হয়েছে তেমনি পুরুষদের পাশাপাশি নারীরাও বিভিন্ন সময় বিভিন্নভাবে আন্দোলনকে শক্তিশালী করেছেন। কখনও বা অন্তরের স্বতঃস্ফূর্ত তাগিদে হাতে রিভলভার তুলে নিয়ে সামনাসামনি মোকাবিলা করেছেন। কখন বা আড়ালে থেকে বিপ্লবী কর্মকাণ্ডকে প্রেরণা যুগিয়ে গেছেন। এরকমই সশস্ত্র আন্দোলনের নির্ভীক যোদ্ধা ছিলেন সুনীতি চৌধুরী। মাত্র চোদ্দো বছর বয়সে যিনি প্রত্যক্ষ সংগ্রামে যোগ দিয়ে কুমিল্লার ম্যাজিস্ট্রেটকে হত্যা করেন, যা তাকে সর্ব কনিষ্ঠ সশস্ত্র মহিলা বিপ্লবী হিসাবে জাতীয় সংগ্রামের ইতিহাসে চিরস্মরণীয় করে রাখবে। এই নিবন্ধ তার প্রতি শ্রদ্ধার্ঘ্য।

ভারতের জাতীয় সংগ্রামের ইতিহাস সশস্ত্র বিপ্লবী আন্দোলন ছাড়া কখনই সম্পূর্ণ হতে পারে না। যে সব বিপ্লবী নারী, পুরুষদের সাথে একযোগে অস্ত্র ধারণ করে ছিলেন দুঃখের কথা ইতিহাসের পাতায় তারা আজ তেমন ভাবে চর্চিত নন। যে অদৃশ্য বেড়ি তাদের পায়ে আবহমান কাল ধরে পরিয়ে আসা হচ্ছে যখনই সে বেড়ি ভেঙ্গে তারা বেরিয়ে এসেছে সমাজ তাদের উপযুক্ত প্রাপ্য থেকে বঞ্চিত করেছে। আজও আমরা কজন মহিলা বিপ্লবীর নাম জানি অথবা তাদের নিঃস্বার্থ ত্যাগের কথা মনে করি। মুক্তি সংগ্রামে যে মহিলারা ঝাঁপ দিয়েছিলেন, ভারত স্বাধীন হওয়ার পর যারা বেঁচে ছিলেন তাদের কি হল? যা দিয়েছিল কতটুকু তারা ফিরে পেল?

উনবিংশ শতাব্দীর প্রথম থেকে নারীর মানাবিক অধিকার অর্জনের যে চেষ্টা

বাংলার নারী স্বাধীনতা সংগ্রামী : জীবনপঞ্জি



ডঃ বাপন কুমার মাইতি
রাজেশ্বরী রায় মাইতি

Scale
English Miles 67.5 in a Degree

বাংলার নারী স্বাধীনতা

সংগ্রামী : জীবনপঞ্জি

ড. বাপন কুমার মাইতি
রাজ্যশ্রী রায় মাইতি

প্রভা প্রকাশনী

প্রকাশক ও পুস্তক বিক্রেতা

১কে, রাধানাথ মল্লিক লেন, কলকাতা-১২

"BANGLAR NARI SWADHINATA SANGRAMI : JIBANPANJI"
By : Dr. Bapan Kumar Maity & Rajyasree Ray Maity
Published by : Prova Prakashani, Rs. 300/-

ISBN : 978-93-94806-10-8

প্রকাশক :

অসীমকুমার মণ্ডল

প্রভা প্রকাশনী

১কে, রাখানাথ মল্লিক লেন, কলকাতা-১২

মোবাইল ৯৪৩৩১৯৪২১৮

E-mail: provaprakashani@gamil.com

প্রকাশক ও স্বত্বাধিকারীর লিখিত অনুমতি ছাড়া এই বইয়ের কোনও অংশের কোনও রূপ পুনরুৎপাদন বা প্রতিলিপি করা যাবে না, কোনও যান্ত্রিক উপায়ের (গ্রাফিক, ইলেকট্রনিক বা অন্য কোনও মাধ্যমে) মাধ্যমে প্রতিলিপি করা যাবে না। কিংবা কোনও ডিস্ক, টেপ, পারফোরেটেড মিডিয়া বা তথ্য সংরক্ষণের কোনও যান্ত্রিক পদ্ধতিতে পুনরুৎপাদন করা যাবে না। এই শর্ত লঙ্ঘিত হলে উপযুক্ত আইনি ব্যবস্থা গ্রহণ করা হবে। কেবলমাত্র বিজ্ঞাপন ও সমালোচনার ক্ষেত্রে এই বিধি শিথিলযোগ্য।

© স্বত্বাধিকার : লেখক

প্রথম প্রকাশ : ২০শে ডিসেম্বর, ২০২২

প্রচ্ছদ : তাসির আহমেদ লস্কর

অলংকরণ : শেখর মণ্ডল

বর্ণসংস্থান : তুহিন ঘোষ, কলকাতা

মুদ্রক :

লক্ষ্মীনারায়ণ প্রেস

টি/৩১/কে, বিপ্লবী বারিণ ঘোষ সরণি, কলকাতা-৬৭

মূল্য : তিনশত টাকা



Book | © 2023

Sustainable Industrial Wastewater Treatment and Pollution Control

[Home](#) > [Book](#)**Editors:** [Maulin P. Shah](#)

Includes theoretical and applied technologies

Emphasizes the potentiality and economic achievability

Bridges knowledge gaps between academia and industry

1058 Accesses | **2** [Citations](#)

Sections

[Table of contents](#)[About this book](#)[Keywords](#)[Editors and Affiliations](#)

[About the editor](#)[Bibliographic Information](#)

This is a preview of subscription content, [access via your institution](#).

Table of contents (12 chapters)

Search within book

Front Matter

[PDF](#) ↓

Pages i-vi

[Microalgae for Treating Wastewater](#)

C. Marimuthu, J. Arun, M. Subathra, P. Priyadharsini, N. Nirmala, S. Sarojadevi
Pages 1-12

[Application of Membrane Technology Combined with Sequencing Batch Reactor for Treating Milk Wastewater](#)

Khac-Uan Do, Minh-Hang Tran
Pages 13-29

[Role of Microalgae in Wastewater Treatment and Their Role in Nutrient Recovery](#)

Dipannita Parial, Satarupa Dey
Pages 31-53

[Role of Microalgae in Integrated Wastewater Remediation and Valorization of Value-Added Compounds](#)

Rayanee Chaudhuri, Nageshwari Krishnamoorthy, Balasubramanian Paramasivan

international journals. He directs the research program at Enviro Technology Ltd., Ankleshwar, India. He has guided more than 100 post-graduate students in various disciplines of life science. He is an active editorial board member in more than 150 renowned journals in the field of environmental and biological sciences. He was the founder and the editor-in-chief of the International Journal of Environmental Bioremediation and Biodegradation (2012–2014) and the Journal of Applied & Environmental Microbiology (2012–2014) [Science and Education publishing (SciEP), USA]. He is also serving as a reviewer for various journals of national and international repute. He has edited 225 books in the area of wastewater microbiology and industrial wastewater treatment.

[Back to top](#) ↑

Bibliographic Information

| Book Title | Editors | DOI |
|---|---|---|
| Sustainable Industrial Wastewater Treatment and Pollution Control | Maulin P. Shah | https://doi.org/10.1007/978-981-99-2560-5 |
| Publisher | eBook Packages | Copyright Information |
| Springer Singapore | Earth and Environmental Science, Earth and Environmental Science (R0) | The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2023 |
| Hardcover ISBN | Softcover ISBN | eBook ISBN |
| 978-981-99-2559-9 | 978-981-99-2562-9 | 978-981-99-2560-5 |

Published: 28
June 2023

Due: 12 July
2024

Published: 27
June 2023

Edition Number

1

**Number of
Pages**

VI, 255

**Number of
Illustrations**

12 b/w
illustrations, 18
illustrations in
colour

Topics

[Waste](#)

[Management/Wa
ste Technology,](#)

[Water, general,](#)

[Applied](#)

[Microbiology,](#)

[Nanotechnology,](#)

[Pollution, general,](#)

[Sustainable](#)

[Development](#)

[Back to top ↑](#)



Sustainable Industrial Wastewater Treatment and Pollution Control pp 31–53

[Home](#) > [Sustainable Industrial Wastewater Treatment and Pollution Control](#) > Chapter

Role of Microalgae in Wastewater Treatment and Their Role in Nutrient Recovery

[Dipannita Parial](#) & [Satarupa Dey](#) 

Chapter | [First Online: 28 June 2023](#)

83 Accesses

Abstract

Rapid industrialization and urbanization have led to extensive pollution of water resources leading to a crisis. Traditional wastewater treatment processes are used to remove both inorganic and organic substances present in wastewater. These primary treatments are mainly aimed at the removal of easily settled and oxidize the organic matters present in the water which results in generation of clean effluent; however, this water contains high amount of

inorganic nitrogen and phosphorus which may lead to rapid eutrophication. Microalgae-based wastewater treatment process has many advantages that can meet the new demand and can be an eco-friendly option for improved tertiary wastewater treatment. This type of treatment can produce valuable biomass along with the removal of inorganic nitrogen and phosphorus required for algal growth. This chapter gives an overview of the microalgae used for wastewater treatment. The different types of physical and chemical properties of wastewater suitable for algal growth have been discussed in detail along with their ability of nutrient assimilation/removal and biomass productivity. The limitations of the microalgal treatment are also discussed to highlight the major drawbacks of the system along with the possible solution.

Keywords

Microalgae-based wastewater treatment

Wastewater treatment Nutrient recovery

Water reuse Heavy metals Xenobiotics

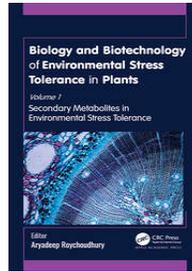
This is a preview of subscription content, [access via your institution.](#)

▼ Chapter

EUR 29.95

Price includes VAT (India)

Book



Biology and Biotechnology of Environmental Stress Tolerance in Plants

Volume 1: Secondary Metabolites in Environmental Stress Tolerance

Edited By Aryadeep Roychoudhury ([/search?contributorName=Aryadeep Roychoudhury&contributorRole=editor&redirectFromPDP=true&context=ubx](https://www.taylorfrancis.com/search?contributorName=Aryadeep+Roychoudhury&contributorRole=editor&redirectFromPDP=true&context=ubx))

| | |
|-----------------|---|
| Edition | 1st Edition |
| First Published | 2023 |
| eBook Published | 21 July 2023 |
| Pub. Location | New York |
| Imprint | Apple Academic Press |
| DOI | https://doi.org/10.1201/9781003346173 (https://doi.org/10.1201/9781003346173) |
| Pages | 420 |
| eBook ISBN | 9781003346173 |
| Subjects | Bioscience, Environment & Agriculture |

Share

Citation

ABSTRACT ▼

TABLE OF CONTENTS ▼



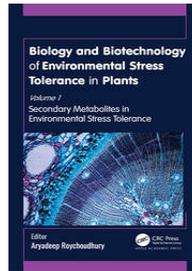
(<https://www.taylorfrancis.com>)

Policies



< [Biology and Biotechnology of Environmental Stress Tolerance in Plants \(https://www.taylorfrancis.com/books/mono/10.1201/9781003346173/biology-biotechnology-environmental-stress-tolerance-plants?refId=ec435026-0602-4bad-b8b4-3d66698c9e86&context=ubx\)](https://www.taylorfrancis.com/books/mono/10.1201/9781003346173/biology-biotechnology-environmental-stress-tolerance-plants?refId=ec435026-0602-4bad-b8b4-3d66698c9e86&context=ubx) [Show Path](#) ▾

Chapter



Tools and Approaches for Assessing Stress-Responsive Secondary Metabolites to Design Climate-Smart Crops

