

# IMPACT AND POLICY RESEARCH REVIEW

IPRR

**VOL. 4 ISSUE 2**

**July – December 2025**

## INSIGHTS

**Displaced By Policy, Driven By Necessity:  
Understanding Katkari Migration Through Macro,  
Meso, And Micro Lenses**

**Why Delhi's Stray Dog Problem Is a Governance  
Failure**

**Rat Race and Viksit Bharat-2047**

## SPECIAL ARTICLES

**Role of Dairy Farming in Enhancing Farm Income:  
Experiences from Punjab and Haryana**

**Unfolding India's Development Partnership in the  
Mekong Subregion: A Comprehensive Overview**

## BOOK/REPORT REVIEWS

**AI and the Future of India's Technology Services  
Industry: A Report Review**

## POLICY PERSPECTIVES

**Fusing AIS and OSINT: A Policy Blueprint for  
Smart Maritime Trade Compliance and  
Surveillance**

**Community Health Workers In Health Care  
Paradigm: A Study of Scheduled Caste ASHAs  
from Punjab (India)**

**Mapping In(dignity) Within the NAMASTE Policy  
Framework**

**Effectiveness of the Kanyashree Scholarship in  
Promoting Girls' Educational Retention in West  
Bengal**

## YOUNG VOICES

**Recalibrating Multilateralism: The Emerging  
Architecture of Global Water Diplomacy in the  
Anthropocene**

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Marine Export Growth In India**

# IPRR

e-ISSN: 2583-3464

# Impact and Policy Research Review (IPRR)

# **I P R R** | **IMPACT AND POLICY RESEARCH REVIEW**

————— Managed & Published by —————  
**IMPRI IMPACT AND POLICY RESEARCH INSTITUTE**

IPRR Volume 4 Issue 2 (July - December 2025)

Editors:

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**Impact and Policy Research Review (IPRR)**  
**IPRR Volume 4, Issue 2, July - December 2025**  
URL:

**e-ISSN: 2583-3464**

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Impact and Policy Research Review (IPRR)

Managed and Published by:

IMPRI Impact and Policy Research Institute

Address: 92, Basement, J-Block, Saket, New Delhi - 110017, India

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URL: <https://iprr.impriindia.com/>

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Impact and Policy Research Review (IPRR) (e-ISSN: 2583-3464) is an international double-blind peer-reviewed biannual research journal managed and published by IMPRI Impact and Policy Research Institute, New Delhi. IPRR hosts written contributions on topics having concrete implications for progressive development, covering a well-grounded policy analysis, that is interdisciplinary or focused on particular disciplines, for example, Economics, Politics, Governance, Geography, Sociology, Gender and Ethnic Discrimination, Development Studies, Environmental Degradation, Anthropology, and International Relations, with an expectation that all work is accessible to readers across the social sciences.

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# EDITORS' NOTE

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Impact and Policy Research Review (IPRR)

**IPRR Volume 4 Issue 2 (July - December 2025)**

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We are pleased to present Volume 4, Issue 2 of the Impact and Policy Research Review (IPRR), a biannual journal dedicated to fostering critical scholarship and policy-relevant research. This issue brings together a range of contributions that reflect the journal's core commitment to interdisciplinarity, evidence-based analysis, and engagement with urgent socio-political and developmental challenges.

The articles featured in this issue explore a wide spectrum of themes including migration and marginalisation, urban governance, economic development, maritime security, public health, gender and social justice, education, environmental sustainability, and international cooperation. From examining distress-driven migration among the Katkari community and the governance dimensions of Delhi's stray dog crisis, to analysing India's developmental aspirations under Viksit Bharat-2047 and proposing integrated maritime surveillance frameworks through AIS and OSINT technologies, the issue presents nuanced perspectives grounded in both empirical research and policy discourse.

This issue also features insightful contributions under the Young Voices section, highlighting emerging scholarly perspectives on global water diplomacy and marine export challenges. The Report Review section includes a reflective engagement with India's evolving technology services sector, encouraging critical discussion on innovation, transformation, and the future trajectory of India's digital economy. Together, the contributions in this volume underscore the evolving landscape of policy research and its relevance for academics, practitioners, policymakers, and civil society stakeholders alike.

We extend our sincere gratitude to our authors, reviewers, editorial board, and readers for their continued support and intellectual engagement. We hope this issue stimulates meaningful dialogue and contributes to informed policymaking and impactful research.

With Gratitude,  
Editors,  
Impact and Policy Research Review (IPRR)

# CONTENTS

Impact and Policy Research Review (IPRR)  
IPRR Volume 4 Issue 2 (July - December 2025)

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## INSIGHTS

**Displaced By Policy, Driven By Necessity: Understanding Katkari Migration Through Macro, Meso, And Micro Lenses** 1 - 7  
Iqra Khan & Varsha Maheshwari

**Why Delhi's Stray Dog Problem Is a Governance Failure** 8 - 14  
Jahnvi Borgohain

**Rat Race and Viksit Bharat-2047** 15 - 20  
Krishna Raj

## POLICY PERSPECTIVES

**Fusing AIS and OSINT: A Policy Blueprint for Smart Maritime Trade Compliance and Surveillance** 21 - 34  
Bhavya Bhav & Ananta Proshad Chakraborty

**Community Health Workers In Health Care Paradigm: A Study of Scheduled Caste ASHAs from Punjab (India)** 35 - 47  
Gurinder Kaur & Shaik Iftikhar Ahmed

**Mapping In(dignity) Within the NAMASTE Policy Framework** 48 - 64  
Aishwarya Karan

**Effectiveness of the Kanyashree Scholarship in Promoting Girls' Educational Retention in West Bengal** 65 - 86  
Joy Karmakar

## SPECIAL ARTICLES

**Role of Dairy Farming in Enhancing Farm Income: Experiences from Punjab and Haryana** 87 - 114  
Vikash Kumar & Abhimanyu Singh Thakur

**Unfolding India's Development Partnership in the Mekong Subregion: A Comprehensive Overview** 115 - 139  
Khath Bunthorn & Ngin Chanrith

## REPORT REVIEW

**AI and the Future of India's Technology Services Industry: A Report Review** 140 - 144  
Atharva Salunke

## YOUNG VOICES

**Recalibrating Multilateralism: The Emerging Architecture of Global  
Water Diplomacy in the Anthropocene** 145 - 151  
Jyotsna Choudhury

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**Post Harvest Losses In Fisheries: A Barrier To Marine Export Growth  
In India** 152 - 160  
Aditi Tiwari & Akshai Suresh

# Displaced by Policy, Driven by Necessity: Understanding Katkari Migration through Macro, Meso, and Micro Lenses

Iqra Khan<sup>1</sup> & Varsha Maheshwari<sup>2</sup>

## Abstract

*Migration has been a significant aspect of human history in pursuit of improved livelihood opportunities. These long-term migratory movements have resulted in unequal development and distribution. This article has used in-depth interviews and observations to explore factors influencing the Katkari community to migrate, specifically in two blocks of Nashik and Trimbakeshwar in the state of Maharashtra. Through a comprehensive macro-meso-micro level analysis, the article demonstrates how- development policies, migration networks, disguised bondage, increased digital exposure and youth aspirations together influence and shape decisions and add depth to migratory reality.*

**Keywords:** *Katkari Community, Seasonal Migration, Distress Migration, Forest Rights Act (FRA).*

## 1 Introduction

In a globalised world, migration as a phenomenon is becoming rampant and the factors influencing and being influenced by migration are taking different forms making it difficult to categorise them into any one kind of category. Often there is no linear process or steps directing migration but a series of factors including macro level changes grounded on the concepts of structural penetration. The imbalance of peripheral areas can generate conditions that lead to mass displacement. (Portes and Walton, 1981, pp. 30-32).

The Katkari community has a rich history rooted in forest based traditions. They were traditionally hunter-gatherers and catechu makers. Their livelihoods declined

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due to restrictive environmental policies, leading to displacement and a shift toward seasonal migration for work. This transition led to challenges such as poverty, illiteracy and social inclusion (Sinha, 2017). Presently, this community with a population of around 0.29 million (Census of India, 2011), is predominantly found in Kolaba and Thane districts and some areas of Pune, Satara, Nashik and Ratnagiri districts.

This article explores how macro, meso and micro level factors influence migration among the Katkari community in Maharashtra. Based on in-depth interviews and field observations in Nashik- Peth and Trimbakeshwar, home to a significant Katkari population, the study highlights the often overlooked meso- level factors. While the traditional literature has focussed more on macro and micro level factors as determinants of migration, we have also emphasized on meso-level factors to comprehensively understand the migration processes.

## **2 Macro-level determinants**

Determinants at this level are embedded within the broader processes of social, political, and economic transformation that shapes migration.

### **2.1 Displacement**

Historically residing in forest regions, Katkari community's forest based activities declined post-independence as bans on tree felling and shifting cultivation were imposed, pushing them to the margins. (Dalvi, Bokil, 2000; Grove, Damodaran, Sangwan, 2013). They had to seasonally migrate in search of employment for survival and were displaced from sites of state-led developmental works such as dam construction, etc.

Elderly members of the Katkari community in both Trimbakeshwar and Peth blocks shared that their ancestors came from the forests of Mokhada and Raigad region of Maharashtra. About 80 years ago, their ancestors came to the present region and started looking for ways to survive. Major Scheduled Tribes (STs) in the region such as Kokna and Warli including other land owning communities provided them space to settle and in return they toiled for them. Lately, about two to three decades ago, the government has started providing 8A certificates to those households who pay ghar patti (house tax) and paani patti (water tax). Consequently, we observed that only a small proportion of Katkari families owned homesteads but hardly any

agricultural land during our visit. With limited commercial agricultural skills and their alienation from forest regions, they now face significant transitions and struggle to sustain themselves through physically demanding work, such as stone cutting and construction labour.

## **2.2 Forest Rights Act (FRA)**

Forest areas closely overlap with land that tribal communities have been living on, and been dependent on, for generations. This dependency and protection of the forests was not based on any legal right. The absence of formal rights and mobility of tribal people from one place to another within the forest enabled the state to exercise control over forests without recognising forest use by the tribal communities.

In Gonde village of Peth block, members of the Katkari community migrate annually for seven-eight months. This is because they don't own any resources such as land, except 30 families owning homestead land under the Forest Rights Act in 2017-2018 with the help of a 7/12 record of rights. Post 2018, no Individual Forest Rights (IFRs) claims were sanctioned and were pending with the Divisional Level Committee. With forest land coming under the control of the forest department, accessibility to forest resources have been strictly reduced for them. Forest resources and their diversity have declined considerably as the majority of forest land is now managed by the forest department.

## **2.3 MGNREGA**

Until the previous year, MGNREGA had not served as a source of income for the Katkari community in these two blocks of Nashik. This scenario has changed as their houses are being constructed under the Union government's housing scheme Pradhan Mantri JANMAN in convergence with MGNREGA. Through this convergence, sanctioned houses under the JANMAN yojana can demand work under MGNREGA to construct the houses. Apart from that, they haven't had an opportunity to work under MGNREGA.

A few families during our visit did possess a job card but shared they could not get any work through the scheme. A local resource person shared with us that most of them lack awareness as they are not aware of wage rates or how to raise demand

for work. Many households don't even possess a job card as they lack the required documents due to families splitting into nuclear units post marriage.

### **3 Meso level determinants**

According to Kuhnt (2019) the meso-level factors “have been shown to impact strongly on an individual's migration aspiration and decision”, and they include migration culture, networks, and information, technology, migrant smugglers, geography and infrastructure.

Human mobility is motivated not only by economic factors but is also driven by many cultural, psychological, social, and emotional factors which may be hard to generalise or can offer little external reasoning (Haas, 2021).

#### **3.1 Migration Networks**

Migrants from the Katkari community travel in groups to work. In most cases, either the couple travels with their young children or children above the age of 17 migrate to earn a living. Instances were also observed during the visit when the elderly couple was living in the village while their children had migrated to other districts. Middlemen facilitating migration from the villages will either be an experienced community member from their village who further has contact with the contractors. A member shares, “Going as a group is better as in cases of emergency we are a helping hand to each other.”

#### **3.2 Disguised Bonded labourers**

Contractors from outside come to their village and offer them a lucrative amount for any of their urgent needs such as marriage or for medical treatment, in return they offer their labour which has no working hours limit, thus this shows a true picture of acquiring ‘absolute surplus’ from workers by the contractors. They work for long hours, often spending the meagre amount they earn after paying back the loan. Women members shared separately that their husbands tend to take their share of wages for alcohol purposes as well, leaving them hand to mouth in some cases. Until they don't pay back the loan through their hard labour, they are left with no option but to work on the contractor's terms and conditions, predominantly working as disguised bonded labourers.

### **3.3 Youth Networks & Digital Exposure**

The young generation from the Katkari community migrates in groups and tends to have contacts in the destination city whether they be contractors, migrants or members of the community. The presence of social networking among them and exposure to multimedia also lure them to stay connected and distances them from their own community and well-being. Members of the community shared that they return to their villages either during Holi or Diwali for a brief period of two-three days, only to return to work immediately. They further shared that the youth are spendthrifts and contribute little to the family expenses.

While their living and working conditions in the destination cities may not be decent, the exposure to a world which is more individualistic and glamorous with the help of multimedia has connected them to the global trends, which draws them towards the metropolis.

## **4 Micro level determinants**

Determinants at this level draw attention to the specific aspects of the Katkari migrants with respect to their culture, age, skills, education, local conditions etc. that influence their migration.

### **4.1 Poor living conditions and discrimination**

In Peth block, the Katkari community resides in compact semi-pucca and kutcha houses with poor drainage. A few pucca houses constructed under Indira Awaas Yojana (IAY) are now dilapidated. They lack both homestead and cultivable land, with a few families residing in makeshift shelters. Most children study in Ashram Schools alongside Kokna children. However, the elders of the Katkari community report instances of discrimination, prompting children to drop out and migrate with their families.

Access to drinking water varies by location. In places where their settlements are located in the interior hilly terrain, they face water shortages due to shallow groundwater tables. The primary source of water is open wells, as hand pumps are ineffective, with some in need of repairs. While we observed infrastructure installed under the Jal Jeevan Mission, community members shared their struggles, noting that the taps are dysfunctional.

## **4.2 Low wages/irregular work**

A significant proportion of working members from the community engages as agricultural wage labourers during the Kharif season on the farmlands of Kokna. One of the family members shared migration as the only alternative for their livelihood in the absence of education and professional skills. Consequently, due to limited work opportunities they face survival issues for almost 5-6 months.

With limited agricultural skills and work opportunities in their region, they are left with no alternative than to migrate to nearby districts such as Beed, Jalna, Pune, Satara, Solapur and Konkan region through contractors where they work as casual farm and non-farm labourers. One of the members shared that they work for more than 14 hours a day. A majority of Katkari members prefer staying in the destination city for 7-8 months despite indecent living and working conditions.

## **4.3 Youth Aspirations**

The aspirational youth of the community prefer staying in the destination city. Community members in a group discussion shared their views towards the youth. “They are young and have different aspirations in contrast to the adult population”. One of the community members shared how her grandson bought a smartphone and a bike immediately after a month. The newer generation lacks the concept of saving, instead, they fall prey to conspicuous consumption as they immediately spend the income earned on non-durable assets. On further inquiry, it was learnt in the aforementioned case that they bought it by taking advance from the contractor.

## **5 In lieu of conclusion**

This paper attempts to highlight myriad factors contributing to migration among the Katkari community, factors which go beyond mere economic necessity and instead reflects a complex interplay of marginalisation and evolving socio-cultural dynamics. Through a comprehensive analysis, the article demonstrates how state-led development policies at the macro level suffer from poor implementation and further forces the community into perpetual cyclical, distress-driven migration. This complex picture of migrants from the Katkari community further throws light on the vulnerable condition of the Katkari community who are

suffering from 'There Is No Alternative' (TINA) syndrome, which explains migration as the only alternative for their livelihood.

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## Why Delhi's Stray Dog Problem Is a Governance Failure

Jahnvi Borgohain<sup>1</sup>

On a warm evening in Delhi's Lodhi Garden, what began as an ordinary cultural outing turned into one of the most haunting lessons of my life. A friend and I had gone there for an open-air lecture, looking forward to a quiet session when suddenly, a large white stray dog wandered over and sat itself near us. Although the dog seemed harmless at first, we looked around and noticed several other dogs hovering nearby, watching us keenly. None of the guests wanted to provoke a pack, so we adjusted. The dog sat in its corner of the mat and the audience sat around it. Towards the end of the lecture however, my friend stepped forward and gently petted the dog, trying to coax it off the mat. The dog suddenly stiffened, bared its teeth, and before we could even react, it lunged and bit him on the hand.

In a matter of seconds, the atmosphere of the gathering changed, with the lecture session turning into a scramble of panic and fear. My friend and I immediately left for RML Hospital in Connaught Place, hoping to get a quick treatment and go home. Instead, what we met with was something far more unsettling. We were directed to a huge chamber of the hospital dedicated solely to dog-bitten patients, and dozens of patients queued up to be vaccinated. At the registration desk, we found ourselves fourth in line, despite having rushed there straight from the park. The doctor, a young lady, mentioned to me almost casually how they see two to three new dog-bite cases every single minute. I was utterly horrified. That evening's chaos, I realised, was not an exception. It was the norm.

### Is this normal for a capital city, or a sign of policy failure?

Delhi prides itself on being India's capital city, yet when we step into almost any residential lane, public park, or even a crowded market, a different reality unfolds. One can almost always find packs of stray dogs roaming freely, scavenging

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near mounds of garbage, often snapping when they feel threatened. What should ideally be safe and accessible civic spaces have now become increasingly marked by fear.

The numbers alone are alarming. According to the Municipal Corporation of Delhi (MCD), the city records over 80,000 dog-bite cases every year. In July 2023, The Hindu reported that Ram Manohar Lohia Hospital alone treated more than 26,000 dog-bite patients in just six months. The World Health Organization estimates 18,000 to 20,000 people in India die of rabies annually, most of them children.

These statistics come alive through tragic real-life stories. In East Delhi's Trilokpuri, a five-year-old boy was mauled to death while playing outside his home in 2022. In Ghaziabad, a seven-year-old girl was killed by a pack of dogs near her housing society, sparking protests and urgent meetings of the municipal council in 2024.

Another shocking story that horrified the nation this year was that of Brijesh Solanki, a 22-year-old state-level kabaddi player from Uttar Pradesh, who died of rabies after being bitten by a puppy he had rescued from a drain. Brijesh's death made headlines not only because he was a young athlete with a promising future, but because his story underscored a devastating truth: in 2025, in a country with abundant medical knowledge, people are still dying of a disease that should no longer even exist.

## How Did We Get Here?

This problem is not a new one, but something that has been allowed to fester. The Animal Birth Control (Dogs) Rules, first framed in 2001 and updated in 2023, are well-intentioned rules that prohibit culling, and mandate sterilization and vaccination drives. On paper, this seems humane and balanced. In practice, however, its implementation is patchy. Civic bodies outsource sterilisation drives to under-resourced NGOs with little monitoring, resulting in a fraction of the population being covered each year. Delhi reportedly has over three lakh stray dogs, but sterilisation numbers fall woefully short of controlling their growth.

Municipal records reveal that sterilization targets often go unmet by wide margins. In 2023, the MCD admitted to having sterilized only about 40,000 dogs in a year, a figure grossly insufficient to manage a population growing exponentially.

Veterinary staff cite poor infrastructure and irregular payments. Shelters lack capacity, and vans meant for capturing strays often lie defunct for months.

Meanwhile, Delhi's broken waste management system acts as an all-you-can-eat buffet for strays. Overflowing garbage dumps near markets and slums, open drains behind restaurants, and food scraps left in public spaces allow packs to thrive. Kachra colonies, such as the informal settlements near landfills like Ghazipur, become breeding grounds for dogs which then spread into neighbouring residential areas. A single day spent near the Ghazipur landfill, as documented by *Down To Earth* magazine, reveals dozens of dogs scavenging on heaps of organic waste, unbothered by the stench or the risk of disease.

Well-meaning residents often add to the issue by feeding strays right outside gates and stairwells. In 2022, the Delhi High Court issued guidelines to move feeding spots to designated areas after numerous Resident Welfare Associations complained of territorial aggression near entrances and play areas. Yet in many localities, residents continue to feed dogs in unsafe spots, leading to bitter clashes between feeders and non-feeders.

## **A Legal and Moral Deadlock**

Any attempt to address the menace meets sharp divisions. Animal rights activists, citing constitutional protections for animals, warn against cruelty and vigilante culling. They argue that the answer lies not in killing but in efficient sterilization and vaccination. Their concerns are valid, as India has seen instances of brutal and illegal culling in the past, which draws justified outrage.

On the other side, residents living with the daily risk of bites, maulings, and constant fear demand immediate, decisive action. Courts have tried to strike a balance. The Supreme Court, in December 2022, directed civic bodies to create "feeding zones" for community dogs, while also ensuring human safety. The court observed that compassion and public safety must coexist, and neither can override the other. Yet on the ground, enforcement remains minimal. Municipal staff often cite lack of manpower or funds, leaving citizens exposed. This tension between the ethics of animal welfare and the fundamental right to public safety has created a policy paralysis.

## Supreme Court's August 2025 Judgment

The Supreme Court's August 2025 judgment attempted to break this deadlock with a series of decisive interventions. On August 11, the Court initially directed Delhi authorities to remove all stray dogs from the streets and shift them into shelters, citing mounting attacks and the urgent need to safeguard public safety. The order triggered immediate backlash from animal rights organizations and even municipal bodies, who warned that mass sheltering was both unfeasible and cruel. Responding to these concerns, the Court revisited its stance. Just days later, on August 22, it modified the order to reflect a more balanced approach. Sterilized and vaccinated dogs, the Court ruled, must be returned to their original areas, while only rabid or genuinely aggressive dogs could be removed. The judgment also required civic bodies across the country to establish designated feeding zones and to enforce the Animal Birth Control (Dogs) Rules in a time-bound and transparent manner.

In principle, the ruling was a progressive step. It rejected indiscriminate culling and mass confinement, reaffirming that compassion and public safety are not mutually exclusive. Yet the judgment also revealed its limitations. Most strikingly, the term "aggressive dog" was left undefined, raising the possibility of arbitrary or inconsistent enforcement. The directive on feeding zones was sound in theory but lacked clarity on how such zones would be created and maintained in crowded residential neighbourhoods. Most significantly, while the Court reiterated the importance of sterilization and vaccination, it did not tackle the chronic underfunding and infrastructural gaps that have long crippled implementation. A judgment, however humane in spirit, cannot substitute for the political will and administrative capacity required to carry it out.

## The Way Forward

Delhi needs a solution that is both humane and effective. It is neither acceptable to allow unchecked dog populations to endanger citizens, nor ethical to resort to indiscriminate killing. What is needed is sustained, well-funded, and carefully monitored intervention.

Mass sterilization and vaccination drives are crucial, and Delhi must set clear yearly targets with independent audits. Civic bodies should be held accountable through public dashboards that track progress colony by colony. Cities like Jaipur and Chennai have demonstrated that consistent sterilisation can dramatically reduce stray populations over time.

Robust waste management is equally important. Eliminating food sources that sustain large packs means enforcing penalties on markets and restaurants that dump waste openly and accelerating the long-promised overhaul of landfill management at sites like Ghazipur and Okhla. Enforced feeding zones must also be implemented. Courts have already ordered this, but implementation has been lax, and municipalities must demarcate safe feeding spots away from residential entrances and penalise violations.

Finally, public education campaigns through schools, RWAs, and local clinics should run sessions on safe coexistence with animals, first-aid measures, and the absolute necessity of post-bite vaccination. Brijesh Solanki's death is a tragic reminder that lack of awareness can cost lives.

## **A Call to Action**

Delhi's stray dog crisis captures, in sharp focus, the deeper weaknesses of urban governance in India. It is ravaged by fragmented accountability, chronic underfunding of municipal bodies, inconsistent policy enforcement, and a reactive rather than preventive approach to public health. The persistence of tens of thousands of dog-bite cases each year in the nation's capital is fundamentally a question of state capacity. Effective urban governance must ensure that compassion for animals coexists with the right of citizens to safe, accessible public spaces.

The path forward is neither abstract nor unprecedented. Delhi requires long-term ring-fenced funding for ABC programmes, mandatory year-wise sterilization targets tied to measurable outcomes, and real-time dashboards that allow public oversight. It must also integrate waste management reforms with animal control strategies, recognising that garbage-fed packs will continue to grow irrespective of sterilisation efforts alone.

Equally crucial is the need for civic participation. Awareness campaigns, school-based sensitization, and community partnerships can help ensure safer human-animal interactions and reduce public panic. India has the legal framework, expert knowledge, and successful models necessary to address this challenge. What remains missing is the institutional resolve to treat stray dog management as a core public health priority rather than a peripheral administrative task.

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## Rat Race and Viksit Bharat-2047

Krishna Raj<sup>1</sup>

The Indian economy faces a serious macroeconomic policy paradox in rearranging development priorities particularly to realise Viksit Bharat in 2047. Developmental needs of the country are misplaced on the one hand and on the other the structural rigidities of the economy have held back the economic potential. India's aspiration to become a developed country by 2047 faces serious policy challenges given the structural problems of the economy and failure of the policy direction to speed up the economic growth. This policy paradox is well analysed in the recent "World Development Report, 2024 titled as "The Middle-Income Trap" which portrays the "underlying structure of the economies of the world and how countries experience systematic growth slowdown as they are unable to take on the new economic structures to sustain the high-income levels". But in this process of upward movements of the economies under capitalism, the compelling "rat race" undermines the values of human and natural resources.