By [Debapriya Rajlakshmi Das](/search?contributorName=Debapriya+Rajlakshmi+Das&contributorRole=author&redirectFromPDP=true&context=ubx) ([/search?contributorName=Debapriya Rajlakshmi Das&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Debapriya+Rajlakshmi+Das&contributorRole=author&redirectFromPDP=true&context=ubx)), [Monolina Sarkar](/search?contributorName=Monolina+Sarkar&contributorRole=author&redirectFromPDP=true&context=ubx) ([/search?contributorName=Monolina Sarkar&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Monolina+Sarkar&contributorRole=author&redirectFromPDP=true&context=ubx)), [Anindita Paul](/search?contributorName=Anindita+Paul&contributorRole=author&redirectFromPDP=true&context=ubx) ([/search?contributorName=Anindita Paul&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Anindita+Paul&contributorRole=author&redirectFromPDP=true&context=ubx))

Book [Biology and Biotechnology of Environmental Stress Tolerance in Plants \(https://www.taylorfrancis.com/books/mono/10.1201/9781003346173/biology-biotechnology-environmental-stress-tolerance-plants?refId=ec435026-0602-4bad-b8b4-3d66698c9e86&context=ubx\)](https://www.taylorfrancis.com/books/mono/10.1201/9781003346173/biology-biotechnology-environmental-stress-tolerance-plants?refId=ec435026-0602-4bad-b8b4-3d66698c9e86&context=ubx)

| | |
|-----------------|----------------------|
| Edition | 1st Edition |
| First Published | 2023 |
| Imprint | Apple Academic Press |
| Pages | 66 |
| eBook ISBN | 9781003346173 |

[Share](#)

ABSTRACT



< [Previous Chapter \(chapters/edit/10.1201/9781003346173-14/seed-priming-seedling-pre-treatment-regulatingsecondary-metabolism-stress-tolerance-subir-ghosh-kuntal-bera-puspendu-dutta-sanjoy-sadhukhan?context=ubx\)](https://www.taylorfrancis.com/chapters/edit/10.1201/9781003346173-14/seed-priming-seedling-pre-treatment-regulatingsecondary-metabolism-stress-tolerance-subir-ghosh-kuntal-bera-puspendu-dutta-sanjoy-sadhukhan?context=ubx)



(<https://www.taylorfrancis.com>)

[Policies](#)



Journals



Corporate



Help & Contact



Connect with us



(<https://www.linkedin.com/company/taylor-&-francis-group/>)



(<https://twitter.com/tandfnewsroom?lang=en>)



(<https://www.facebook.com/TaylorandFrancisGroup/>)



(<https://www.youtube.com/user/TaylorandFrancisGroup>)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG

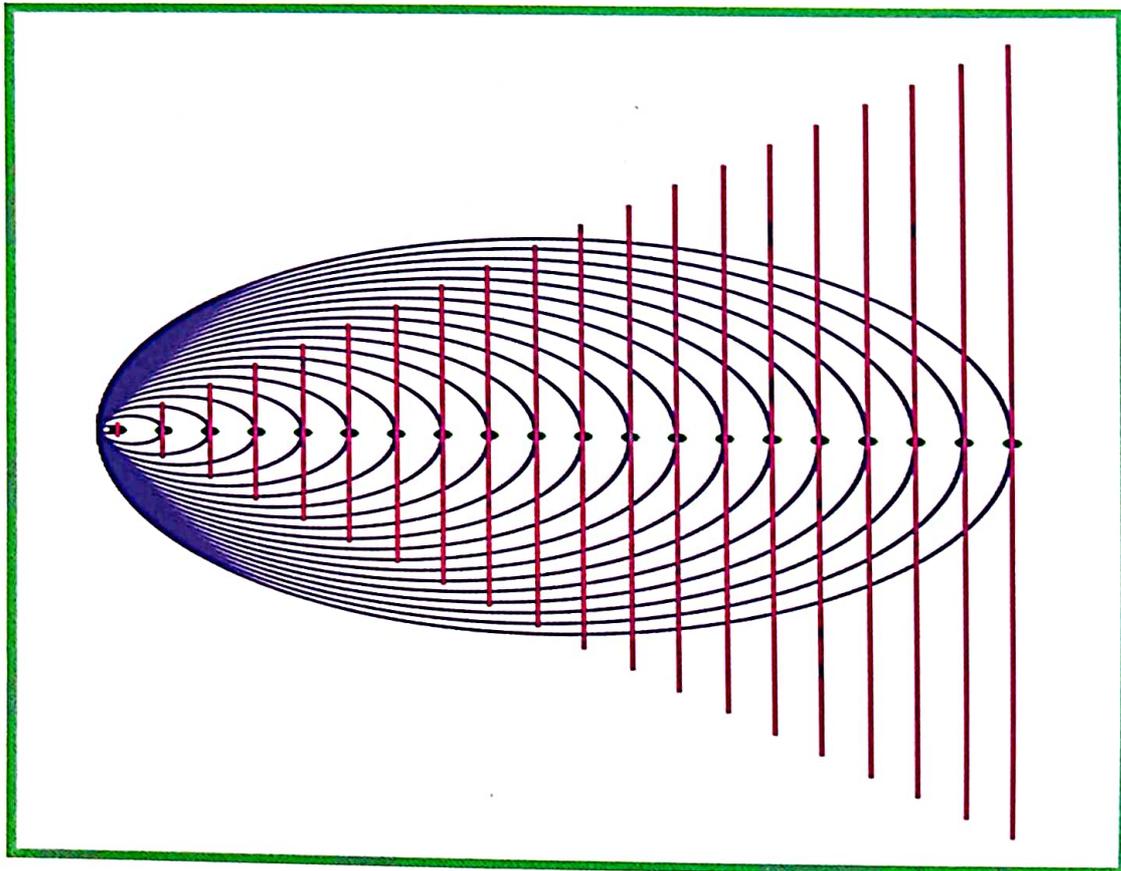
© 2023 Informa UK Limited



A BEGINNER'S COMPANION OF SAGEMATH

Scientific Computing, Drawing Tools & Programming

Dr. Malay Roy



 ACADEMIC PUBLISHERS

ABOUT THE BOOK

Learning a programming language is a crucial component of the undergraduate B.Sc. curriculum. Recently, the UGC has recommended the integration of SageMath, a computer algebra system-based software package, into the Mathematics Honours curriculum under the new CBCS system. In response to this, we have developed a comprehensive textbook that aligns with the undergraduate syllabus. This book covers everything from the installation of SageMath, obtained from the official website, to its practical usage. To facilitate better understanding of the concepts, numerous exercises have been solved and provided throughout the text. Additionally, each chapter concludes with multiple-choice questions designed to aid students in their semester examination preparation. To further enhance learning, supplementary exercises are included for additional practice on each topic. Our aim is to assist undergraduate students, as well as postgraduate and research scholars, by providing them with a highly beneficial resource. We believe that this book will prove invaluable in their pursuit of knowledge.

ABOUT THE AUTHOR



Dr. Malay Roy is presently working an Assistant Professor of Mathematics, Sammilani Mahavidyalaya, E.M. Bypass, Baghajatin, Kolkata – 700094. He has completed his M.Sc. in Mathematical Sciences from IIT Kharagpur and Ph.D. in Science in the field of Bio-fluid Mechanics from Jadavpur University. His area of research interest is Bio-mechanics, CFD & MHD. His teaching interests are in Particle Dynamics, Fluid Dynamics, Advanced Mechanics, Vector Analysis, Numerical Analysis, Programming Languages and mathematical softwares etc. He published many research articles in various reputed International Journals.



Books available at



For Undergraduate students (Honours & General) of Basic Science

A Beginner's Companion of SageMath

Scientific Computing, Drawing Tools & Programming

Dr. Malay Roy

*Assistant Professor, Department of Mathematics
Sammilani Mahavidyalaya, E. M. Bypass, Baghajatin, Kolkata*



ACADEMIC PUBLISHERS

5A Bhawani Dutta Lane, Kolkata-700073

E-mail : contact@academicpublishers.in

Website : www.academicpublishers.in

© Reserved by the author

First edition : June 2023

ISBN : 978-93-93662-24-8

Price : Rupees three hundred and fifty only

All rights reserved by the authors. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright holder.

Published by Bimal Kumar Dhur of Academic Publishers, 5A Bhawani Dutta Lane, Kolkata-700073, Laser type setting by Studio Michaelangelo, 5A Bhawani Dutta Lane, Kolkata-700073 and printed at Rajendra Offset & Graphics, 11 Panchanan Ghosh Lane, Kolkata-700009.

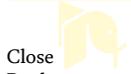


Menu



Author Panel Sign in

Search



- Close
- Books
- Book Series
- Journals
- Publish
- About
- News

AUTHOR PANEL SIGN IN

What is Open Access?

Open Access is an initiative that aims to make scientific research freely available to all. To date our community has made over 100 million downloads. It's based on principles of collaboration, unobstructed discovery, and, most importantly, scientific progression. As PhD students, we found it difficult to access the research we needed, so we decided to create a new Open Access publisher that levels the playing field for scientists across the world. How? By making research easy to access, and puts the academic needs of the researchers before the business interests of publishers.

Our Authors and Editors

We are a community of more than 103,000 authors and editors from 3,291 institutions spanning 160 countries, including Nobel Prize winners and some of the world's most-cited researchers. Publishing on IntechOpen allows authors to earn citations and find new collaborators, meaning more people see your work not only from your own field of study, but from other related fields too.

Content Alerts

Brief introduction to this section that describes Open Access especially from an IntechOpen perspective

How it Works Manage preferences

Contact

Want to get in touch? Contact our London head office or media team here

Careers

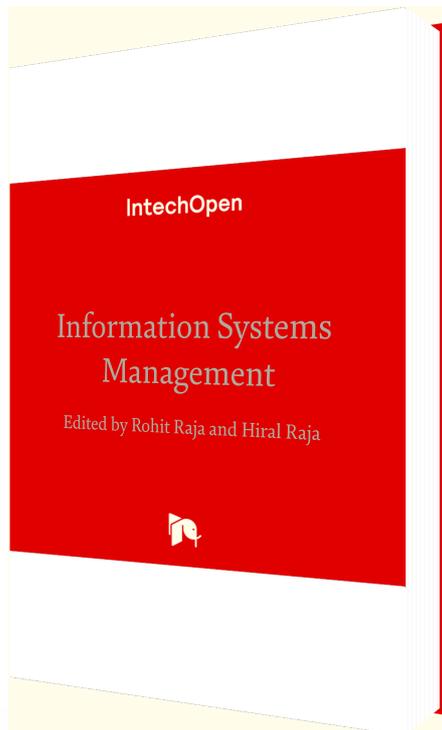
Our team is growing all the time, so we're always on the lookout for smart people who want to help us reshape the world of scientific publishing.

Home > Books > Information Management

OPEN ACCESS PEER-REVIEWED EDITED VOLUME

Information Systems Management

View Chapters Share Cite



**BOOK METRICS OVERVIEW**

486 Chapter Downloads

View Full Metrics →**ACADEMIC EDITOR****Rohit Raja**Guru Ghasidas Vishwavidyalaya,
India**CO-EDITOR****Hiral Raja**Dr. C. V. Raman University,
India**PUBLISHED**

18 October 2023

DOI

10.5772/intechopen.100784

ISBN

978-1-80355-652-9

PRINT ISBN

978-1-80355-651-2

EBOOK (PDF) ISBN

978-1-80355-653-6

COPYRIGHT YEAR

2023

NUMBER OF PAGES

198

This book is intended for the technical reader who works with large volumes of data. Written by experts in information systems management, the book includes chapters on software development, cloud implementation, networking, and handling large datasets, among other topics. Blockchain and artificial intelligence (AI) are the foundations of automated systems and the authors provide their viewpoints ...