The report categorised India as a "low middle income country (LMIC)" with Gross income capita of \$2,540, whereas China as Upper Middle-Income Country (UMIC) with \$13,400, USA as High-Income Country (HIC) with \$80,300. India, to become a developed economy, its Gross Income Per capita should cross \$15,000. However, the World Bank Report observed that India will take 75 years to reach even one quarter (\$ 20,000) of the US income per capita. Whereas South Korea is categorised as HIC with \$ 35,490 achieved its spectacular economic growth miracle in 25 years.

The underlying structure of the world economies and their growth stories both success and failures, are interlinked to obvious growth strategies to overcome the "middle income trap". Achieving economic growth or miracle depends on three influencing factors or three I's which are investment, infusion of new technology, and innovation. To influence economic growth, the country's economic policies

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should have enabled dynamic enterprises, utilisation of dynamic productive workforce and energy efficient or climate resilient economy.

The Indian economy has both inherent strengths and structural weaknesses to realise high income country status. India is populous but the youngest country in the world with a dynamic productive workforce which constitutes about 68% of the population, aging between 15 to 64 till 2055-56. The young productive work force constitutes about 26% falls within the 10-24 age group. The traditional economic growth theory predominantly suggested that a nation's wealth is mainly dominated by its stock of man-made capital assets, such as roads and machinery. However, the role played by human capital is dominant as they contribute about 70-80 per cent for countries' wealth including the USA and India as they are the knowledge economies. Therefore, modern theories of economic growth including Harrod-Domar, Solow and Schumpeter have been developed, with a focus on skills, technology and knowledge. Modern economic growth, therefore, depends on innovation, technology, and entrepreneurship which drive the economy for higher productivity.

Unfortunately, structural rigidities in the economy as India's 50% population depends on the agriculture sector and 60% people live in rural areas, where the productive work force is not effectively put into economic growth. The youth unemployment is as high as 26 per cent and they lack education, entrepreneurship skill, investment, technological support from the government for their productive use for economic growth. MSME is the potential sector for economic growth which can play an active role in entrepreneurship development utilising available natural resources in the rural areas for example, Khadi industries, coir industry, pottery, wood industry can support rural artisans.

The economic miracle in the case of South Korea happened in the 1960s as their productive work force or young entrepreneurs have been trained in Japan in manufacturing sectors (cars and television) with a strong focus on innovation, technology, and exports. Subsequently, the government provided incentives for technological investment, subsidised adoption of foreign technology, invested in research and development (R&D), innovation, and trained young entrepreneurs in skill development. As a result, South Korea has been transformed from predominately an agrarian economy to industrialised economy with remarkable

“product innovation” in car (Hyundai, KIA), television, washing machine and cell phone (Samsung and LG) manufacturing and they have become household products in India and the world today.

The World Bank report also highlights India’s achievement in “service sector innovation” as the Government of India’s policy importance to Information and Communication technology (ICT) and import of foreign technology and promotion of innovation in the 1980s. Which led to emergence of service sector-led economic growth (53.34% to GDP) in India particularly referring to growth of software industry in India which includes TCS and Infosys. The report also appreciates how the development of Aadhar has resulted in the digital transformation of India in using the internet, mobile phones, digital payments which contributed for development of entrepreneurship and business. However, these achievements are not sufficient to provide impetus to economic growth in India, the stumbling blocks to India’s growth aspirations are the slow and sluggish growth of the industry and agriculture sectors, they contribute 28.25% and 18.42% to the country’s GDP, respectively.

The present model of economic development perpetuates inequalities and fails to reallocate and redistribute resources. Economic inequality and climate change are intricately linked to an unequal distribution of income and resources, limiting the economic resilience of the poor to fight climate change. India’s socio-economic, and environmental indicators in comparison with the world countries is worsening in recent years. India’s per capita income as per the World Bank data is 1,900.7 US\$ which is lower than world’s average per capita is 10,909.3 US\$, USA’s \$63,543.6, China’s \$10,500.4. India has slipped to 131st rank out of 189 countries with 0.645 value in the Human Development Index. The highest poor people are in India, with 37.2 per cent of the people, or 500 million people, below the poverty line. India is ranked 168th country out of 180 countries in the world with an EPI score of 27.6 out of 100 in the environmental performance indicator. These data provide a stark reality about India’s worsened developmental status among the world countries. The recurrent natural disasters specifically Covid-19 and climate-induced cyclones have further worsened the livelihood of millions of people and the economy.

India's macroeconomic policies are under illusion and not open to reality, as creative destruction operates in the world that instantly destroys obsolete technology and creates new technology that drives the economy. Development of new technologies depends on investment on R&D (innovation), India's R&D expenditure as percentage of GDP is hardly 0.64% whereas, Israel (5.56%), South Korea (4.93%), America (3.46%) are the world's leading investors on R&D. Further WB report developed indicators to provide the picture of the underlying structure of economies where India lags in Enterprise (measure of country's productive capabilities and infuse of new technology), Talent (skilled workforce) and Energy (reliable energy supply). In the technology index, India scores 1 out of 100, whereas the USA (100), China (13.1), South Korea (92.5), and Japan (50.1). These indicators provide a clear picture about India's underlying structure of the economy and policy direction to its structural transformation to adopt new growth strategies.

Therefore, India's aspiration to become a developed country depends on how it takes on the new economic structures which create increasingly dynamic enterprises, a productive workforce and an energy-efficient economy. India needs to aggressively invest in youths (productive workforce) to promote entrepreneurship and innovation, which can take the country on a new economic structure to speed up the economic growth while realising the principles of inclusive growth and sustainable development. Therefore, there is an urgent need to restructure economic and environmental governance systems to achieve inclusive development and strike a balance between ecological and economic stability to tackle climate change in India.

In reality, markets do not consider the depreciation of natural resources in estimating the GDP, and there is also a narrow understanding of welfare and wellbeing in terms of utility or satisfaction based on materialistic consumption and wealth accumulation. Economic development is largely carried out in the name of the poor, but it fails to lift millions of people out of poverty. In fact, it has created a huge income inequality between the rich and the poor. Around 700 million poor live in extreme poverty across the world with less than \$2.15 per day, and largely it is these poor who suffer from climate-related natural disasters, with no economic resilience. Further, high carbon economic growth has already posed a

great threat to economic development for India with the increase in the world's average temperature by 1 degree Celsius. It is projected by the UN IPCC-6 Report that if the present rate of increase in greenhouse gases continues, the world will obviously fail to limit the world's average temperature by less than 2 degrees Celsius. This trend spells a catastrophe for the economic development and well-being of the people in India. Climate change is a recipe for economic disaster due to the growth of a high-carbon economy linked to the neo-liberal economic policy of capitalism of mass production and mass consumption that led to economic inequality in India. However, the carbon footprints vary with income inequality in the economy, the rich produce more carbon footprints than poor. Already many sectors of the economy, regions, millions of poor people are affected with increasing number of cyclones, high precipitation, floods, severe droughts, forest fires, acute shortage of drinking water, destruction of social and economic infrastructure which are common.

The economic cost of climate change is estimated around 5 to 10 percent of India's GDP annually. About 60 per cent of the population in India is dependent on the agriculture sector and climate change affects agriculture and water resources. The scarcity of water is very high as the per capita water availability in India has drastically been reduced to 1486 cubic meters. The scarcity of water limits the economic growth in India and costs the economy in terms of pollution control, water recycle, and drinking water purification. As a result, climate change imposes high costs on society and impoverishes economic wellbeing. It is also imperative to improve the human capital through education, technology, health, jobs and a decline in poverty and income inequality. Inclusive development, such as social protection, acts as an insurance against climate change. The poor need financial, technical and institutional support in the form of poverty reduction programmes, social security schemes, etc., to improve their quality of life and develop climate resilience. Indian cities need to have institutional capacity to adapt to climate change. Systemic wealth and income inequalities have exacerbated the impact of climate change on the poor. Many experts observe that India needs to tread a different developmental path rather than desperately following the one pursued by Western economies or by China, given India's diverse demographic, social, economic and environmental conditions.

The nation needs to realise its inherent macroeconomic strengths and weaknesses to gain the 'developed country' status by 2047. The government immediately needs to review its policies of economic growth for course correction and achieve sustainable and inclusive development. India's public policy needs to redefine economic development in the context of climate change and growing income inequality. Development for whom and at what cost needs to be brought into economic policies. India's economic success relies on balancing its economic policies with environmental policies to achieve sustainable development. A fundamental change in the way of thinking by the State and the market forces about the environment, society, and development is sine qua non. Environment and development are not mutually exclusive; a healthy environment is an integral part of a healthy economy.

## Fusing AIS And OSINT: A Policy Blueprint For Smart Maritime Trade Compliance And Surveillance

Bhavya Bhav<sup>1</sup> & Ananta Proshad Chakraborty<sup>2</sup>

### Abstract

*The global maritime sector faces multiple challenges from organized criminal networks and their illegal activities, geopolitical tensions, sanctions evasion, and ship collisions, among others. These challenges require monitoring tools to reduce vulnerabilities by tracking the activities of those ships in real-time and responding accordingly. In this context, AIS helps track a vessel's location and activities of the vessel. Although it faces challenges in providing the identity of the vessel, its signals can sometimes be misleading. In contrast, OSINT can verify ship locations and analyze satellite imagery and detect suspicious actors, thereby revealing the identity of the vessel. Although without AIS signals, the ability to track a ship becomes extremely limited. Therefore, this paper proposes integrating Automatic Identification System (AIS) and Open-Source Intelligence (OSINT) to create a stronger ecosystem for maritime security and compliance, as the integration of both technologies complements each other. This analysis highlights the institutional, legal, and technical criteria required for the actual deployment, drawing on case studies of the sanctions frameworks of the European Union and the Indian Ocean. The results indicate that improving the security, equity, and resilience of international maritime trade requires integrating AIS and OSINT data.*

**Keywords:** AIS-OSINT integration, maritime surveillance, smart compliance, global trade governance, maritime intelligence.

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## 1 Introduction

Maritime trade stands at the crossroads of global economic recovery, geopolitical instability, and rapid technological transformation. In 2023, global seaborne trade rebounded to 12.3 billion tons and is projected to grow steadily ([Chirls, 2024](#)). However, persistent disruptions, from the Black Sea and Red Sea conflicts to climate-related risks, continue to expose vulnerabilities in the world's shipping arteries. Freight rates have surged due to rerouting, port congestion, and increasing operational, with ripple effects on global inflation and food security ([UNCTAD, 2024](#)). The International Maritime Organisation (IMO) and regional authorities are facing mounting pressure to modernise surveillance and compliance mechanisms, as fraudulent ship registrations, “shadow fleet” operations, and AIS (Automatic Identification System) blackouts are undermining transparency, safety, and enforcement ([European Parliament, 2024](#)).

These dynamics underscore an urgent policy imperative: maritime governance must evolve from reactive monitoring to integrated, intelligence-driven oversight. Against this backdrop, the fusion of Automatic Identification System (AIS) and Open-Source Intelligence (OSINT) offers a robust framework for smart maritime trade compliance and surveillance. AIS provides near-real-time vessel identification and tracking; however, it cannot expose deceptive practices such as transponder spoofing, falsified registries, or illicit ship-to-ship transfers ([Turgeon, 2024](#)). OSINT, encompassing satellite imagery, social media, commercial databases, and trade records, add contextual intelligence that can verify, augment, or challenge AIS data. Together, these tools can detect dark fleet operations, monitor sanctions evasion, and uncover supply-chain manipulations that traditional enforcement misses ([Meehling, n.d.](#)). By integrating both, policymakers can transition toward predictive and adaptive governance, enhancing maritime domain awareness while promoting accountability and compliance.

However, the potential of AIS-OSINT fusion extends beyond enforcement. It provides a pathway for data-driven policymaking that aligns with international frameworks for sustainability and security. For example, the IMO's new regulatory scoping exercises on illegal operations, the push for greener and more resilient supply chains, and ongoing debates on seafarer welfare all highlight the need for transparent, interoperable information systems ([IMO Takes Action on Seafarers'](#)

[Rights, Substandard Shipping, 2025](#)). A unified AIS-OSINT approach can support these efforts by enhancing situational awareness, facilitating coordination among maritime authorities, and providing early warning of systemic risks, ranging from environmental disasters to illicit trade networks. This policy blueprint thus argues that fusing AIS and OSINT is not merely a technical upgrade but a strategic necessity. It offers an opportunity to reimagine maritime trade governance through more innovative, collaborative, and ethically grounded surveillance.

## 2 Understanding AIS and OSINT: Technical and Policy Foundations

The technical characteristics and policy foundations of AIS and OSINT differ significantly from one another. AIS tracks and identifies vessels using standardised technical protocols. However, to support intelligence activities, OSINT relies on open source data collection, analysis, and the intelligence tradecraft. The main policy factors for both technologies in their respective domains are transparency, accountability, governance, and ethical use ([Chen et al., 2024](#)).

### 2.1 Automatic Identification System

The 1974 International Convention of [SOLAS](#) has made AIS mandatory as a marine safety and monitoring system. This system is designed to avoid ship collisions. Ships with a gross tonnage of 300 tons or more are required to send AIS signals while undertaking international journeys, allowing them to be tracked by satellites and receivers along the coasts of other nations (IMO, 2022). It enhances maritime domain awareness, aids in search and rescue operations, and ensures navigation safety. The vast amount of data obtained by AIS enables global-scale monitoring, which can be integrated with security solutions ([Da Silva Figueiredo et al., 2025](#)). However, the respective system also has its limitations. For instance, it is very common for ships to disable or turn off their AIS transponders, which is generally termed as ‘going dark.’ Ships may also use false coordinates to spoof locations, duplicate Maritime Mobile Service Identity,<sup>3</sup> falsify destination and cargo information, and drift outside of satellite coverage. These manipulation techniques have become increasingly common among vessels in an effort to avoid sanctions or engage in illicit trading activities ([Bergman, 2021](#)). To ensure interoperable

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<sup>3</sup> MMSI: For tracking and communication purposes, a vessel’s radio and AIS signals are uniquely identified by a nine-digit identifier.

operation between devices and systems, AIS is governed by international standards, particularly those established by organisations such as the IEC<sup>4</sup> and IMO, as mentioned above. Ships use the AIS to track their movements and communicate with other vessels over radio frequencies, Time Division Multiple Access (TDMA),<sup>5</sup> enabling precise ship tracking and communication through Very High Frequency (VHF)<sup>6</sup> maritime channels. AIS transponders utilize High-Level Data Link Control (HDLC)<sup>7</sup> protocols and Gaussian Minimum Shift Keying (GMSK)<sup>8</sup> modulation, which automatically resolves channel contention even in high-traffic situations ([Chen et al., 2024](#))

## 2.2 AIS: Policy Foundations

The principles of the NIST AI Risk Management Framework serve as the foundation for the responsible use of AI technologies.<sup>9</sup> Essential policy measures involve establishing governance teams within organisations tasked with developing and overseeing the AIS system, regularly assessing for bias and fairness, maintaining transparency in AI-generated decisions, particularly in insurance or claims contexts, and ensuring adherence through ongoing monitoring during the system's duration ([Da Silva Figueiredo et al., 2025](#)).

## 2.3 Open Source Intelligence (OSINT)

Open Source Intelligence is a method that gathers intelligence/information from publicly available data or sources. In the maritime domain, it collects data from satellite images, port records, ship registries, financial documents, and also social media. ([Pohontu & Ermolai, 2024](#)). Through data collection, it helps identify unusual patterns in vessel behavior. For example, covert ship-to-ship transfers or

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<sup>4</sup> The International Electrotechnical Commission (IEC): Global technical standards for maritime communication systems, like AIS, are established by this international standards organization.

<sup>5</sup> A communication technique that allows multiple ships to send AIS data without interference by dividing radio frequencies into time slots.

<sup>6</sup> AIS uses this radio frequency band for dependable long-distance ship-to-ship and ship-to-shore communication.

<sup>7</sup> A data transmission protocol that provides secure and accurate delivery of AIS messages.

<sup>8</sup> AIS uses a digital modulation technique to improve the efficiency, stability, and noise resistance of signal transmission.

<sup>9</sup> The National Institute of Standards and Technology developed the voluntary and adaptable NIST AI Risk Management Framework (RMF) to manage risks associated with artificial intelligence. It divides AI risk management tasks into four main categories: Map, Measure, Manage, and Govern. The framework helps companies identify, assess, mitigate, and track the potential risks and benefits of AI systems throughout their entire lifecycle, promoting ethical and trustworthy AI development and application.

suspicious voyages to ports that may have been sanctioned (Larsen et al., 2023). OSINT aids in addressing a few important questions for the authorities, such as the identity of the owner, who owns the vessel, and who earns the profit? Previous suspicious behaviour or not? Whether the AIS reports conflict with the satellite imagery found through OSINT or not? Whether sanctioned entities have political ties or not, etc. Technical tracking alone is incapable of uncovering hidden relationships, and that is where OSINT helps expose them. Linking shipping practices to international legal frameworks, such as sanctions programs or counter-piracy initiatives, promotes accountability (Pohontu & Ermolai, 2024). Moreover, this method is now an essential component of maritime intelligence due to the global expansion of commercial satellites and digital data. Transparency is now a shared governance responsibility due to the growing contributions of civil society, journalists, and private organizations to maritime monitoring (Larsen et al., 2023).

### **3 The Synergy: Why AIS and OSINT Must Work Together?**

AIS shows a ship's location and its activities. On the other hand, OSINT reveals the ship's identity and the significance of its actions. Together, if integrated, they create an ecosystem of security and compliance intelligence. AIS by itself is unable to provide context. It is legal for a ship to turn off tracking in proximity to crowded ports. In that context, OSINT can detect suspicious actors, but it is nearly impossible to track a ship's movements in the absence of AIS. Hence, both are complementary to each other (Chen et al., 2024). Specifically, if both are integrated, the benefits would include verifying satellite images against false or misleading AIS signals, identifying owners and connections to illegal networks, and authorities can use behavioral patterns to predict future violations. Through their combination, maritime awareness becomes proactive rather than reactive. Global trade governance initiatives, counter-piracy missions, and the enforcement of international sanctions have already been impacted by this collaboration (Da Silva Figueiredo et al., 2025; Chen et al., 2024).

## 4 Challenges in Fusing AIS and OSINT

Although combining AIS and OSINT provides more robust maritime surveillance, integration is challenging due to several significant issues. The issues include the ethical, political, legal, and technical aspects. For example, AIS-OSINT systems collect a substantial amount of behavioural information about crew members, businesses or companies, and the ships themselves. There are concerns about privacy rights and limits in surveillance, as excessive monitoring may lead to violations of companies' privacy or discrimination against nationals. Shipping companies, which are often innocent, may be vulnerable to data misrepresentation, especially small-scale companies that lack sufficient legal protections.

Therefore, it is necessary to stop discrimination, wrongful detention of the ships, and data abuse. Without verified sources, OSINT also carries the risk of disseminating false information (Larsen et al., 2023). Moreover, maritime intelligence must balance the political challenges, as international relations are significantly impacted by maritime intelligence. Governments frequently disagree about what constitutes illegal actions. For instance, the imposition of sanctions by one country may be interpreted as economic aggression by another country. Although many developing countries criticise such sanctions as hurting the world's energy supply (OFAC, 2024). Furthermore, there are challenges in the legal arena because digital intelligence is not yet entirely reflected in maritime laws. Additionally, concerns remain regarding jurisdiction, as many AIS-OSINT enforcement operations occur outside territorial waters. Foreign ships are allowed to navigate freely in international waters under the United Nations Convention on the Law of the Sea (UNCLOS), 1982. There are restrictions on the extent to which governments can use intelligence to support or justify inspections and sanctions. In fact, some doubts remain related to data ownership. Private companies own the majority of the satellite surveillance and AIS tools.

Hence, countries that monitor data may not be able to obtain the necessary information. Lastly, advanced analytics, fast data processing, and safe digital systems are necessary for the fusion of AIS-OSINT. Developing countries lack many of these capabilities. Another significant issue is the quality of the data (Soner et al., 2023). Although OSINT sources may be limited, AIS data can be tampered with

or contain errors. False Alerts can arise from the mismatched/tempered datasets. For instance, bad weather can cause a ship to lose AIS contact, and the authorities may mistakenly presume that the ship is evading sanctions. Another, more specific technical challenge is about cybersecurity. To deceive naval forces, AIS can be compromised, allowing fake signals to be generated and transmitted (Sage, 2023).

## 5 Case Study: Indian Ocean Piracy and Smuggling Networks

The Indian Ocean remains one of the world's most vital maritime corridors, facilitating a large share of global oil shipments and containerized trade. However, its vastness and porous governance architecture have made it fertile ground for piracy, arms trafficking, narcotics smuggling, and illicit trade in wildlife and minerals. According to the International Maritime Bureau (IMB) 2025 Annual Report, in 2024, a total of 126 crew members were taken hostage, compared to 73 in 2023 and 41 in 2022. Twelve crew were reported kidnapped, compared to 14 in 2023 and two in 2022, while a further 12 crew were threatened and one was injured in 2024 (ICC International Maritime Bureau, 2025). Although the number of successful high-profile hijackings has declined, smaller-scale piracy and smuggling networks continue to adapt and operate with impunity (Ibrahim, 2024). The threat is particularly acute in areas such as the Horn of Africa, the Arabian Sea, and the western coast of India, where non-state maritime threats converge, and trade compliance becomes increasingly challenged.

According to one strategic assessment, maritime piracy and the security of maritime traffic remain key strategic issues for the region (Cordesman, 2016). Many smugglers exploit weakened regulatory enforcement, trans-shipment loopholes, and the use of "dark" vessels that either deactivate their AIS transponders or spoof their signals. This blending of legitimate trade flows with illicit networks hampers both maritime trade compliance and surveillance. Traditional maritime domain-awareness frameworks struggle to monitor these dynamic networks because of fragmented data sharing among littoral states, jurisdictional issues between military/naval authorities, customs and port administration, and the technical challenge of verifying vessel identity and cargo. For example, IUU (illegal, unreported, and unregulated) fishing in the Indian Ocean is strongly linked to trafficking and smuggling networks, further complicating

enforcement efforts ([Camurri, 2022](#)). From a policy perspective, fusing AIS data with OSINT offers a viable and innovative response. By combining real-time vessel tracking with social-media monitoring, port-call records, commercial satellite imagery, and AIS anomaly detection, policymakers can uncover behavioral patterns that indicate illicit activity, such as repeated transponder gaps, unreported at-sea rendezvous, or anomalous route deviations. Machine-learning algorithms can flag high-risk vessels for inspection and risk profiling, thereby enhancing compliance audits and interdiction. Thus, the piracy and smuggling ecosystem in the Indian Ocean underscores the urgency of integrating technological innovation with cooperative governance. AIS-OSINT fusion represents not merely surveillance enhancement, but a strategic policy tool for securing maritime trade lanes, strengthening compliance, and countering transnational maritime crime.

## 6 Case Study: EU and U.S. Maritime Sanctions Monitoring

Both the European Union (EU) and the United States (U.S.) have developed advanced systems for maritime sanctions monitoring to counter illicit trade, sanctions evasion, and the rise of “dark fleets.” These efforts increasingly rely on integrating AIS data with OSINT, such as satellite imagery, port records, and corporate registries. The U.S. model, led by the Office of Foreign Assets Control (OFAC), combines regulatory enforcement with public guidance to industry. OFAC’s *Sanctions Guidance for the Maritime Shipping Industry* ([U.S. Treasury, 2024](#)) and the *2025 Advisory on Iranian Oil Sanctions Evasion* detail deceptive practices like AIS manipulation, flag hopping, and ship-to-ship transfers ([OFAC, 2025](#)). The U.S. encourages financial institutions and insurers to use AIS-OSINT fusion, comparing vessel tracks with satellite imagery and registry data, to detect high-risk behavior ([K&L Gates, n.d.](#)).

This model leverages financial pressure and transparency to enforce sanctions worldwide. The EU emphasizes collective surveillance and data sharing across member states. The European Maritime Safety Agency (EMSA) operates *SafeSeaNet*, integrating terrestrial and satellite-AIS data with Earth-observation imagery to monitor vessel movements ([SafeSeaANET - EMSA - European Maritime Safety Agency, n.d.](#)). A European Parliament analysis highlights how EMSA tools have been adapted for sanctions enforcement, especially in tracking oil shipments

linked to Russia (EPRS, 2024). EU analysts use multi-source fusion: AIS gap detection followed by OSINT verification through imagery, port logs, and ownership searches. This creates actionable intelligence for national enforcement agencies while maintaining a shared situational awareness framework. Comparatively, the U.S. model excels in *deterrence and enforcement*, while the EU system provides *broad situational visibility and coordination*. Both face challenges, spoofed AIS data, fragmented jurisdiction, and limited satellite access, but their complementary approaches demonstrate the value of AIS-OSINT fusion. Together, the EU and U.S. experiences form a global benchmark for “smart compliance,” showing that integrating AIS and OSINT not only strengthens sanctions enforcement but also builds transparency across maritime trade.

## **Policy Blueprint: Smart Maritime Trade Compliance and Surveillance**

To counter the maritime challenges, a new paradigm, *Smart Maritime Trade Compliance and Surveillance (SMTCS)*, is needed. The integration of AIS and OSINT provides an advanced intelligence architecture that enables transforming maritime oversight from reactive monitoring to predictive governance. This blueprint outlines a governance and implementation framework for SMTCS based on *four pillars: principles for innovative surveillance governance, institutional reforms, legal and regulatory enablers, and capacity-building mechanisms*.

## **7 Principles for Smart Surveillance Governance**

### **7.1 Transparency and Accountability by Design**

Intelligent maritime surveillance must embed transparency as a structural feature. AIS-OSINT fusion generates sensitive behavioural data about vessels, companies, and crew; thus, data collection must follow verifiable audit trails. Governance protocols should adopt “accountability by design” standards, modelled on the NIST AI Risk Management Framework, ensuring all algorithmic decisions are explainable, documented, and reviewable by independent authorities.