READ MORE[Order Print Copy](#)[Recommend to Your Library](#)**EDITED VOLUME AND CHAPTERS ARE INDEXED IN**



SHOW MORE

Table of Contents

 OPEN ACCESS CHAPTERS

  50

1. Software Development Management

By Rahul Patel

VIEW ABSTRACT 

  18

2. Classification in Multi-Label Datasets

By Aouatef Mahani

VIEW ABSTRACT 

  41

3. Research Trends in Library and Information Science in India during 2011 to 2018

By Sutapa Paul and Bapan Kumar Maity

VIEW ABSTRACT 

  36

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,300

Open access books available

170,000

International authors and editors

190M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Chapter

Research Trends in Library and Information Science in India during 2011 to 2018

Sutapa Paul and Bapan Kumar Maity

Abstract

Bibliometric analysis analyzes the research activity based on the doctoral theses that were submitted to the Shodhganga repository from 2011 to 2018 to determine the research trends in library and information science (LIS) in India. The findings demonstrate a shift in academic attention from fundamental LIS subjects to computer applications. Based on the data from Shodhganga, the INDCAT database, Vidyanidhi, and University News, this paper examined 612 PhD theses that were submitted at various universities in India during the course of these eight years.

Keywords: LIS research, research in LIS, PhD theses, research trend, LIS research-India

1. Introduction

The development of LIS as a field of study began with the basic skills of classification, cataloging, indexing, reference, bibliographical search, and professional values. Dr. S.R. Ranganathan played a vital role in the development of library education, libraries, and the library profession in India. Formal LIS education in India is nearly 100 years old.

In this study, an attempt has been made to assess the year-wise and subject-wise growth of new conceptual research in LIS, particularly during the period 2011–2018. This is a bibliometric study, which identifies the recent trend in LIS education in India by analyzing the doctoral thesis uploaded in the Shodhganga repository during the year 2011 to 2018.

Shodhganga is a reservoir of electronic theses, and dissertations are primary sources of research materials that originate from doctoral theses/dissertations submitted to the universities for the award of a PhD degree. It is mandatory to submit an electronic version of theses and dissertations by the researchers in universities to a national repository with an aim to facilitate open access to Indian theses and dissertations to the academic community worldwide.

2. Review of literature

There are so many studies on LIS research trend on the basis of articles published in national and international journals, but it has been found that only few studies have been done on the basis of PhD thesis, which is awarded by Indian universities. Maity and Hatuta's [1] study is an attempt to find out the research trends of library management in LIS and to quantitatively analyze the research activity in India based on doctoral theses that were already awarded in the period 1950–2012. Yadav and Gohain [2] have noted that the trends of LIS education in India under three important phases: genesis of LIS education; LIS education during 1947–2014; and emerging trends in the new millennium in order to cover the important milestones that occurred in Indian LIS education. The literature that informs the study came from a wide range of sources. The paper provides useful current information to LIS professionals, fraternities, researchers, students, and other stakeholders. According to Pandita and Singh [3], this study examines the research growth in the field of LIS at a global level for the period 2004–2013. The key areas analyzed in the study include research growth in LIS at the continental level, world's ten leading LIS research countries, citation analysis Hirsch Index (h-index), etc. The study is supported with empirical findings, for which data were retrieved from the SCI MagoJournal and Country Ranking, based on SCOPUS data source. The study is not exhaustive in nature, as it covers only those articles published in LIS journals indexed with this particular data source. According to Chatha [4], the aim of the study is to analyze the current research trends in LIS through journal articles. The study covers the number of publications, authors per year, cited items, country-wise distribution of articles, state-wise authorships, and current research areas in LIS. According to Dora and Kumar [5], the current study aims to understand the trends in LIS research during 2004–2015 by studying the published literature in Indian LIS journals. Singh [6] in his article study investigates and identifies research trends on LIS on the basis of PhD theses for the past nineteen years at the Department of Library & Information Science (DLIS), Aligarh Muslim University (AMU), India. Mondal and Roy's [7] paper is basically a bibliometric study based on 4993 citations from 53 PhD theses on economics under the University of Burdwan, West Bengal, India.

3. Aim of the study

The aim of the study is to analyze the current research trends in LIS through research theses in India. The bibliometric method is used to categorize the data. The data was gathered from the Shodhganga repository for the time span of 2011–2018. The study shows the current trend in LIS research publication, carried out to determine all the important points helpful for further research. The study covers the number of doctoral theses, the number of universities that are actively involved in research work, year-wise distribution of theses, state-wise contribution to research work, and current research areas in LIS.

All data are collected from Shodhganga repository; then, all the theses are individually analyzed by the titles and keywords and undergo a lot of tool subjects like classification, cataloging, academic library, management, budgeting, bibliometric study, information-seeking behavior, and so on. According to UGC-recommended syllabus, all these tool subjects are distributed under 13 broader subjects those are identified as main topics of research work in the LIS field. These broader subjects are:

1. Library and society
2. Library management
3. Classification/knowledge management
4. Cataloging/resource description
5. Information and communication technology
6. Information source, system, and center
7. Information literacy
8. Information-seeking behavior
9. Information economics and knowledge management
10. Content creation and technical writing
11. Digital library system and digital environment
12. Information system analysis and design
13. Library statistics and informatics

A reservoir of Indian theses is a digital repository of theses and dissertations submitted to Indian universities. It is maintained by INFLIBNET Center, which is an autonomous center of the University Grants Commission (UGC) of India and was initially located at the campus of Gujarat University, Ahmadabad. The repository has a collection of 210,661 theses and 6123 synopses.

It has been observed that “Shodhganga” is an important Indian initiative and will facilitate open access to Indian theses and dissertations to the world academic community. Online availability of electronic theses through centrally maintained digital repositories will not only ensure easy access and archiving of theses but will also help in raising the quality and standard of research.

4. Objectives of this study

The main objectives of this study are:

1. To find out the nature and direction of LIS research during 2011–2018
2. To know the yearly distribution of the subject of LIS research
3. To examine the research trend of LIS in India
4. To verify the diversity of current research in the LIS field

5. Limitation of the study

The study covers research works in LIS at the PhD level, which have been already awarded for doctoral degree by Indian universities. The period of coverage is from 2011 to 2018, a period of 8 years. It has considered only those titles of doctoral theses that appeared in the INFLIBNET-Indcat (<http://incat.inflibnet.ac.in/indcat>). Various universities that have an LIS department and have uploaded theses on INFLIBNET have been searched and data accrued year-wise.

6. Methodology

The main source of data collected is from university news, which periodically lists out the doctoral theses accepted by different universities and also uploaded in the thesis database in India and collected from Shodhganga. Data collected from these databases namely Shodhganga, INDCAT database, Vidyandhi, University News data, and INFLIBNET (<http://incat.inflibnet.ac.in/indcat>) were searched with the key term “Library,” “Library science”, and “Library and Information science” to retrieve 612 records and were downloaded for the period of 2011 to 2018. All doctoral theses have been listed out and checked manually. After checking, 715 records were retained for the study. The whole work has been divided into three parts. The retrieved title has been grouped according to chronological growth, decade-wise growth, and university-wise distributions in one part. The broad and narrow subject distribution has also been made to find the actual subject trends in other parts. And the third part is state- and zone-wise distribution. The data has been analyzed quantitatively using statistical charts, diagrams, tables, etc.

Data interpretation under topic and year wise: Here, data are analyzed according to tools areas under 13 broad areas.

Table 1 shows 84 research studies, which were completed through the years 2011 to 2018. Out of these, 42.86% research studies were done on academic library, 20.24% on university library, 14.28% on special library, and 1.19% and 4.76% on public library and national library, respectively. Also 4.76% research studies were done on librarianship. So, the result shows that the maximum research studies were done on academic library.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | (%) |
|----------------|--------------------|------|-------|-------|------|------|-------|-------|------|-------|-------|
| 1 | Academic Library | 2 | 4 | 5 | 2 | 6 | 10 | 7 | 0 | 36 | 42.86 |
| 2 | University Library | 1 | 3 | 3 | 1 | 2 | 4 | 3 | 0 | 17 | 20.24 |
| 3 | Special library | 1 | 1 | 0 | 3 | 3 | 2 | 2 | 0 | 12 | 14.28 |
| 4 | Public library | 0 | 4 | 2 | 1 | 1 | 2 | 3 | 0 | 13 | 15.48 |
| 5 | National library | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1.19 |
| 6 | Reference service | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1.19 |
| 7 | Librarian-ship | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 4 | 4.76 |
| Total value | | 4 | 12 | 11 | 8 | 14 | 20 | 15 | 0 | 84 | 100 |
| Percentage (%) | | 4.76 | 14.84 | 13.09 | 9.52 | 16.6 | 23.80 | 17.85 | 0 | 100 | |

Table 1.
Research on library society.

If we analyze the data according to the year, the highest research studies were done in 2016 (23.80%) and the second highest research in the year 2017 (17.85%). In the area of library and society, rest of the research percentage were 4.76%, 14.84%, 13.09%, 9.52%, and 16.6% in the year 2011, 2012, 2013, 2014, and 2015, respectively.

Figure 1 shows a graphical research on library society according to year.

Table 2 shows 104 research studies, which were completed through the years 2011 to 2018. Out of these, 56.73% research studies were done on management, 10.58% on quality management, 6.73% on organization, 5.73% research on book publishing / e- publishing and infrastructure, 2.88% on preservation and conservation, 4.80% on finance, and only 0.96% on both administration and acquisition. So, the result shows that the maximum research studies were done on management.

If we analyze the data according to year, the highest number of research studies were done in 2012 (18.25%) and second highest research in 2014 (16.35%). In the area of library management, rest of the research percentage were 12.5%, 15.38%, 15.38%, 10.5%, 7.69%, and 3.85% in the year 2011, 2013, 2015, 2016, 2017, and 2018, respectively.

Figure 2 shows research on library organization and administration based on the years.

Table 3 represents 13 (100%) research studies that were completed through the years 2011 to 2018. Out of these, 23.08% (total 3) research studies were done on classification, 69.23% (total 9) on collection development, and 7.69% (total 1) on information processing in the area of research on knowledge organization.

If we analyze the data according to the year, the highest number of research studies were done in 2012 (30.77%, where the total was 4), and the second highest was done in the years 2017 and 2018, where both percentage were same, that is, 15.38%. During the rest of the remaining years, 7.69% research studies were done in the area of knowledge management.

Figure 3 shows research on classification/knowledge organization based on the years.

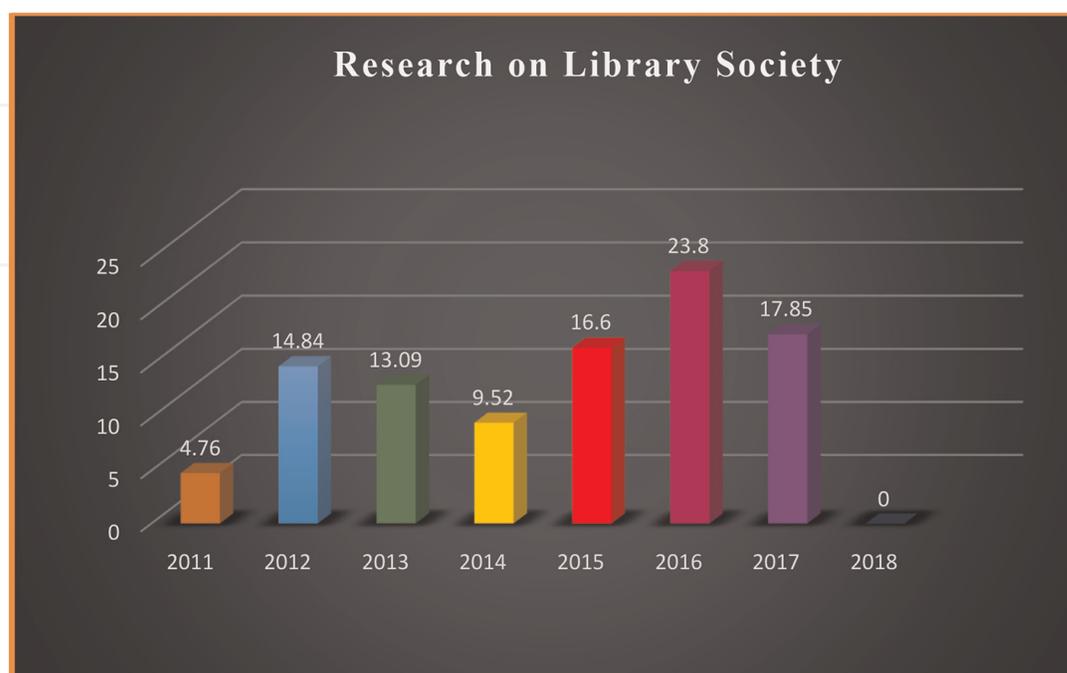


Figure 1.
Research on library society according to years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|-------------------------------------|------|-------|-------|-------|-------|-------|------|------|-------|----------------|
| 1 | Management | 9 | 9 | 10 | 9 | 11 | 8 | 2 | 1 | 59 | 56.73 |
| 2 | Organization | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 7 | 6.73 |
| 3 | Acquisition | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.96 |
| 4 | Finance | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 4.80 |
| 5 | Administration | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.96 |
| 6 | Book publishing / e- publishing etc | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 6 | 5.78 |
| 7 | Infrastructure | 1 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 6 | 5.78 |
| 8 | Preservation & conservation | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 2.88 |
| 9 | Quality control | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 5 | 4.80 |
| 10 | Quality Management | 0 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 11 | 10.58 |
| Total value | | 13 | 19 | 16 | 17 | 16 | 11 | 8 | 4 | 104 | 100 |
| Percentage (%) | | 12.5 | 18.27 | 15.38 | 16.35 | 15.38 | 10.58 | 7.69 | 3.85 | 100 | |

Table 2.
Research on library management.

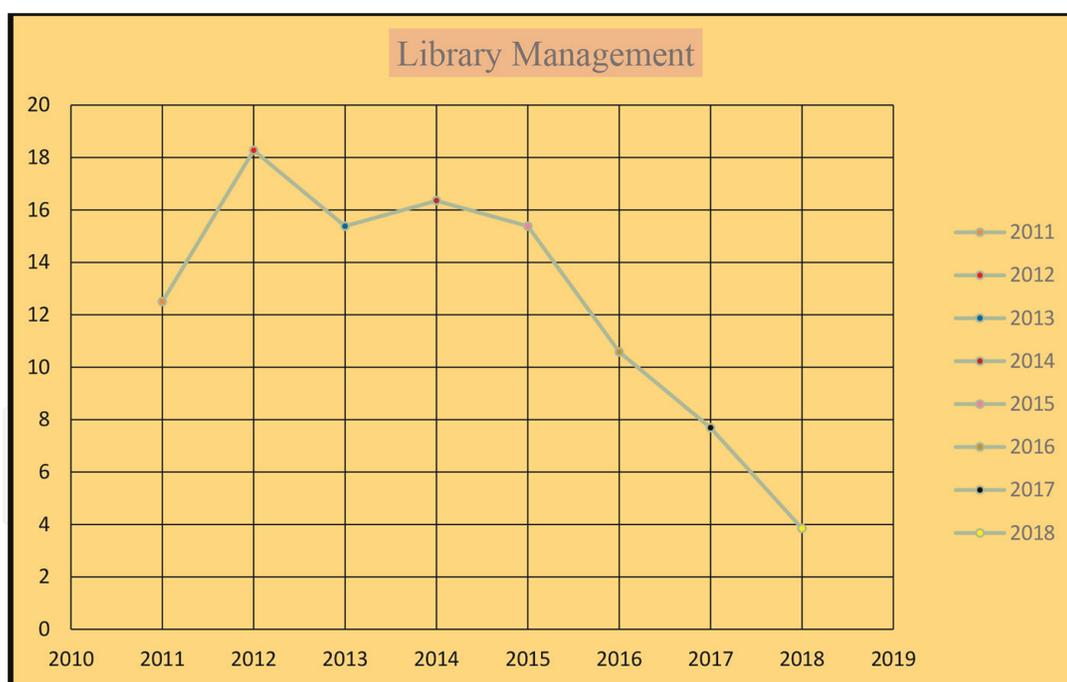


Figure 2.
Research on library organization & administration based on the years.

Table 4 shows that total 19 research studies were done on cataloging/resource description. Out of this, 26.31% research studies were completed on cataloging; 21.05% research studies were done on bibliography and indexing; and 15% research studies were completed on manuscript and control vocabulary. So, maximum research studies were done on cataloging.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|------------------------|------|-------|-------|------|------|------|------|-------|-------|----------------|
| 1 | Classification | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 23.08 |
| 2 | Collection development | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 9 | 69.23 |
| 3 | Information Processing | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7.69 |
| Total value | | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 13 | 100 |
| Percentage (%) | | 7.69 | 30.77 | 15.38 | 7.69 | 7.69 | 7.69 | 7.69 | 15.38 | 100 | |

Table 3.
 Research on classification/knowledge organization.

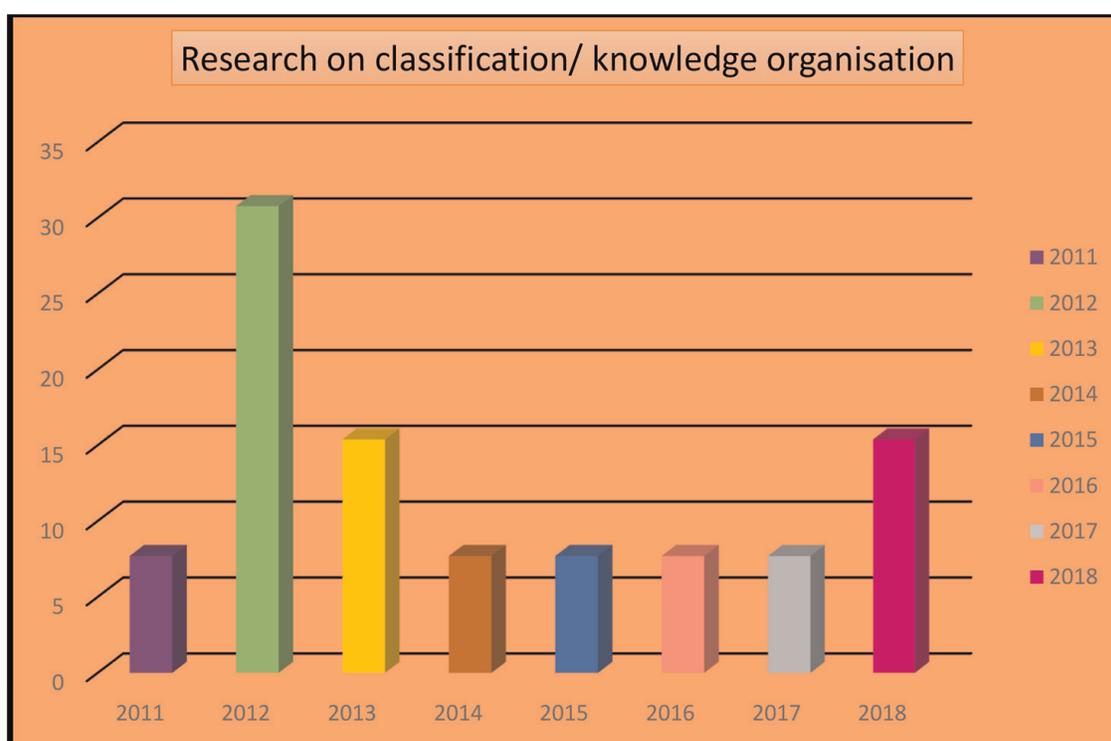


Figure 3.
 Research on classification/knowledge organization based on the years.

On the basis of years (2011 to 2018), the analysis of data represents that 26.31% research studies were done in the year 2011, 21.05% in the year 2015 and 2018, 10.53% and 5.23% research studies were done in 2012 and 2016, respectively, in the research area of cataloging/resource description.

Figure 4 shows research on cataloging/resource description according to the year.

Table 5 shows 179 research studies, which were completed through the years 2011 to 2018. Out of these, 40.78% research studies were done on information technology, 12.85% on ICT, 11.73% on network, 11.17% on software, and 6.14% both internet and e-journals. Only 4.47%, 5.59%, and 1.12% research studies were done on database, automation, and electronic/print media, respectively. So, the result shows that the maximum research studies were done on information technology.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|--------------------|-------|-------|-------|------|-------|------|------|-------|-------|----------------|
| 1 | Cataloging | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 5 | 26.31 |
| 2 | Bibliography | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 21.05 |
| 3 | Manuscript | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 15.79 |
| 4 | Indexing | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 21.05 |
| 5 | Control vocabulary | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 15.79 |
| Total value | | 5 | 2 | 3 | 1 | 4 | 1 | 0 | 3 | 19 | 100 |
| Percentage (%) | | 26.31 | 10.53 | 15.79 | 5.23 | 21.05 | 5.23 | 0 | 15.79 | 100 | |

Table 4.
Research on cataloging/research on resource description.

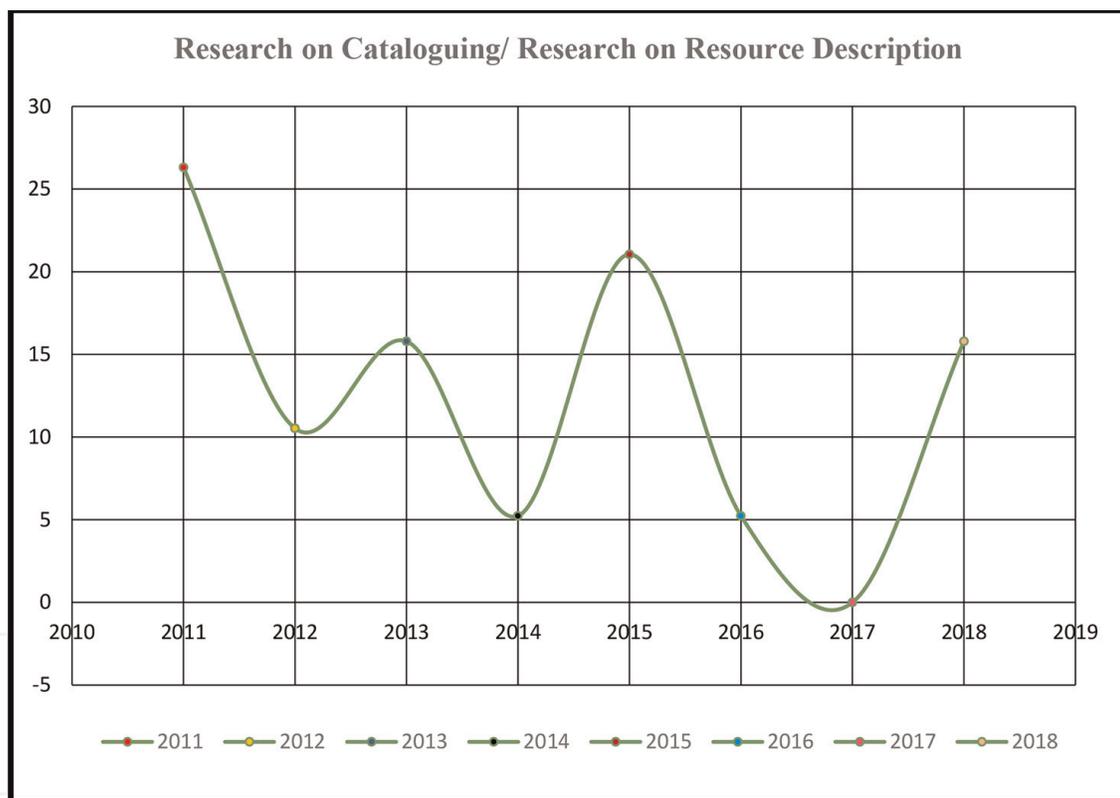


Figure 4.
Research on cataloging/resource description according to the year.

If we analyze the data according to the year, the highest number of research studies were done in 2012 (19.55%) and second highest research in 2013 (18.99%). In the area of information communication technology, rest of the research percentage were 9.50%, 11.17%, 13.96%, 11.17%, 11.73%, and 3.91% in the year 2011, 2014, 2015, 2016, 2017, and 2018, respectively.

Figure 5 shows research on information communication technology based on the years.