### **7.2 Ethical and Proportionate Use of Intelligence**

Governments must ensure that surveillance remains proportionate to the risks it aims to address. Overcollection or misuse of OSINT may violate privacy or

commercial rights. Surveillance ethics committees, comprising representatives from the public, private, and civil society sectors, should evaluate data access requests and prevent the discriminatory targeting or wrongful detention of vessels.

### **7.3 Interoperability and Data Integrity**

The SMTCS must align with IMO, IEC, and UNCLOS frameworks to ensure data interoperability and integrity. AIS and OSINT systems should follow standardized metadata schemes, cryptographic authentication, and open APIs that allow real-time data exchange without compromising confidentiality.

## **8 Institutional Reforms**

### **8.1 Establish a Global Maritime Intelligence Fusion Centre (GMIFC)**

It could be established under the leadership of the International Maritime Organization (IMO), in collaboration with major maritime powers and regional security organisations such as the Indian Ocean Rim Association (IORA), ASEAN, and the Gulf of Guinea Commission. It would serve as a multi-source intelligence hub connecting AIS, OSINT, and satellite feeds.

### **8.2 Public-Private Partnerships (PPP) for Data Access**

PPPs are essential because the majority of AIS and satellite data is privately held. Governments and commercial providers should work out safe data-sharing agreements that benefit both parties, such as providing discounted access in return for capacity support, co-branding, or recognition within the SMTCS network.

## **9 Legal and Regulatory Instruments**

### **9.1 Recognition of Digital Intelligence in Maritime Law**

In line with UNCLOS frameworks, AIS manipulation alerts and OSINT-verified anomalies should be clearly identified as valid triggers for compliance checks, boarding decisions, and sanctions investigations. This reduces ambiguity in international waters and strengthens the legal basis for digital enforcement actions. IMO member states may include AIS-OSINT under UNCLOS-based national frameworks to legally validate them.

## **9.2 Data Governance, Privacy, and Accountability**

International regulations must specify which data is open for security and which information needs higher security. Establishing oversight organizations by governments to regulate the use of analytics is necessary to prevent discrimination, detentions, or harm to one's reputation resulting from the misuse of faulty intelligence. Documented verification procedures must serve as the foundation for all enforcement decisions.

## **9.3 Obligation of the Maritime Industry**

To ensure consistent evidentiary standards and risk indicators, sanctions and enforcement practices should be harmonised through regional coordination, particularly between central sanctioning authorities such as the United States and the European Union, to prevent shadow fleets from exploiting flag shopping and regulatory arbitrage.

# **10 Capacity Building and Inclusion**

## **10.1 Equitable Access to Technology and Funding**

For developing nations near important trade routes, international donors and development banks should prioritize maritime digitization projects that provide safe AIS upgrades, reasonably priced satellite services, and AI-enabled monitoring. This enhances global surveillance coverage.

## **10.2 Human Skills Development and Institutional Strengthening**

Specialized training programs should emphasize analytics, OSINT verification, cybersecurity, and maritime law enforcement. Joint academies and simulation exercises promote cooperation among navies, coast guards, and customs agencies, resulting in more coordinated responses.

## **10.3 *Inclusive Participation of Local Stakeholders***

It is essential to involve port employees, small-scale shipping operators, and fishing communities in grievance procedures and awareness campaigns. By shielding crews from erroneous notifications or misidentification, digital monitoring systems will gain credibility and lessen suspicion.

## 10.4 Regional Information Sharing Networks

Regarding piracy, smuggling, and sanctions evasion, neighbouring states ought to establish official regional intelligence exchanges, shared watchlists, and early warning platforms. Additionally, regional centres ensure that information does not remain isolated in national headquarters, but instead reaches frontline authorities swiftly.

## 11 Conclusion

Maritime trade remains the backbone of the global economy. However, it is under threat from geopolitical tensions, cyber vulnerabilities, and illegal networks that exploit weaknesses in current governance frameworks. AIS is an important tool for ensuring safety and navigation. However, when it comes to complex threats like piracy, sanctions evasion, or "shadow fleet" operations, AIS becomes inadequate. As a result, AIS and OSINT integration provides a more proactive, smart, and contextual approach to maritime surveillance. Although this fusion improves maritime security and trade compliance, there are challenges regarding privacy, jurisdiction, and shared accountability etc. Strengthening legal frameworks, encouraging institutional collaboration, ensuring equitable access to technology, and incorporating ethical safeguards helps increase the system's legitimacy and trustworthiness. A responsible and predictive maritime intelligence system based on collaborative governance would be required to safeguard maritime supply chains and promote economic resilience in the future. Thus, AIS-OSINT fusion is a strategic investment in the long-term stability of global maritime trade rather than being just a technical development.

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## Community Health Workers in Health Care Paradigm: A Study of Scheduled Caste ASHAs from Punjab (India)

Gurinder Kaur<sup>1</sup> & Shaik Iftikhar Ahmed<sup>2</sup>

### Abstract

*For low and middle income countries (LMIC) like India large-scale inequalities are observed in terms of availability and affordability of quality medical care, particularly in rural India. In response to such inequalities impressive efforts have been made towards creating a cadre of Community Health Workers (CHW). The history of the CHW programme in India dates back to 1977, but faced difficulties from its inception and collapsed in a few years' time. The CHWs continued to work under the form of various titles as Anganwadi workers, health workers, etc. but their mandate and scope was limited. With the launch of National Rural Health Mission (NRHM, part of National Health Mission since 2013) in 2005, as commitment towards achieving targets set under MDGs, a specialised cadre of CHWs by the nomenclature of Accredited Social Health Activist (ASHA) was created. The present attempts to understand the labour, lives and roles of ASHA workers with the health system and the community they are located in. The study is based on primary data from SBS Nagar district in the north Indian state of Punjab. ASHAs have a complex relationship with their lives which comes to define their identity within social, political, and economic spheres and within which they further seek changes in their job conditions. The study shows that ASHAs demand for their right to salary as a right for the labour along with other issues of concern for them. A hierarchical set up goes parallel to their commitment for the work they undertake providing a strong base for government policies on health.*

**Keywords:** Community Health Workers, ASHA, Scheduled Caste, Punjab, gender, health care, women's empowerment, maternal health

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## 1 Introduction

The concept of health for all targeted to be achieved by the year 2000 became the foundation of Millennium Development Goals (MDGs) 2015 and which later translated to Sustainable Development Goals (SDGs) 2030. Health for all was envisaged through the Universal Health Care (UHC) where Primary Health Care (PHC) would play the pivotal role with active participation and involvement of the community in matters of health. Prior to this the Alma Ata Declaration of 1978 attributed significant importance to “inter-relationship and inter-dependence” between health, social and economic development with the aim of involving individuals, families and community to bring health care as close to people as possible. As a part and continuity of this ideal, Community Health Workers (CHWs) were envisaged as cadres of the workforce who would act as the first point of contact between the state health care system and the community. the WHO (1978), thus, defined them as “community health workers should be members of the communities in where they work, should be selected by the communities for their activities, should be supported by the health system but not necessarily a part of its organisation, and have shorter training than professional workers” (WHO 1978: 6).

## 2 Community Health Workers in India

For low and middle income countries (LMIC) like India<sup>3</sup>, large-scale inequalities are observed in terms of availability and affordability of quality medical care, particularly in rural India (Joe, Mishra and Navaneetham 2008). In response to such inequalities impressive efforts have been made towards creating a cadre of Community Health Workers (CHW). In India, the history of CHWs precedes the Alma Ata Declaration by a year. Under the Rural Health Scheme, launched in 1977, known by the name of Jan Swasthya Rakshak scheme, CHW were selected based on selected criteria. Though the history of the CHW programme in India dates back to 1977, but faced difficulties from its inception and collapsed in a few years’ time (Lehmann and Sanders 2007, Leslie 1989, Nichter 1984). Leslie (1985) described the scheme as “an ambitious and controversial programme” and it was so because of the misgivings about it among the medical professionals, “particularly its use

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<sup>3</sup> For the current 2024 fiscal year the World Bank (WB) identifies India as a LMIC.

and therefore its sanction of indigenous medicine, and its creation of a category of health care provider outside the occupational structure controlled by doctors” (Leslie 1985: 923). Nichter (1980) also made similar observations about the scheme. Apart from distrust of the larger medical community, the other issues with the scheme were related to the involvement of the local political leaders for selection candidate as CHWs which was considered problematic, there were uncertain perceptions about roles and responsibilities of the CHWs and the structure and medium of instructions to the CHWs about the same were also not commensurate with the local needs of the community. The CHWs continued to work under the form of various titles as Anganwadi workers, health workers, etc. but their mandate and scope was limited.

Some of these cadres have continued to exist, while others have been discontinued over the years. For example, the VHGs were discontinued by the states due to change in the funding of the scheme from 1st April 2002, from being fully centre sponsored to being state sponsored. Another peculiar feature of the CHW was that their cadre in India from 1970s to 1980s till date has changed from being more male concentrated to women concentrated. The focus of the state policy at the time was on male sterilisation and hence the cadre of CHWs was primarily male centric, whereas, the focus from 1990s onwards was more on maternal and child health and hence, the gendered form of CHWs changed from male to female. Lehman and Sanders (2007) reviewed research papers published across the world on CHWs and observed that the majority of research articles (numbers not mentioned by them), do not mention gender of the CHW, except for 17 articles, wherein 70 per cent of the CHW were women. The journey of CHWs in India has traversed from being viewed with scepticism, distrust and confusion to becoming the backbone of health care system in rural areas of India.

### **3 NRHM and ASHA**

With the launch of National Rural Health Mission (NRHM, part of National Health Mission since 2013) in 2005, as commitment towards achieving targets set under MDGs, a specialised cadre of CHWs by the nomenclature of Accredited Social Health Activist (ASHA) was created. The major components of the ASHA programme focus on maternal and child health. Indeed since its inception and

implementation, there has been a significant decrease in the maternal and infant mortality rates in the country. NRHM is a highly structured programme with bureaucratic hierarchies with ASHAs at the lowest level. The focus of this programme, in consonance with the history of CHWs, was community involvement wherein the ASHAs are to be selected from within the community that they reside in. Their selection involves direct participation of the village Panchayati Raj Institutions.

According to Singh et al (2015) and Saprii et al (2015), three roles were formulated for the ASHA under the NRHM programme: to achieve government policies by acting as service extension workers; to act as bridge between the community and the state health apparatus; as an agent of change by engaging with the community. The context of this was to encourage direct local community participation. Even though their primary mandate relates to mother, child and adolescent health, they also look after tuberculosis medications, referral and follow up of communicable and non-communicable diseases, tobacco control and were also involved on the frontline during the covid 19 pandemic. Their work is not based on salaried remuneration but they receive incentive based payments. This gives the ASHA an imagery of an altruistic health volunteer. Also since ASHA is at the lowest rung of the bureaucratic hierarchy, she is under constant surveillance from multiple sections beginning from the Auxiliary Nurse and Mid-wife (ANM) to the Chief Medical officer (CMO) at the district level.

Since NRHM made community participation as its foundation through the cadre of ASHA and their selection from within the community with direct involvement of the village panchayats, this represents a typical example of state verticality and encompassment (Ferguson and Gupta 2002). Within the simultaneously moving processes of the state verticality and encompassment, the site of ASHA emerges as a location where the two meet. Within this paradigm, the ASHA worker is imagined as an activist, representing a pragmatic woman who has stepped out of her traditional role at home and who is responsible for the population that 'falls under her purview' (Gjostein 2014). Being at the lowest level she too is under constant surveillance of the state (especially through the check of official documents and registers that are maintained for this purpose) for her work and simultaneously is also under constant gaze of the community of which she is a part.

Yet, recent protests by ASHA workers across the country provide a different perspective, wherein, these workers are not passive receivers of discipline and surveillance. Rather, they are active agents of change for themselves as well. They have their own agency for resistance and assertion. They are viewed as empowered and as agents of the state at the level of the community.

This gaze at the same time intersects with the ascribed gender roles and at times with caste as well (Ved et al 2019). Previous studies that have followed the framework of power relations, agency, gender among the CHWs were located in countries of Africa (Kasteng et al 2015, Oliver et al 2015, Maes 2014) and in South Asian context in the countries of Pakistan (Colser 2015), Bangladesh and Nepal. In Indian context such studies have been limited to few other states (Saprii et al 2015, Roalkvam 2014). Studies pertaining to the state of Punjab were more focused on evaluation and appraisal of ASHA workers (Kaur 2018, Padda et al 2013, Mahajan and Kaur 2021). Moreover, as per the NITI Aayog health index, incremental performance for the state of Punjab from 2015-16 to 2017-18 did not show any improvement.

In this context the present study highlights the issues of ASHA workers and also gives insights to improve the work relations and capabilities thereby giving inputs for improving the overall quality of life. In this context the study attempts to understand the labour, lives and roles of ASHA workers with the health system and the community they are located in. The study is based on primary data collected through fieldwork using pre-tested questionnaires. For this purpose the north Indian state of Punjab has been selected as the site of study.

For the present study SBS Nagar district has been selected as specific focus of the study is on ASHA workers from Scheduled Castes (SC) and SBS Nagar has highest proportion of SCs in the state. Therefore, since ASHA workers are selected from within the districts, it can be safely assumed that a high proportion of ASHA workers from SBS Nagar would be SCs.

The study followed a random sampling technique. There are around 95 sub-centres in the district spread across five administrative blocks of Saroya, Balachaur, Mukandpur, Muzaffarpur and Sujjon. 43 sub-centres were randomly selected from all the blocks and 200 randomly selected ASHA workers from these 43 sub-centres were interviewed using questionnaire with open and close ended questions.

## 4 Results and Analysis

The maximum proportion, 71 per cent, of ASHA workers were in the age group of 40 to 49 years followed by those in the 35 to 40 years age category. The highest level education for maximum ASHA workers was up to secondary level at 48 per cent followed by upper primary at 26.5 per cent and higher secondary at 18.5 per cent. Most ASHA workers were homemakers, 71 per cent, followed by 15 per cent who were working in the private sector on menial wages, before joining the cadre of ASHA. 80 per cent ASHA workers have been working in this cadre for more than 10 years. Comparing the relation with age and years of work as ASHA, 63 per cent in the age group of 40 to 49 years have more than 10 years of work experience.

This age group is not only economically productive in general, but also is group most of whom have children pursuing higher education or the children are at marriageable age. Also, maximum ASHA workers had average monthly household income between 10 to 20 thousand rupees. 42.5 per cent of ASHA workers indicated that their husbands are casual labourers. This suggests that their household income is likely insufficient to maintain a comfortable and high-quality standard of living. In contrast, not having much in the form of a regular salary or incentives proves to be difficult to cope with the growing needs of not only daily survival but also the educational requirements of the children.

Since SBS Nagar has the highest population of SCs in the state, as an obvious extension of this, maximum ASHAs were from this category at 61 per cent. Religion-wise, maximum ASHAs, 82 per cent, were Hindu followed by 16 per cent Sikhs. Being a cadre of married women only, all ASHAs have been married at some point, with 87 per cent being currently married, 11 per cent widows and 1 per cent separated. This implies that for 12 per cent of them any earnings from ASHA work was or presently could be the only source of income. 62 per cent ASHA workers lived in nuclear families, primarily relying on their income and that of their husband. About two third ASHA workers are residing in Pucca house and 13.5 percent of ASHA workers are still residing in Kutcha house in SBS Nagar

General norm as per the NRHM guidelines is that one ASHA would serve a population of 1000. Though this may be changed as per the topographic and other work requirements of the state. Even though 50 per cent of ASHAs fulfilled this

norm of serving a population of less than 1000, 39 per cent served a population of up to 1500 and 11 per cent served population of more than 1500 as well. On an average maximum ASHAs, 56 per cent visited 10 to 29 households every week and 32 per cent visited more than 30 households per week.

The NRHM mandates at least 4 compulsory ANC's. Depending upon the registered pregnant women and duration of their pregnancy the visits varied from none to maximum of 7 and more. Maximum, 35 per cent ASHAs had completed two ANC's, whereas, 11 per cent had made 7 or more visits. The number of PNC's varies from immediate care for the mother and the new-born to visits for the newborn within 3 days, 7-14 days and 42 days. Depending upon the number of deliveries, maximum ASHAs, 22 per cent, had visited 3 new born within the first week of their birth, followed by 19.5 per cent who had visited 4 new born within the first week.

Also depending upon the pregnancies registered (718 pregnancies) in the given quarter, 64 per cent ASHA had referred pregnant women to the sub-centre/health care facility for regular check-ups and for these registered pregnant women, 88.5 per cent ASHA had accompanied them to the nearest health facility. All the ASHAs were aware of major causes of maternal death which ranged from anaemia, high BP, carelessness on part of the pregnant woman or her family like not taking precautions as advised, excessive bleeding, pre-existing health conditions, etc.

Apart from major duties related to maternal and child health care, ASHAs are also assigned a number of other tasks, like attending regular Village Health Sanitation and Nutrition Committee (VHSNC), creating awareness about health and hygiene, malaria and leprosy programmes. 97.5 per cent ASHAs had attended 3 meetings of VHSNC in the given quarter and 52.5 per cent disseminated awareness about general health and hygiene at least once a month through visits to homes or at Anganwadi centres during child immunisation days.

As for malaria programmes, maximum ASHAs work in the form of either creating awareness like keeping windows closed, not keeping stagnant water around the vicinity, etc. and remaining were involved in the regular surveys about the cases of malaria. Apart from these, the ASHAs were also assigned duties for constructing toilets during the Swachh Bharat Abhiyan and Covid for survey of individuals showing flu like symptoms, those returning from some trip, Covid vaccinations, etc.

The all-female cadre of ASHA workers selected from within the community and by the community embedded in the conceptualisation and practice of voluntarism. These were considered to be essentials in order to ensure deeper outreach into the community to address overall maternal and child health. These factors, particularly that of voluntarism and incentive based work ethic, have been identified as having their own set of challenges faced by ASHAs. Based on their extensive review of policy documents and academic studies on ASHA, Ved et al (2019), observe that despite having been a source of empowerment for these women, it has also created high level of dissatisfaction among them related to limited remuneration, lack of stipulated salary, work load, limited scope for career progression.

71 per cent of ASHA workers were in the age group of 40 to 49 years and 63 per cent among them had work experience of more than 10 years. Many of them had started this work in 2005 when the NRHM programme was launched. Maximum ASHAs were approached by the ANM, 64 per cent, with the offer to work as ASHA. Since ANMs were the only cadre of CHWs who were in close contact with women of the villages, they were well aware of the demography of the village. Even though community participation is a major component in the ASHA selection, however, the encouragement to join the cadre was from family or ANM or a matter of self-motivation. Despite being new to the work back then and increasing work load over time, maximum ASHA workers, 69 per cent, came into this field for financial incentives, followed by 27.5 per cent who joined this workforce for it gave them a social prestige in their society.

The average working hours for maximum ASHAs were around 5 hours per day and beyond this, since they also accompanied pregnant women for their regular check-ups, particularly in case of high-risk pregnancies and for deliveries as well, for maximum of them, 36 per cent, this travel distance was between 6 to 10 kms. The mode of travel was usually by public transport, particularly buses. Many of them during discussion mentioned many times while taking women for deliveries or to main CHC for check-up in case of referrals, they did not get compensated for the money spent on travel. This added on to their personal expenditure particularly when maximum of them, 40 per cent, earned between Rs. 3000-4000 from their incentives, followed by 37.5 per cent who earned even less than Rs.

3000 from incentives. 93 per cent ASHAs mentioned that their expectation from the work they had joined was of financial incentives. Since the range of their incentives including monthly fixed allowance of Rs.2500 remains below Rs. 4000, almost all ASHAs were dissatisfied and disappointed with the amount they earned despite the amount of work load on them. They expect to be regularised like their counterparts in the Anganwadi centres and be given a monthly salary of at least Rs. 10000 to 15000 and all the ASHAs have only one demand from the state that they be given a regular salary as well. Another major problem that they face is from the hospital staff, 56.5 per cent of ASHAs mentioned that whenever they visited the government health facilities like PHC or CHC, the hospital staff did not cooperate with them.

The nature of work for ASHAs creates challenges particularly related to their position within the hierarchy of the health care system and the remuneration they receive. Issues related to job security and subtle forms of discrimination faced by them have emerged to be the prominent concerns for the ASHAs.

Even though 41 per cent ASHAs did not face any issues at the beginning of their career, 28 per cent reported that they faced problems in cooperation from local population they served, particularly in terms of convincing them for regular check-up of pregnant women and child immunisation. 14 per cent of them faced issues owing to not understanding their roles and responsibilities and 10 per cent of them faced problem in convincing their families to let them work. For the overwhelming majority of ASHAs, the villagers or families of pregnant women have become increasingly cooperative over the years. This is further supported by the observations where all ASHA reported that women seek and follow advice not only related to pregnancy but also related to birth control. Even adolescent girls from the village that they serve approach them for any help or clarifications, if any and they have reported 100 per cent immunisation of the children as well.

Even vis-à-vis their caste, since most of them were SCs, 97.5 per cent mentioned having never faced any caste-based discrimination. Only 2.5 per cent of them mentioned that some families had not allowed them to enter their house on some occasions.

On a personal front, the maximum proportion of ASHAs, 65 per cent, mentioned that their work hours or extent of their work did not affect their personal family

life. However, 35 per cent of them mentioned that on some specific occasions they have experienced disruptions in personal life on account of their work. This was especially the case at times of official inspections or surveys when a team from the headquarters would visit or when some specific information was sought at a short notice. On the other hand, 57 per cent ASHAs stated they were not satisfied with their jobs and some ASHAs mentioned that lack of proper incentives or salary is a matter of ridicule among the family members. Despite these issues and challenges that these women face, they are willing to continue their work as ASHAs. Even if lack of security in the work is a major concern, social prestige and a sense of independence is also felt by these women.

## 5 Conclusion

Apart from the formal medical cadre of doctors, paramedical staff and the associated state bureaucracy, community health workers form a broad base of this structure. Since the concept of local and community form the core of CHW cadre, they act as a source of integration between the community and the formal health apparatus. As such their contributions and role have significant importance for population health.

Nuanced understanding of the significant role that ASHAs play in the functioning of health care system requires thorough research related to their labour as workers in the hierarchical system; about their embeddedness in the social realities of their lives, of the community and the state; contextual understanding of their priorities, challenges and issues. The present study shows that ASHAs have a complex relationship with their professional lives which comes to define their identity within social, political, and economic spheres and within which they further seek and demand changes in their job conditions.

The study shows that ASHAs demand for their right to salary as a right for the labour along with other issues of concern for them vis-à-vis their lowest position a hierarchical set up goes parallel to their commitment for the work they undertake providing a strong base for government policies on health.

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## Mapping In(dignity) Within the NAMASTE Policy Framework

Aishwarya Karan<sup>1</sup>

### Abstract

*The National Action for Mechanised Sanitation Ecosystem (NAMASTE, hereinafter) scheme launched in 2023 was formulated by subsuming the erstwhile Self-Employment Scheme for Rehabilitation of Manual Scavengers (SRMS, hereinafter) to ensure rehabilitation of persons engaged in manual scavenging. The policy attempts to signal a significant shift from ‘rehabilitation’ to an ‘enabling ecosystem’ aimed at targeting fatalities of workers engaged in ‘hazardous cleaning’ of sewers and septic tanks. However, it forsakes an opportunity for a radical policy shift in transforming mechanization of sewage. The paper posits that there is a significant ‘dignity deficit’ in the language of NAMASTE policy document, among issues like paternalistic gaze and privatization of risk. Aiming to ‘ensure safety and dignity’ of workers, it ironically identifies the objective as ‘systemizing human entry into sewers and septic tanks through the organization of well-trained and appropriately equipped’ workers. The analysis delineates a casteist model of techno-solutionism instead of resolving technological injustice in urban sanitation governance. With a heavy reliance on framing workers as ‘sanipreneurs’ and ‘sewer entry professionals’, the state effectively relinquishes accountability to private contractual arrangements between workers and employers, simultaneously shifting the burden of abolishing hazardous cleaning onto affected workers from intergenerationally marginalized communities, including legal formalization of caste-based allocation of labour. A critical discourse analysis approach is employed to examine the policy as a legal text while using qualitative empirical data from interviews, observations and field notes focussed in Delhi and Noida as a political field.*

**Keywords:** NAMASTE, human dignity, hazardous cleaning, caste, policy.

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## 1 Introduction

The Ministry of Social Justice & Empowerment provided data from National Commission for Safai Karamchari in reply to an unstarred question on deaths in sewers and septic tanks in the Rajya Sabha; 2023 saw 63 workers' deaths and in 2024, the number was 50 (Ministry of Social Justice and Empowerment, 2024). The documented persistence of fatalities exposes the lethal gap between official policy and ground reality. This is in spite of repetitive judicial interventions by the Supreme Court (Bakshi, 2025). By June 2025, at least 42 manual scavengers had already lost their lives across the country, and in the capital alone, the six workers died during manual scavenging of sewers and septic tanks by September 2025 (Sathuluri, 2023). These routine violations point to the systemic failure of the policy mandate and expose the claim of 'zero fatalities' (Ministry of Social Justice and Empowerment, 2023). Such wide enforcement gap between the policy promises in the NAMASTE scheme and the ground realities (Kumar, 2025), absence of institutional mechanisms part of implementation and weak monitoring are symptomatic of legal instruments pertaining to manual scavenging, as admitted by the Supreme Court (Balram Singh v. Union of India, 2020, para. 14).