Table 6 reflects that total 29 (100%) research studies were done on information source, system, and center. Out of this, 13.79% (total 4) research studies were done on

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|-------------------------|------|-------|-------|-------|-------|-------|-------|------|-------|----------------|
| 1 | Database | 0 | 4 | 1 | 1 | 1 | 1 | 0 | 0 | 8 | 4.47 |
| 2 | Automation | 2 | 3 | 1 | 3 | 1 | 0 | 0 | 0 | 10 | 5.59 |
| 3 | Network | 2 | 2 | 3 | 4 | 3 | 6 | 0 | 1 | 21 | 11.73 |
| 4 | Software | 7 | 3 | 4 | 1 | 1 | 1 | 3 | 0 | 20 | 11.17 |
| 5 | Information Technology | 3 | 16 | 11 | 7 | 13 | 9 | 10 | 4 | 73 | 40.78 |
| 6 | ICT | 0 | 5 | 6 | 2 | 3 | 0 | 6 | 1 | 23 | 12.85 |
| 7 | Internet based | 3 | 0 | 4 | 1 | 0 | 2 | 1 | 0 | 11 | 6.14 |
| 8 | Electronic/ print media | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1.12 |
| 9 | E journal | 0 | 1 | 4 | 1 | 2 | 1 | 1 | 1 | 11 | 6.14 |
| Total value | | 17 | 35 | 34 | 20 | 25 | 20 | 21 | 7 | 179 | 100 |
| Percentage (%) | | 9.50 | 19.55 | 18.99 | 11.17 | 13.96 | 11.17 | 11.73 | 3.91 | 100 | |

Table 5.
 Research on information communication technology.

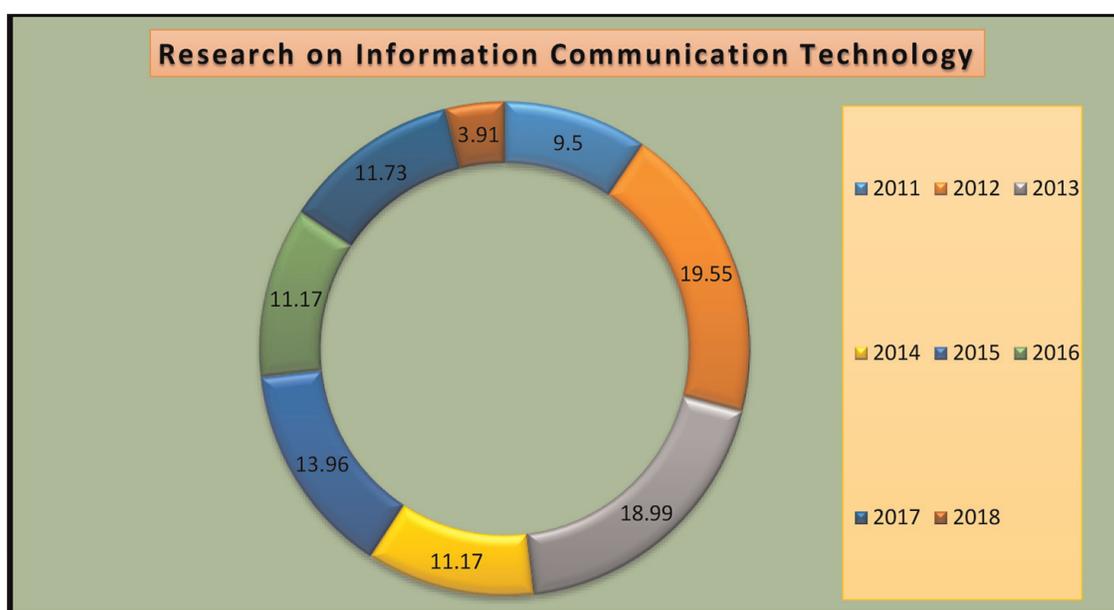


Figure 5.
 Research on information communication technology based on the years.

information system, and 86.21% (total 25) research studies were done on information service/source.

Yearly distribution shows that 24.14% (7) doctoral theses were completed in the year 2015, which was the highest number of research on information source, system, and center during the years 2011 to 2018. The second highest was 20.69% (6) in the year 2012, whereas in the year 2018, no research was done on this topic. Rest of the research percentages with years were 13.79% (4) in 2011 and 2017, 6.9% (2) in 2013, and 10.34% (3) in 2014 and 2016.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|-----------------------------|-------|-------|------|-------|-------|-------|-------|------|-------|----------------|
| 1 | Information system | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 4 | 13.79 |
| 2 | Information service/ source | 3 | 5 | 2 | 2 | 6 | 3 | 4 | 0 | 25 | 86.21 |
| Total value | | 4 | 6 | 2 | 3 | 7 | 3 | 4 | 0 | 29 | 100 |
| Percentage (%) | | 13.79 | 20.69 | 6.9 | 10.34 | 24.14 | 10.34 | 13.79 | 0 | 100 | |

Table 6.
Research on information source, system, and services.

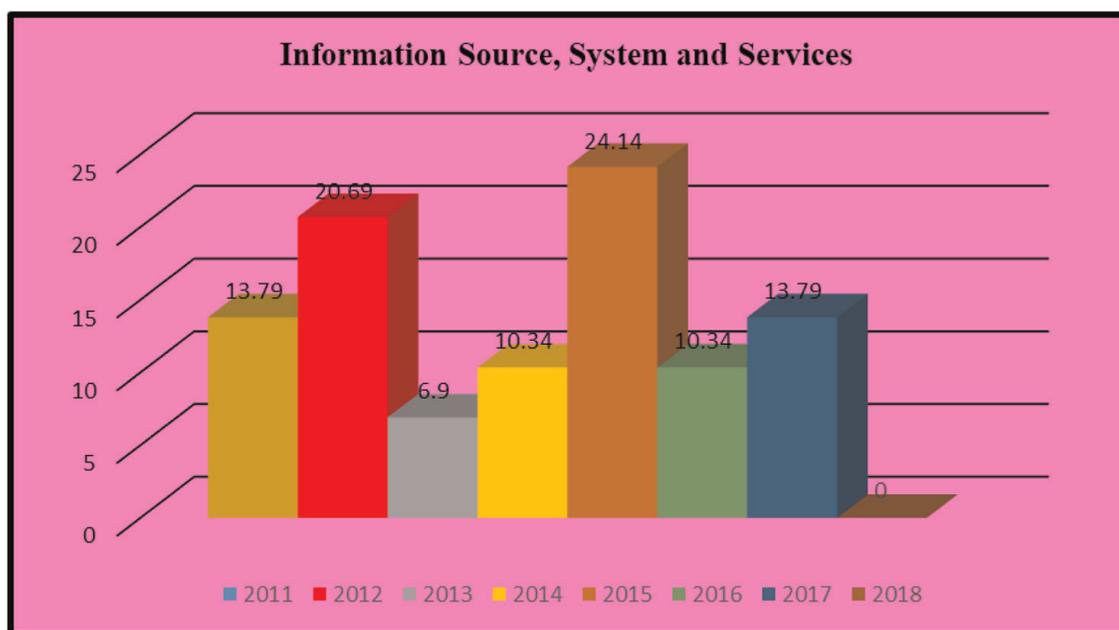


Figure 6.
Research on information source, system, and services according to the year.

Figure 6 shows research on information source, system, and services according to the year.

Table 7 shows that the total number of research on library classification in the year 2011–2018 was (21) 100%.

If we study according to the year, we can see the highest research studies were done in the year 2014 and 2017, where the percentage was same (23.81%; total 5 out of 21), and the second highest was in 2016 (19.05%; total 4), and 2015 had 14.28% (3)

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|----------------------|------|------|------|-------|-------|-------|-------|------|-------|----------------|
| 1 | Information Literacy | 1 | 1 | 1 | 5 | 3 | 4 | 5 | 1 | 21 | 100 |
| Total value | | 1 | 1 | 1 | 5 | 3 | 4 | 5 | 1 | 21 | 100 |
| Percentage (%) | | 4.76 | 4.76 | 4.76 | 23.81 | 14.28 | 19.05 | 23.81 | 4.76 | 100 | |

Table 7.
Research on information literacy.

research studies. Rest of the years were 2011, 2012, 2013, and 2018, which had done the same number of research studies on this topic, where the percentage were only 4.76 (total 1 out of 21).

Figure 7 shows research on information literacy based on the years.

Table 8 shows that total 86 research studies were done on seeking behavior and user approach in the years 2011–2018, where 41.86% were on information-seeking behavior and 47.67% were on user survey and user study. Only 10.47% research studies were done on reading habit. So, maximum research studies were done on user survey and user study.

If we study according to the year, we can see that the highest research studies were done in the year 2015, where the percentage was the same (17.44%; total 15 out of 86), second highest was in 2012 (16.28%), and 2013 and 2017 both had equal percentage, that is, 15.12% (total 12). Rest of the years were 2011, 2014, 2016, and 2018, which had done 10.46%, 13.95%, 9.30%, and 2.32%, respectively.

Figure 8 shows research on information-seeking behavior and user Approach.

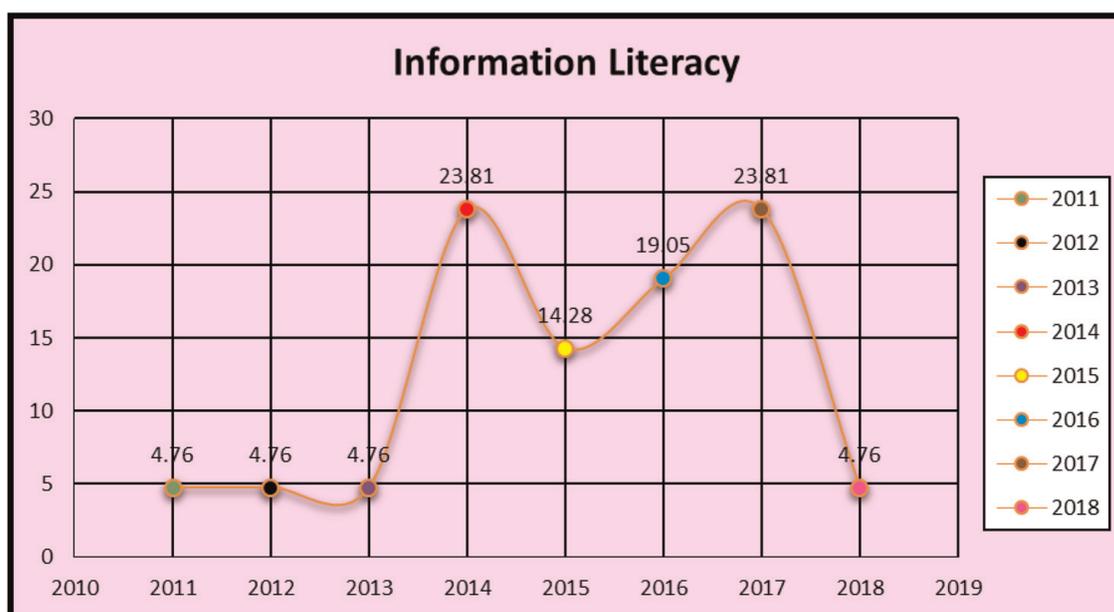


Figure 7.
 Research on information literacy based on the years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|------------------------------|-------|-------|-------|-------|-------|------|-------|------|-------|----------------|
| 1 | Information seeking behavior | 5 | 7 | 5 | 7 | 5 | 3 | 3 | 1 | 36 | 41.86 |
| 2 | User survey and User study | 2 | 7 | 7 | 4 | 9 | 5 | 6 | 1 | 41 | 47.67 |
| 3 | Reading habit | 2 | 0 | 1 | 1 | 1 | 0 | 4 | 0 | 9 | 10.47 |
| Total value | | 9 | 14 | 13 | 12 | 15 | 8 | 13 | 2 | 86 | 100 |
| Percentage (%) | | 10.46 | 16.28 | 15.12 | 13.95 | 17.44 | 9.30 | 15.12 | 2.32 | 100 | |

Table 8.
 Research on information-seeking behavior and user approach.