### 1.1 Rationale

Notably, there are some deeper structural concerns that appear in the form of a perpetual theme of patronization of communities engaged in such work, lack of abolitionist language towards the practice and symbolic treatment of the human right to dignity, equity and right against discrimination in the NAMASTE scheme. A similar treatment is also seen in the NAMASTE scheme. Rather it goes a step further and undertakes the project of rebranding workers as 'sanipreneurs', thereby, allowing the government to effectively evading its own responsibility while leaving sanitation workers' safety to be handled through 'formalized' private contracts. This moves the burden of ending dangerous practices onto marginalized communities while diminishing state accountability, and risks legally entrenching the historical nexus between caste and its hierarchically graded occupational linkages.

## 1.2 Policy Rationale and Intent

The policy guidelines under NAMASTE aim to address specific gaps in the SRMS and shift the policy focus from mere welfare-based rehabilitation to a technological and ‘enabling ecosystem’. The policy promises the safety and dignity of India's sanitation workers by building a supportive system that recognizes workers as essential to infrastructure maintenance, and improving access to occupational safety and health through capacity building by providing training, equipment, and machinery. It offers financial support to reduce sanitation workers’ vulnerability by providing capital subsidies for ‘sanitation related projects’ to enable them to become sanitation-based entrepreneurs. The functional transition is made to offshoot the limitations of SRMS. As per the guidelines, the need for a new framework was the persistence of hazardous cleaning of sewage resulting in 1,056 workers dying between 1993- 2023 and failure of safety protocols. It marks a distinction from its precursor by highlighting the unfinished mandate of SRMS which was focused on rehabilitation of identified manual scavengers and the critical need for ‘full mechanization’ of sewage cleaning procedures. While considering mechanization imperative and acknowledging that most Tier II and Tier III towns lack underground drainage systems, and even urban spaces with such systems are not fully equipped for mechanized cleaning, the policy necessitates provisioning of specialized machinery, thereby justifying the shift to a comprehensive ‘enabling ecosystem’ (Ministry of Social Justice and Empowerment, 2023, p. 2).

The scheme attempts to standardize service delivery to regulate these services through SRUs and licensed Private Sanitation Service Organizations (PSSOs) hoping that it would prevent any informal worker to be engaged in hazardous cleaning (Ministry of Social Justice and Empowerment, 2023, p. 12). In its attempt to create this ‘enabling ecosystem’, the scheme envisages an economic empowerment via ‘sanipreneurship’ offering transitioning roles from that of a worker to that of a contractor. While recognizing that workers aspire to a more dignified life, it seeks to do so by transforming sanitation workers engaged in sewage cleaning from manual labourers into owners of sanitation-related enterprises while providing upfront capital subsidies for purchasing mechanized equipment. Yet, what is strikingly similar between the SRMS and NAMASTE policy is their approaches of

rehabilitation with one of the prominent means being extension of the scheme through subsidised loans for sanitation-related projects to manual scavengers, sanitation workers, and their dependents (National Safai Karamcharis Finance and Development Corporation, n.d.).

## 2 Literature Review

### Dignity Deficit in NAMASTE policy

#### 2.1 Paternalism and performative dignity

Human beings possess qualities, a distinctive value or worth which the drafters of the Universal Declaration of Human Rights (UDHR) called ‘inherent dignity’ that could not be allowed to be sanctioned by either the state, any social organ, or derived metaphysically or religiously and, hence, cannot be socially stripped away or rescinded in any way, making the rights and freedoms emanating from the human sense of dignity ‘inalienable’ (Universal Declaration of Human Rights, United Nations General Assembly, 1948, pmb.). However, there have been attempts by the state to impose dignity from above, as opposed to its intrinsic nature and misalign its meaning with a ‘performative’ perception of dignity. Such understanding of dignity is in contradiction to its conception under the UDHR and the Indian constitution to one that is relational and patronizing. One instance of this attempt was the 2019 Kumbh Mela in Prayagraj served as a televised stage for the Prime Minister’s ritualistic washing of the feet (Charan Vandana) of sanitation workers, a spectacle that perfectly encapsulates the state’s preference for performative dignity over substantive rights. This act was immediately challenged by Dalit activists like Bezwada Wilson, founder of the Safai Karamchari Andolan, who dismissed the event as a ‘gimmick’ rooted in mere optics (Puniyani, 2019).

NAMASTE is both a consequence and reinforcement of that paternalistic project that covers up manual scavenging and normalizes it under a ‘Gandhian model’ (Chhachhar, 2025) of sanitation governance tying certain marginalized at the lowest rung of the caste ladder to sanitation work in name of ‘sacred duty’ and ‘karma-dharma logic of varnashram’ (Ramaswamy, 2005, p. 86). By framing sanitation workers as ‘sani-entrepreneurs’ or ‘sewer-entry professionals’, the state adopts a paternalistic gaze that effectively infantilizes a marginalized group historically burdened by the inhumane repercussions of practice of manual

scavenging. While Gandhi's logic purportedly aimed to universalize sanitation work, it simultaneously rendered such labour optional for the upper castes while cementing it as a 'sacred' and 'noble' duty for the marginalized - a 'spiritual necessity to wash away the sins of a previous birth'. This phenomenon is not a contemporary political anomaly but can be traced back to the Gandhian project of envisioning the 'Ideal Bhangi' (Ramaswamy, 2005, p. 89).

The 'sanipreneur' initiative represents a contemporary manifestation of such exploitative and performative perception of dignity that fundamentally fails to bridge the existing dignity deficit but instead widens it. True dignity for discriminated and exploited communities at the margins implies the freedom to exist without being tethered to any caste-based and historically imposed occupation, even if the work is formalized, mechanized and regulated on paper. It requires the substantive presence of social mobility and the unencumbered choice of livelihood and not the 'social empowerment' model following neo-liberal market mechanisms while advocating a sanitation-based entrepreneurship for members of these communities. Instead, the policy omits the social context of human dignity of oppressed and discriminated communities that are systematically denied their right to dignity and right to choose one's vocation freely due to pervasive caste inequality, 'untouchability based economic discrimination' (Thorat, 2025, p. 185) while simultaneously appearing benevolent in creating 'alternatives' like turning workers into private contractors and entrepreneurs. Thus, it does away with a model of independent or a caste-liberated hiring process in urban local bodies rather considers turning existing pool of those engaged in manual scavenging to become are collectivized into self-help groups, become 'sanipreneurs' by 'empowering them to run sanitation enterprises' (Ministry of Social Justice and Empowerment, 2023, p. 5-6, and 22).

## **2.2 Oppression of caste and contractualization**

As discussed earlier, while the de jure position does not afford absolute abolition of hazardous cleaning, and providing partial justification for manual entry into sewers and septic tanks under PEMSAR 2013 and further diluted prohibition due to policy interventions, the de facto situation produces a reality far from even such conditional prohibition. Caste inequality is reproduced in urban India through the

corrupt nexus of contractualization and caste (Sharma, 2025). The proliferation of private contracting of casual labour for septic tank cleaning by households, commercial enterprises, and the systemic shift toward informalization and contractualization within urban local bodies exacerbate caste inequality for those engaged in sewer work, who are predominantly drawn from intergenerationally marginalized communities. This rising contractualization functions as a mechanism of state distancing from its responsibility, where the legal and financial liabilities of hazardous cleaning are outsourced to private entities that operate with minimal oversight. Replacing secure public employment with precarious, short-term contracts, authorities like Jal Boards effectively formalize a regime of disposable marginalized workers stripped off their rights and institutional protections working routinely in acutely hazardous and undignified conditions. Similar structural reliance on a flexible, caste coded workforce through ‘formalization’ of this contractual mode of sanitation governance is observed in NAMASTE. Alpa Shah and Jens Lerche call this ‘re-entrenching of identity based social oppression’ in a neo-liberal social order as the process of ‘conjugated oppression’ (Shah et al., 2018, p. 21) affecting workers at the margins due to the ‘enduring nature of caste discrimination in the economic sphere’. This reinforces and results in the inseparability of caste-immobilized class and market having grave implications on the right to dignity and a dignified livelihood of those engaged in the urban sanitation supply chain.

Notably, this problem of ‘dignity deficit’ is not a peculiar attribute of the scheme in question but a symptom across governmental ‘reforms’ of the practice. Critics such as Wankhede & Kahle (2018), Khanna (2019) and Koonan (2021) have been underscoring the same issue in PEMSR Act 2013. Although Article 17 explicitly abolishes untouchability and practices derived from it in any form (Constitution of India, 1950, art. 17), the persistence of manual scavenging reveals how this practice remains a fundamental manifestation of caste-based oppression within the sanitation labour governance. Sanitation work is deeply rooted in the historical structures of untouchability, exclusion and inequality and continues to function as a caste ordained practice that imposes distinct gendered roles - hazardous and undignified manual cleaning of sewer and septic tank for Dalit men and manual scavenging of dry latrines and public toilets for Dalit women. The perpetuation of

the neo-liberal market mechanisms manifesting as contractualization coupled with undignified labour, the state fails to uphold constitutional promises of dignity instead permitting the continued iniquitous treatment and exploitation of intergenerationally marginalized communities. Though the policy adopts an ‘integrated approach of convergence of the programmes for safety and dignity of sanitation workers’ (Ministry of Social Justice and Empowerment, 2023, p. 8), it follows an approach that in effect prioritizes safety over dignity of workers.

### **3 Discussion**

#### **3.1 The problems with ‘Sanipreneurship’ model of governance**

##### **Legal Formalization of Caste based Labour and Symptoms of Techno-solutionism**

In 2019, the Delhi government adopted a similar patronizing stance while launching a fleet of 200 vehicles fitted with sewer-cleaning machines. Chief Minister Arvind Kejriwal through his public rhetoric took part in shifting the burden of safety onto the workers themselves, urging workers not to be ‘careless’ while announcing the distribution of ‘free safety gear’(Ahmad, 2021). His stance effectively reframed systemic infrastructure failures as matters of individual negligence. Such paternalistic plea suggested that sewer deaths are primarily a result of worker behaviour rather than the state's failure to provide a full mechanization, a legally compliant sewerage infrastructure and an abolitionist framework instead of one that links caste and sanitation labour. By focusing on safety gear as a gift from the government, the administration obscures the technological injustice where such equipment is often insufficient for the actual physical conditions of Delhi's narrow sewer networks. Such discourse of ‘carelessness’ allows the state to maintain a performance of concern while simultaneously giving up accountability for the material realities of caste-based labour. The patronizing attitude was also found in the framing the allotment of cleaning machines as a form of social empowerment when this policy results in a policy-based formalization of caste roles. By specifically targeting the families of sanitation workers for machine ownership the state reinforces the intergenerational link between the Valmiki community and the city's waste, thereby, ensuring that the identity of the worker remains tethered to their caste. This initiative marked a transition to the ‘sanipreneur’ model - a

sanitation based entrepreneurship model for empowerment of those engaged in manual scavenging.

Furthermore, in 2019, the Government of India issued an advisory to all states to constitute 'Emergency Response Sanitation Units (ERSU). The advisory issued by the Ministry of Housing and Urban Affairs was meant to deal with 'extreme situations when a sewer gets blocked and no mechanical equipment can offset human intervention causing overflow of sewage onto roads and public spaces exposes citizens to serious health hazard' and to solve this public health crisis, it recommends establishing such ERSUs. It further remarks 'as is noted from practices across the world, trained sanitation workers, termed sewer-men, are employed to undertake repairs and physical removal of chokes from public sewers and septic tanks on such rare occasions when doing so lies beyond the capability of machines'(Ministry of Housing and Urban Affairs, 2019, pp. 3-4).

To further elucidate the point, the NAMASTE policy guidelines, borrowing key terminologies and ideas from the 2019 ERUSU guidelines, introduce a structured 'ecosystem' designed to 'professionalize and regulate' sanitation work through specific roles and institutions. At its base are Sewer and Septic Tank Workers(SSWs), a broad category of labourers engaged in cleaning operations across both public and private sectors. Workers on the payroll of Urban Local Bodies (ULBs), parastatals (like Jal boards, cantonment boards, public work department, development authorities, etc), or those engaged through private contractors and Self-Help Groups (SHGs) involved in emptying septic tanks or maintaining sewerage networks (Ministry of Social Justice and Empowerment, 2023, p. 6). Within this group, the policy identifies Sewer Entry Professionals (SEPs) as a specialized, certified subset authorized to perform manual entry under strict safety protocols, only in exceptional cases. These services are delivered through Private Sanitation Service Organizations(PSSOs), which are licensed private entities or 'sanipreneur' enterprises empanelled to manage sanitation contracts (Ministry of Social Justice and Empowerment, 2023, pp. 3-4). The entire framework is overseen by Sanitation Response Units (SRUs) or Emergency Sanitation Response Units (ERSUs) which are state-mandated bodies at the local level that act as centralized hubs for regulating private contractors, managing mechanized equipment, and enforcing safety standards to prevent fatalities. This governmental

body not only regulates PSSOs but also authorizes the entry of SEPs into sewers and septic tanks.