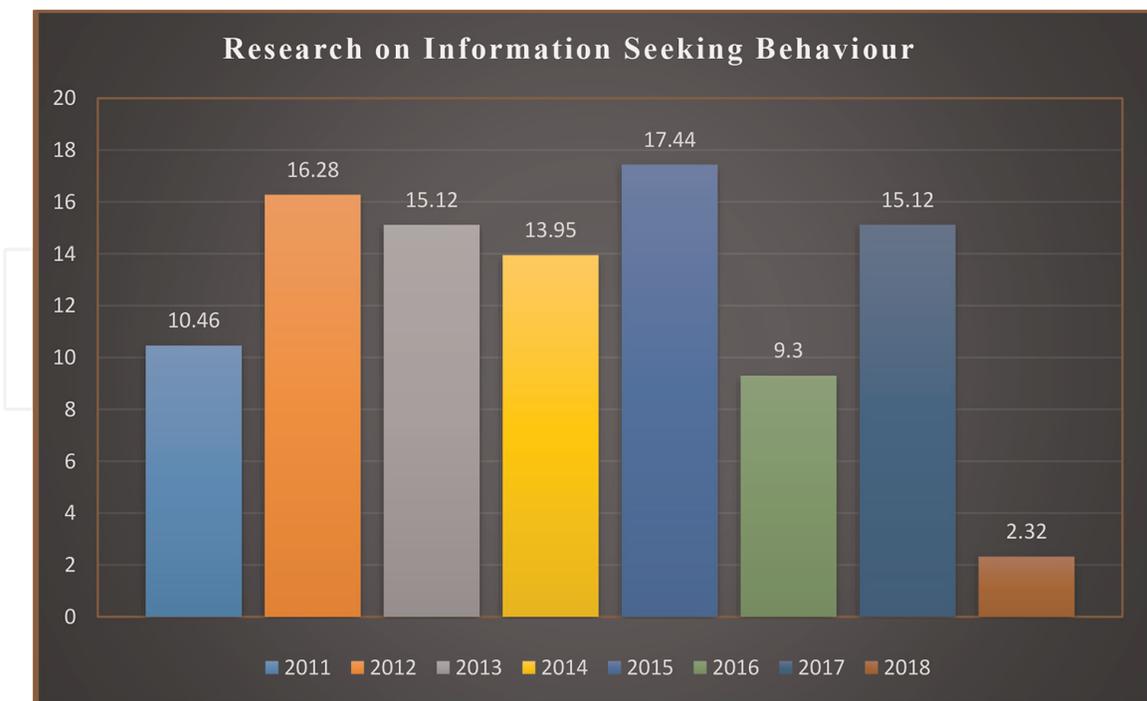


Figure 8.
Research on information-seeking behavior and user approach.

Table 9 shows that the total number of research studies done on information economics and knowledge management was 37 (100%). Out of this, 64.86% research studies were completed on information resource, where the total was 24, which is the highest among all, 16.21% research studies were done on resource sharing, where the total was 6, and remaining 5.40% (2), 10.81% (4), and 2.70% (1) research studies were done on marketing, web resource, and information dissemination, respectively.

Yearly distribution of library management research theses from 2011 to 2018 shows that among the 37 (100%) theses, the highest number of research studies were done in the year 2014; percentage is 29.7 (14). Second highest research studies were done in the years 2015 and 2017; percentage is 16.21 (6).

Figure 9 shows research on information economics and knowledge management based on the years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|---------------------------|------|------|-------|-------|-------|-------|-------|------|-------|----------------|
| 1 | Marketing | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5.40 |
| 2 | Information resource | 1 | 0 | 2 | 8 | 4 | 3 | 5 | 1 | 24 | 64.86 |
| 3 | Web Resource | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 4 | 10.81 |
| 4 | Information dissemination | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2.70 |
| 5 | Resource sharing | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 6 | 16.21 |
| Total value | | 2 | 2 | 4 | 11 | 6 | 5 | 6 | 1 | 37 | 100 |
| Percentage (%) | | 5.40 | 5.40 | 10.81 | 29.73 | 16.21 | 13.51 | 16.21 | 2.70 | 100 | |

Table 9.
Research on information economics and knowledge management.

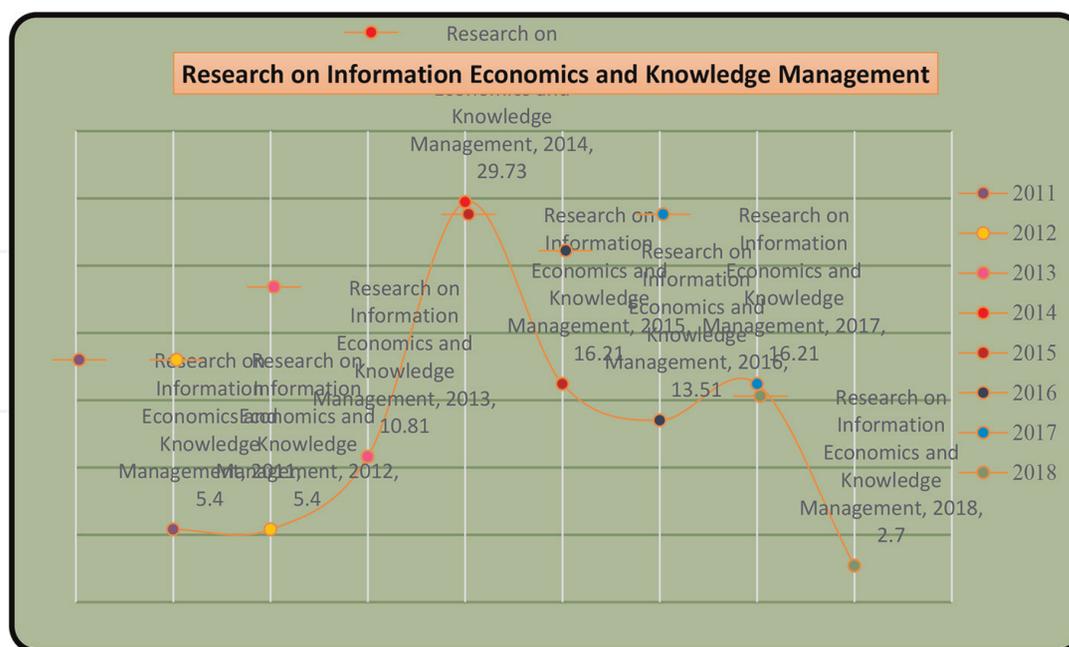


Figure 9.
 Research on information economics and knowledge management based on the years.

Table 10 describes that total 10 (100%) research studies were completed on content creation and technical writing. Out of this, 50% research studies were done on open access, 30% research studies on e-learning, and 20% research studies on content management.

Yearly distribution shows that the highest research studies were done in the year 2015, which is 40%, and remaining 20%, 30%, and 10% research studies were completed in the years 2013, 2014, and 2016, respectively. 2011, 2012, 2017, and 2018 had no research in content creation and technical writing.

Figure 10 shows research on content creation and technical writing based on the years.

Table 11 shows 58 (100%) research studies that were completed on digital library system and digital environment. Out of this, 41.38% (24) research studies were done on the digital library system, which had the highest score; the second highest research score 34.48% (20) was on e-resource, 13.79% (8) on e-journal, and 5.17% (3) research studies were completed on both metadata harvesting and digital repository. So, the result shows that the maximum research studies were done on the digital library system.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|--------------------|------|------|------|------|------|------|------|------|-------|----------------|
| 1 | Open access | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 5 | 50 |
| 2 | E-learning | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 3 | 30 |
| 3 | Content management | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 20 |
| Total value | | 0 | 0 | 2 | 3 | 4 | 1 | 0 | 0 | 10 | 100 |
| Percentage (%) | | 0 | 0 | 20 | 30 | 40 | 10 | 0 | 0 | 100 | |

Table 10.
 Research on content creation and technical writing.

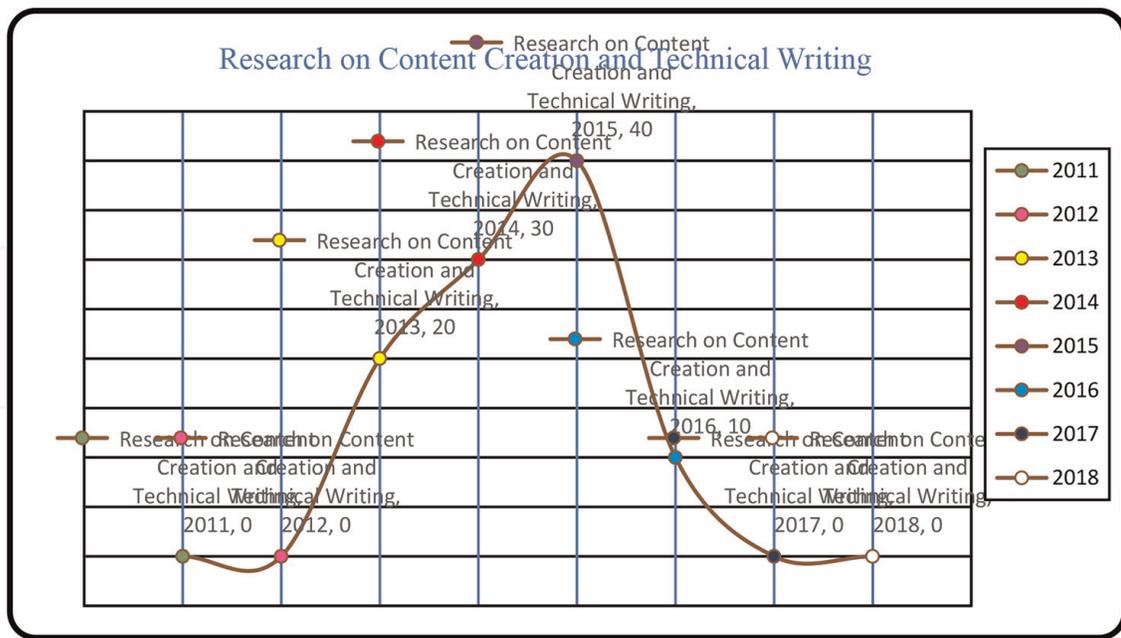


Figure 10. Research on content creation and technical writing based on the years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|--------|--|-------|-------|-------|------|-------|------|-------|------|-------|----------------|
| 1 | Digital library system & Digital Environment | 3 | 4 | 1 | 2 | 4 | 4 | 3 | 3 | 24 | 41.38 |
| 2 | Metadata harvesting | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5.17 |
| 3 | Digital repository | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 5.17 |
| 4 | E- resource | 1 | 3 | 0 | 1 | 6 | 0 | 8 | 1 | 20 | 34.48 |
| 5 | E- journal | 0 | 1 | 4 | 1 | 2 | 0 | 0 | 0 | 8 | 13.79 |
| | Total value | 6 | 10 | 6 | 4 | 12 | 4 | 12 | 4 | 58 | 100 |
| | Percentage (%) | 10.34 | 17.24 | 10.34 | 6.89 | 20.69 | 6.89 | 20.69 | 6.89 | 100 | |

Table 11. Research on digital library system and digital environment.

If we analyze the data according to the year, highest research studies were done in 2015 and 2017, both (6.89%). In the area of digital library system and digital environment, rest of the research percentage were 17.24% in 2012, 10.34% in both 2011 and 2013, 6.89% in 2014, 2016, and 2018.

Figure 11 shows research on digital library system and digital environment based on the years.

Table 12 shows that total 40 (100%) research studies were completed on information system analysis and design. Out of this, highest research studies were done on library professional (40%). Second highest was on quality management (30%) and rest of 15% (6), 12.5% (5), and 2.5% (1) research studies were completed on consortia, performance evaluation, and Thesaurus construction, respectively.

Yearly distribution shows that highest research studies were in the year 2012 and 2013, the score was same 17.5% (7); 2014 and 2015 also had done same percentages of

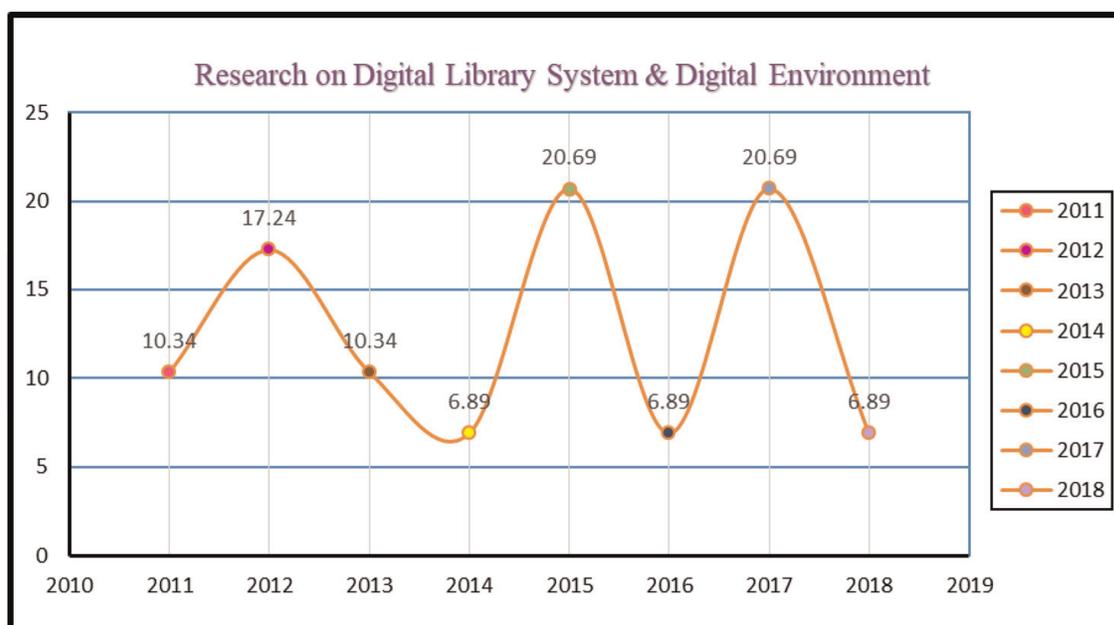


Figure 11.
 Research on digital library system and digital environment based on years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|------------------------|------|------|------|------|------|------|------|------|-------|----------------|
| 1 | Quality Management | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 12 | 30 |
| 2 | Consortia | 0 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 6 | 15 |
| 3 | Performance evaluation | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 5 | 12.5 |
| 4 | Library Professional | 1 | 4 | 1 | 3 | 1 | 4 | 1 | 1 | 16 | 40 |
| 5 | Thesaurus construction | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2.5 |
| Total value | | 2 | 7 | 7 | 5 | 5 | 6 | 6 | 2 | 40 | 100 |
| Percentage (%) | | 5 | 17.5 | 17.5 | 12.5 | 12.5 | 15 | 15 | 5 | 100 | |

Table 12.
 Research on information system analysis and design.

research studies, which was 12.5 (5). 2016 and 2017 also had same 15% (6), and 5% (2) research studies were done in the year 2011 and 2018.

Figure 12 shows research on information system analysis and design according to years.

Table 13 reflects that total 86 (100%) number of research studies were done on library statistic and informatics. Out of this, 61.17% (total 52) research studies were done on scientometric, which got highest number among these, and second highest research was 16.47% (total 14) done on citation analysis. Rest of 7.05% (total 6), 2.35% (total 2), 5.88% (total 5), and 8.14% (total 7) research studies were completed on bibliometric, webometric, hypotheses testing, and content analysis, respectively.

Yearly distribution shows that 20% (total 17) doctoral thesis were completed in the year 2014, which was the highest number of research on library statistic and informatics during the year 2011 to 2018. Second highest was 17.47% (total 17) in the year

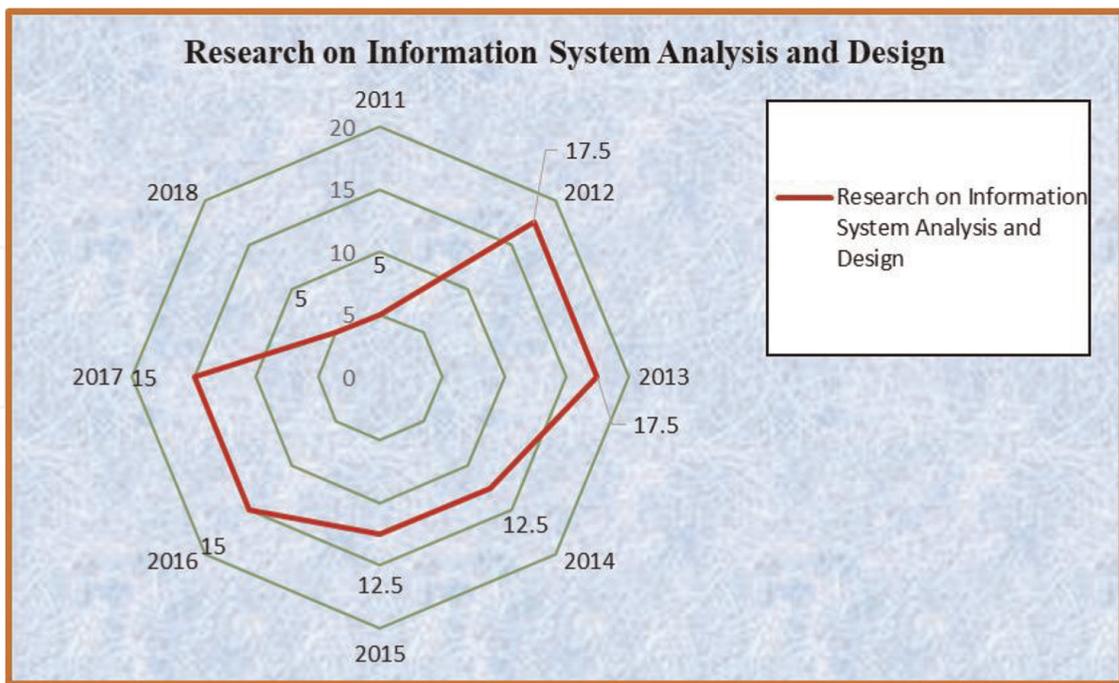


Figure 12.
Research on information system analysis and design according to years.

| Sl no. | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|--------------------|------|-------|------|-------|------|-------|-------|------|-------|----------------|
| 1 | Bibliometrics | 2 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 6 | 7.05 |
| 2 | Citation analysis | 1 | 1 | 1 | 3 | 3 | 1 | 4 | 0 | 14 | 16.47 |
| 3 | Webometrics | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 2.35 |
| 4 | Hypothesis testing | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 5.88 |
| 5 | Scientometric | 4 | 8 | 3 | 9 | 14 | 9 | 4 | 1 | 52 | 61.17 |
| 6 | Content analysis | 0 | 0 | 1 | 0 | 0 | 2 | 3 | 1 | 7 | 8.14 |
| Total value | | 8 | 12 | 6 | 15 | 17 | 14 | 12 | 2 | 86 | 100 |
| Percentage (%) | | 9.41 | 14.11 | 7.05 | 17.64 | 20 | 16.47 | 13.95 | 2.35 | 100 | |

Table 13.
Research on library statistics and informatics.

2014. Rest of the research percentages with years were 9.41% (8) in 2011, 14.11% (12) in 2012, 7.05% (6) in 2013, 16.47% (14) in 2016, 13.95% (12) in 2017, and 2.35% (2) in the year 2018, respectively.

Data analysis and interpretation under broad subject with years: Here, data is represented and analyzed according to 13 broad subjects included with yearly distributions.

Figure 13 shows research on library statistic and informatics based on the year.

This table (**Table 14**) represents the research studies under broad subject. Here, we can see that the highest research studies were done under the subject “Information Communication Technology”, the total number of research 179 (25.03%) out of 715 (100%). Second highest research studies were done in “Library Management”

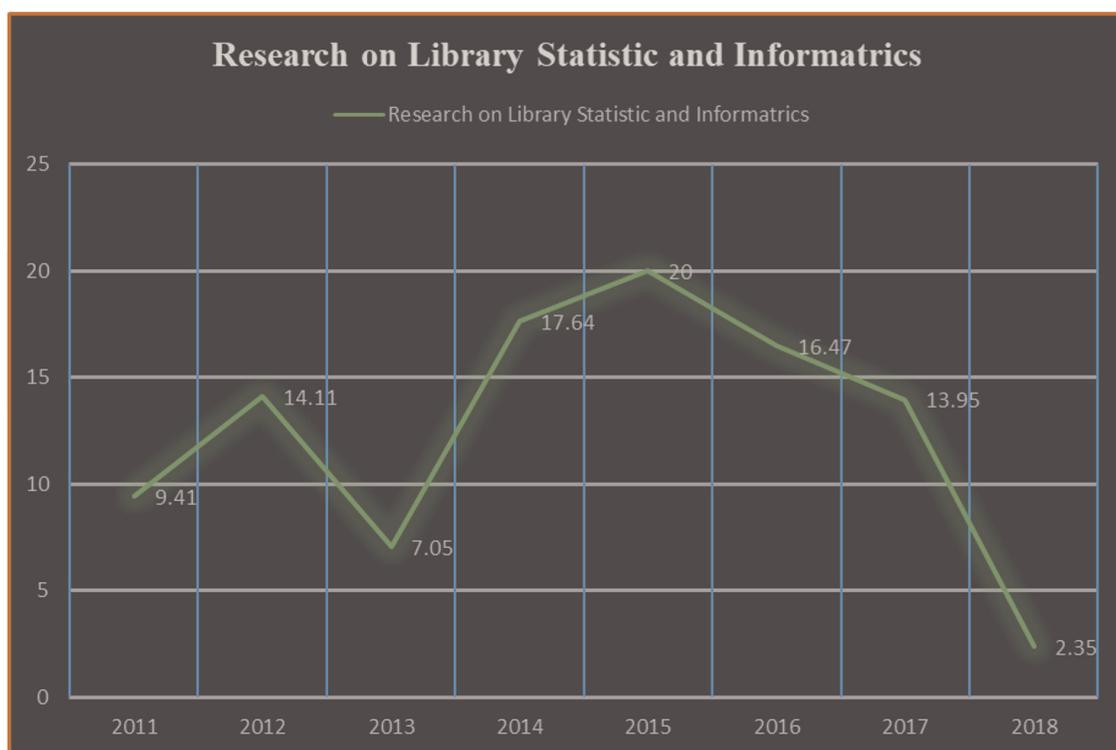


Figure 13.
 Research on library statistics and informatics based on the year.

| SL. No | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|--------|--|------|------|------|------|------|------|------|------|-------|----------------|
| 1 | Library and Society | 4 | 12 | 11 | 8 | 14 | 20 | 15 | 0 | 84 | 11.75 |
| 2 | Library Management | 13 | 19 | 16 | 17 | 16 | 11 | 8 | 4 | 104 | 14.54 |
| 3 | Research on Classification/ Knowledge Organization | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 13 | 1.82 |
| 4 | Cataloging/ Resource description | 5 | 2 | 3 | 1 | 4 | 1 | 0 | 3 | 19 | 2.66 |
| 5 | Information Communication Technology | 17 | 35 | 34 | 20 | 25 | 20 | 21 | 7 | 179 | 25.03 |
| 6 | Information Source, System and Services | 4 | 6 | 2 | 3 | 7 | 3 | 4 | 0 | 29 | 4.06 |
| 7 | Information Literacy | 1 | 1 | 1 | 5 | 3 | 4 | 5 | 1 | 21 | 2.94 |
| 8 | Information Seeking Behavior | 5 | 7 | 5 | 7 | 5 | 3 | 3 | 1 | 36 | 5.03 |
| 9 | Information Economics and Knowledge Management | 2 | 2 | 4 | 11 | 6 | 5 | 6 | 1 | 37 | 5.17 |
| 10 | Content Creation and Technical Writing | 0 | 0 | 2 | 3 | 4 | 1 | 0 | 0 | 10 | 1.4 |

| SL. No | Name of sub topic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total | Percentage (%) |
|----------------|--|------|-------|-------|-------|-------|------|-------|------|-------|----------------|
| 11 | Digital Library System & Digital Environment | 6 | 10 | 6 | 4 | 12 | 4 | 12 | 4 | 58 | 8.11 |
| 12 | Information System Analysis and Design | 2 | 7 | 7 | 5 | 5 | 6 | 6 | 2 | 40 | 5.59 |
| 13 | Library Statistic and Informatics | 8 | 12 | 6 | 15 | 17 | 14 | 11 | 2 | 85 | 11.89 |
| Total value | | 68 | 117 | 99 | 100 | 119 | 93 | 92 | 27 | 715 | 100 |
| Percentage (%) | | 9.51 | 16.36 | 13.85 | 13.99 | 16.64 | 13 | 12.88 | 3.77 | 100 | |

Table 14.

Data analysis under broad subject.

(14.54%) total were 104, where 85 (11.89%) research studies were on “Library Statistic and Informatics”. “Library and Society” accrue 84 (11.75%) research studies. Next, “Digital Library System & Digital Environment”, “Information System Analysis and Design”, and “Information Economics and Knowledge Management” completed 58 (8.11%), 40 (5.59%), and 37 (15.17%) research studies, respectively. Rest of the subjects are “Research on Classification/ Knowledge”, “Organization Cataloging/ Resource description”, “Information Source”, “System and Services”, “Information Literacy”, and “Information Seeking Behavior” completed 1 to 36 (6% to <2%) research studies in LIS field during 2011 to 2018.

According to years, the maximum number of research studies were in the years 2015 and 2012; the total were 119 (16.64%) and 117 (16.36%), respectively, where medium number of research studies were in the years 2014–100 (13.99%), 2013–2099 (13.85%), 2016–2093 (13%), 2017–2092 (12.88%), and 2011–2068 (9.51%), where lowest number of research studies were in the year 2018–2027 (3.77%) on the basis of theses uploaded in Shodhganga.

Figure 14 shows research studies under broad subject, and also **Figure 15** shows yearly distribution of research studies under broad subjects.

7. Findings of broad subject with years

According to the UGC recommended syllabus of LIS, all data which was collecting from INFLIBNET are content analysis and made through title and keyword and categorized in to 20 broad subjects, which is already discussed in Chapter 1. and Chapter 3. To identify the research trend in the area of subjects in LIS field, it will have to focus on findings. These are:

- After analyzing the data through the year 2011 to 2018, we can see that maximum research studies were done on “**Information Communication Technology**”, which got highest number of research studies, that is, 179 (25.03%) out of 715.
- “**Library Management**” got second position. The total number of research studies done on this subject was 104 (14.75%).

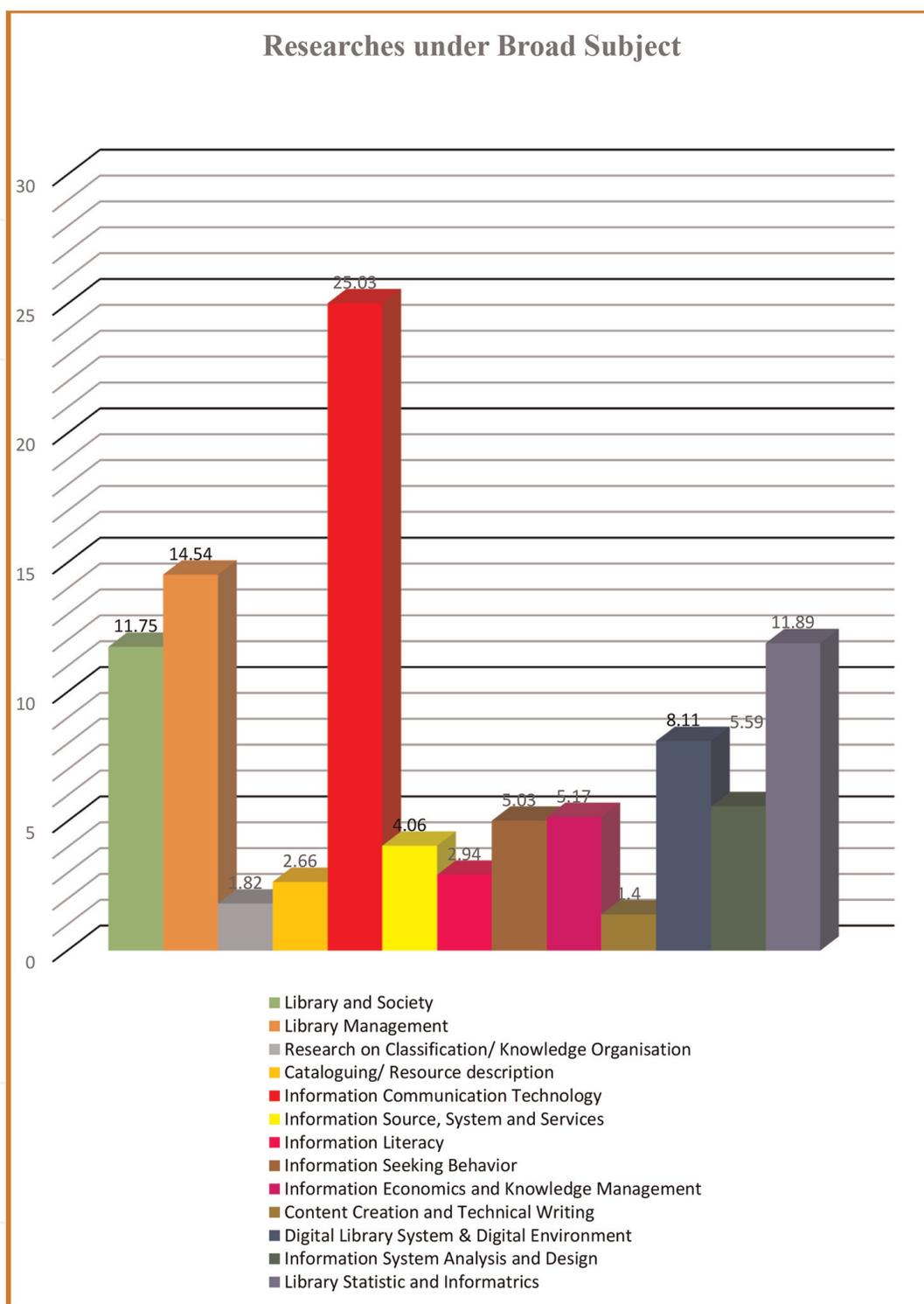


Figure 14.
 Research studies under broad subject.

- “**Library Statistic and Informatics**”, “**Library Society**” also had good number of research studies, which accrue 85 (11.89%) and 84 (11.75%), respectively.
- Next “**Digital Library System & Digital Environment**” and “**Information System Analysis and Design**” completed 58 (8.11%) and 40 (5.59%), respectively, which is also good.

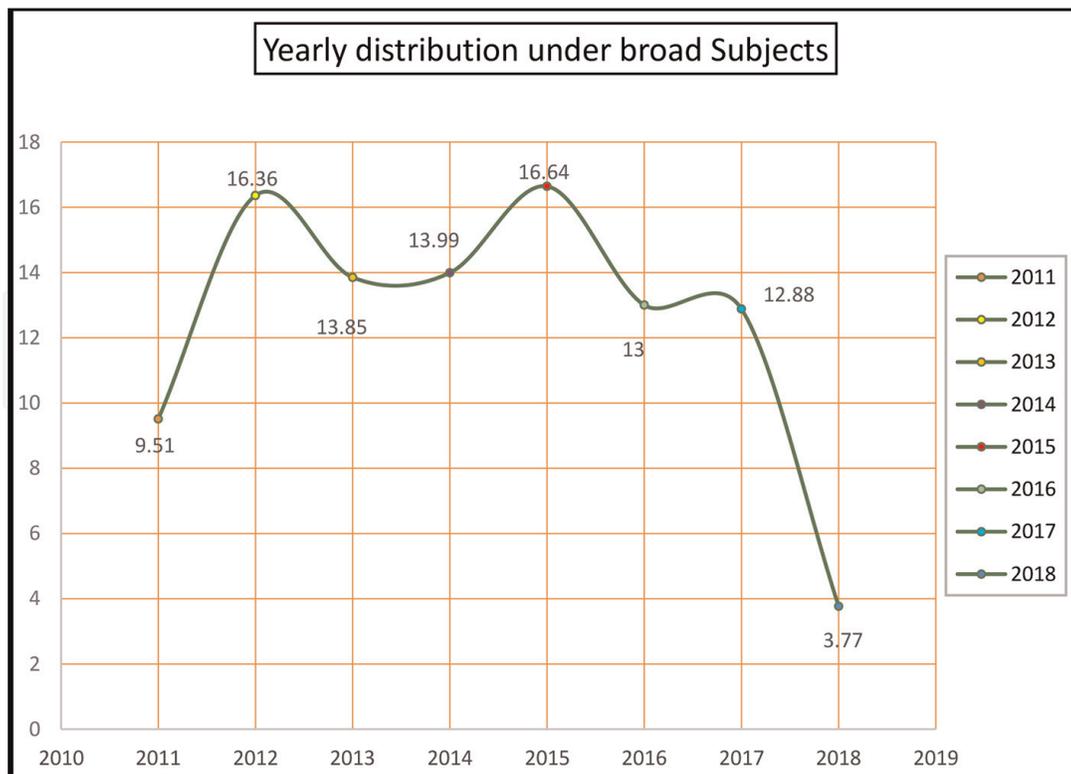


Figure 15.
Yearly distribution of research studies under broad subjects.

- But research studies on these subjects, that is, “Information Economics and Knowledge Management”, “Information Seeking Behavior”, and “Information Source, System, and Services” is medium.
- Lowest number of research studies were done under content creation and technical writing (1.4%), classification/ knowledge organization (1.82%), cataloging/resource description (2.66%), and information literacy (2.94%).
- On the basis of theses, which were uploaded to Shodhganga during 2011–2018, the yearly distribution showed that maximum number of research studies was in the years 2015 and 2012; the total was 119 (16.64%) and 117 (16.36%), respectively. The lowest research studies were done in the year 2018 (3.77%).

8. Conclusions

The current study shows that most of the doctoral theses that have been submitted in LIS discipline in India gradually come out from the core area of LIS fields like classification, cataloging, knowledge management, etc. The research trend is growing forward to the scholarly communication, IT based, management oriented, and in academic field also. Most of the research studies are being done on library statistics like bibliometric, scientrometric, webometrics, citation analysis, etc. Also, research on library society, information technology, application of information technology, digital library system and digital environment, information system analysis and design, and user approach is among the modern area of research of LIS field.

IntechOpen

Author details

Sutapa Paul¹ and Bapan Kumar Maity^{2*}

1 Kothari Medical Centre, Kolkata, India

2 Sammilani Mahavidyalaya, Kolkata, India

*Address all correspondence to: bkmaity84@gmail.com

IntechOpen

© 2023 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

[1] Maity BK, Hatua SR. Research trends of library management in LIS in India since 1950–2012. *Scientometrics*. 2015; **105**:337-346. DOI: 10.1007/s11192-015-1673-8

[2] Yadav AK, Gohain RR. Growth and development of LIS education in India. *SRELS Journal of information Management*. 2015;**52**(6):403-414

[3] Pandita R, Singh S. Research growth in LIS during last decade: A study. *Library Review*. 2015;**64**:514-532. DOI: 10.1108/LR-04-2015-0037

[4] Chatha HS. Research trends in LIS: A bibliometric study of information studies journals during 2011-2015. *International Research Journal of Management Science & Technology*. 2016;**7**(7):03-07. Retrieved February 02, 2019, from <http://www.irjmst.com>

[5] Dora M, Kumar HA. An empirical analysis of the research trends in the field of library and information science in India –2004-2015. *COLLNET Journal of Scientometrics and Information Management*. 2017;**11**(2):661-678. DOI: 10.1080/09737766.2017.1317959

[6] Singh RK, Singh AP, Singh AK. Research trends in field of library and information science: A case study of DLIS Aligarh Muslim University through Shodhganga repository. *Library Progress (International)*. 2018;**35**:158-165. DOI: 10.5958/2320-317X.2018.00016.8

[7] Mondal S, Roy BK. Research trends of sub-subjects on economics: A bibliometric study. *Library Philosophy and Practice*. 2018. Retrieved from <https://search.proquest.com/docview/2165581881?accountid=16284>