However, the problem with such a functionalist approach is that it treats the problem from a ‘techno-solutionist’ (Morozov, 2013) standpoint and uses words like ‘systemizing sewer entry’, ‘sewer entry professionals’ and ‘sewer-men’ justifying the use of such terms as it is also used in ‘practices across the world’ (Ministry of Housing and Urban Affairs, 2019, p. 10) while failing to grasp the desensitized, decontextualized and problematic manner of such phrases in a policy document within India where members of discriminated and marginalized castes have been historically forced into manual scavenging and hazardous cleaning of sewage, the practice perpetuates and state is found to be invisibilizing and normalizing it often (Karan, 2025).

While technological solutions are required to combat the issue, the complexity of the social practice of manual scavenging and hazardous cleaning also requires addressing and resolving the ‘technological injustice’ in the form of failure of specialized and cost-effective innovations, contractual mode of mechanization in urban local bodies like DJB, absence of large scale penetration and scaling of mechanization, regulation and maintenance of dilapidated and legally non-complaint sewerage networks, inter alia. However, the techno-solutionist approach attempts to apply a seemingly innocuous ‘techno-fix’ by avoiding the more difficult social engineering of decoupling caste from sanitation and overlooking the resolution of technological injustices perpetuating the practice. Government data confirms that majorities of sewer and septic tank workers are from Scheduled Castes, Scheduled Tribes, and Other Backward Classes, reflecting deep socio-economic structures that underlie sanitation labour in India (“67% of sanitation workers are from SC community: Govt data”, 2024). India struggles with some especially challenging aspects of its sanitation system like the caste character of the practice (Human Rights Watch, 2014) that has in effect sustained the extremely dehumanizing nature of the practice. Within its graded hierarchy, the caste system assigns all sanitation jobs deemed ‘menial’ to the lowest castes. It applies the notion of ritual purity and impurity which extends beyond physical conditions of dirt; it is also a social construct (Sakthivel et al., 2019).

### 3.2 Privatization of Risk

The ‘sanipreneur’ paradigm is fundamentally based in the privatization of risk and the relinquishing of state accountability through contractualization. While shifting the identity from a sanitation worker to an entrepreneur, the scheme seemingly also overlooks the shift of accountability from the state to private contractual arrangements. Simultaneously, the responsibility of abolition of ‘hazardous cleaning’ of sewage is also indirectly shifted onto the intergenerationally marginalized workers themselves. In a socially just policy of occupational health and safety, and as per the National Institute for Occupational Safety and Health, the hierarchy of controls which offers a structured approach to identifying and applying controls, prioritized by effectiveness, to safeguard workers’ health and safety, places the reliance first and foremost at the elimination and substitution of the hazards, applying engineering and administrative controls to the risk and at last, it applies the least effective mechanism - personal protective equipment (Centers for Disease Control and Prevention, 2022). In India, the sanitation infrastructural governance in a cultural climate of caste is not fit to rely upon PPE and safety equipment for its effective enforcement. It is not only lowest in efficiency as it puts the entire onus on the worker but is practically and socially inexpedient without the prerequisite sanitation infrastructural and societal transformation.

Functional lens to ‘Emergency’ versus legal definition in Manual Scavenging Rules, 2013

The structural silence within the NAMASTE policy regarding a precise or itemized definition of an emergency situation reflects a profound dignity deficit at the core of its framework. The actual technical definition of ‘exceptional circumstances’ (such as removing concrete obstructions or inter-linking new sewer lines after duly emptying the sewers or pits of sewage) is found in Rule 3 of the Manual Scavenging Rules, 2013. The drafting members of the NAMASTE policy assumes this list as a prerequisite and did not even care to reproduce it. This not only lends to ambiguity but could result in misuse of the discretionary powers of the executive apparatus responsible for its implementation, to determine what constitutes an ‘emergency’ such as CEO of a responsible sanitation authority. Under Rule 3 of the

Prohibition of Employment as Manual Scavengers and their Rehabilitation Rules, 2013, manual cleaning is generally prohibited except in five specific circumstances - 'removal of obstructions, inter-linking sewer mains, pump set maintenance, structural repairs, absolute necessity'. As per Rule 3(2), for circumstances involving pump set removal (3) and structural repairs (4), it is a mandatory legal prerequisite that the sewage is totally emptied with the aid of cleaning devices before a person is allowed to enter the sewer. Additionally, in all these exceptional cases, the employer must provide the worker with the full range of prescribed protective gear and safety devices (Prohibition of Employment as Manual Scavengers and Their Rehabilitation Rules, 2013, r. 3).

By deferring to the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act of 2013 and Rule 3 of Manual Scavenging Rules, 2013 for the legal definition of exceptional circumstances, the guidelines operate as a vague implementation document. This is evident in the use of emergency as a functional label through the creation of Emergency Response Sanitation Units and the 14420 helpline, which categorize emergencies merely by the urgency of a service request rather than the nature of the hazard. Furthermore, the policy relies on a negative definition of emergency where manual entry is sanctioned only when a situation is deemed beyond the capability of machines.

Hence, such policy void masks a continued reliance on the bodies of intergenerationally marginalized workers, thereby, entrenching the legal formalization of caste-based labour by 'systemizing human entry' under a vague emergency banner without explicitly delineating even the specific physical conditions to justify such a life-threatening risk, in accordance with the 'conditional prohibition' (Wankhede, 2020) under Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013. Shomona Khanna, academician and advocate in Safai Karamchari Andolan case calls the 1993 Act 'stillborn' and the 2013 Act compromised due to 'ambiguous illegality of the practice being now watered down with exemptions, exceptions and provisos' (Khanna, 2019, pp. 315-316), thereby, allowing entry of humans into sewers and septic tanks due to the diluted definition of 'hazardous cleaning' (Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013, § 2(d)).

## 4 Field Reflections: Qualitative Insights from the Political Field of Delhi and Noida

### 4.1 No dignity in life and in death

A DJB field assistant contractually engaged for acting on complaints of sewer overflowing recollected during interview that remarks such as ‘this work is of a bhangi’ are often made to them by service seekers, referring to a dalit sub-caste that has been traditionally discriminated by upper castes and kept bound in allocation of sanitation work inter-generationally (anonymous sanitation worker, personal communication, November 4, 2024). As observed during shadowing and later interviewing DJB workers on work in the field, the workers are forced to come into contact with faecal matter in narrow lanes where no machines reach while using the rudimentary tools like khappachi (long split bamboo sticks), sutli (thread to tie the sticks when they break while removing blockages from the sewer), gaiti (two-sided hammer to open the lid/door of the sewer), kochi/fawda (a long-handled axe to collect silt) and chabi (metal rod with curved end used to open heavy sewer lids with fulcrum). These tools are sanctioned by the DJB itself to workers who themselves split the bamboo sticks and carry them on a bicycle or motorcycle to sewers from where a complaint is received. Such rudimentary tools are unable to safeguard the dignity and health of worker as they cannot avoid direct manual contact with sewage and faecal sludge as required by the definition of cleaning devices under Section 2(1) (b) of the MS Rules 2013. This is a prime example of ‘technological injustice’ even after mechanization explained earlier. Equipment like robotic cleaners has been much famed, but actual deployment is limited outside a few pilot cities. Innovations like ‘bandicoot-mini’ acquired in Kerala and Leh is a step forward in this direction, however, what remains crucial is their affordability and scaling up as they are considered too costly by urban local bodies (Praveen, 2024). Up until 2021, the official nomenclature for the workers in the Delhi Jal Board was ‘sewer gang beldars’ which was re-designated in an attempt to ‘dignify’ the job profile to ‘field assistants’ (Delhi Jal Board, 2021). The same attempt to dignify and formalize the nomenclature addressing contractual workers is seen in the NAMASTE deploying terms like ‘Sewer entry professionals’ and ‘Sanipreneurs’, however, such superficial motivations have shown to do little for safeguarding the dignity of workers on the ground.

In August 2025, a field visit in an incident where two workers died while cleaning a sewage pumping station unsupervised, where the entire city's sewer flows for interception and filtration in Noida Authority(Jal) ("Sewer tank deaths: Noida authority acts against three officials", 2025) revealed that there are attempts to pressurize the family to sign a 'razinama', a compromise agreement stating that victims' families are deciding to settle the matter through monetary compensation and would not in future take any legal action. Under pressure, the agreement was signed by heirs of the deceased, however, afterwards the Investigating Officer did file an FIR (anonymous relative of deceased worker, personal communication, September 18, 2025). This incident demonstrates how justice and rights operate under the elusive nature of accountability subjected to the dynamics of caste, contractualization, and power relations between accused and victims due to.

In a similar incident on November 4, 2024, a 24-year-old contractual security guard cum sanitation worker employed by the Delhi Jal Board (DJB) was found dead inside a 21-foot-deep drain chamber in Anand Vihar (Express News Service, 2024). The police official interviewed took part in victim blaming and remarked with an abusive word to the brother of the victim in front of the fact-finding team, "why did he, (curse word) enter without supervision" (anonymous law enforcement officer, personal communication, November 6, 2024), even when the rule under Section (3) (a) and (c) of PEMSAR Rules, 2013 requiring attendance of three employees including one supervisor at hazardous sites and inspection to determine hazardous atmosphere prior to cleaning was flouted openly.

This was a case that occurred at an interceptor chamber site where hazardous manual cleaning without any safety equipment or cleaning devices place during filtration of sewage and blackwater from the Yamuna River and the brother of the victim who reached the site of incident found extremely foul air making it tough to breathe in the interceptor chamber. The police official had yet not added offences under Section 7 and Section 9 of PEMSAR Act related to hazardous cleaning citing the preliminary nature of the investigation. Such lack of awareness and inhumane attitude to the workers' family who had lost their family member, reflects the critical need for training and sensitization of police officials.

When two migrant labourers lost their lives when asked to clean the household's septic chamber, a private residence in Noida ("Two sanitation workers die while

cleaning sewage shaft at Noida house”, 2024), the police officers interviewed by the fact-finding team reflected a profound indifference characteristic of both law enforcement and society in general. One sub-inspector referred to the fatalities of the two workers as ‘ittefaqiya,’ suggesting that their deaths were merely coincidental, despite being cognizant that manual scavenging is illegal. This choice of language also suggested a defensive stance qua the owner's liability for the negligence that led to the deaths of the two persons (anonymous law enforcement officer, personal communication, May 3, 2024).

During personal interviews with neighbours of household and the family of the deceased workers where two workers died in a private septic chamber in Old Jasola Village, Sarita Vihar on May 2024 (Express News Service, 2024), the fact-finding revealed that one of the workers had taken a private loan for owning a suction machine but the owner of household was not satisfied with the cleaning work and told workers to enter and remove the faecal sludge from the chamber manually. The workers dived inside the less than one-foot narrow opening of the septic chamber for fear of loss of wages, complying with the instructions and unaware of the dangers. The other worker went inside to rescue the first worker but succumbed to the gases and both men in their 40s lost their lives (anonymous law enforcement officer, personal communication, May 27, 2024).

Such incidents speak in amplitude about the structural failure in safeguarding the right to life with dignity of those engaged in manual scavenging of sewers and septic tanks under the lethal dynamics of caste and contractual mode of urban sanitation governance, despite ongoing solutions for mechanization. This reveals a perfunctory policy approach that prioritizes numerical targets (“66,961 sanitation workers validated under NAMASTE scheme, govt tells Parliament”, 2025) under a neo-liberal regime while the persistence of such primitive sanitation systems ensures that hazardous cleaning remains a burden on the lives and bodies of intergenerationally marginalized communities.

## 5 Conclusion

The NAMASTE framework is not entirely ill intended as it places renewed focus on mechanisation in the urban sanitation governance, which suffers from ‘technological injustice’ and deep complex nexus of caste and contractualization.

However, the larger problem lies in its approach which makes it a perfunctory policy reform failing to bridge the dignity deficit, but rather appears to be widening it. It prioritizes numerical targets and professionalized labels over the radical abolition of hazardous cleaning. By employing phrases such as ‘systemizing human entry’ and ‘motivated sewer entry professional’, the policy accepts the body of the marginalized worker as a permanent fixture of urban infrastructure. The core criticism of the NAMASTE framework lies in its reduction of a profound social crisis through its paternalistic treatment and a ‘techno-solutionist’ stance. The paternalistic gaze of the policy allows it to employ a clinical language insensitively decontextualized from the Indian reality of caste-based inequity and exploitation of communities engaged in such work. This approach offers a mere ‘techno-fix’ that bypasses the necessary social engineering required to decouple caste identity from sanitation labour.

Rather than resolving ‘technological injustice’ which manifests as a lack of specialized innovation for narrow urban lanes and a fragmented, contractual mode of mechanization, removing engineering hazards and non-maintenance of dilapidated and legally non-complaint sewerage networks, the policy subscribes to and reinforces the existing graded hierarchy under caste. Such selective decontextualization and clinical treatment continues to inform current political and policy discourse. In adopting such an approach, workers are turned into objects of policy rather than autonomous persons with the agency of determining their own occupations without the state's unsolicited influence, with the absolute freedom to negotiate their own vocational priorities and social futures, possibly in a different direction from what the caste system has ordained for them. A fair and just policy must move beyond techno-solutionism and paternalism by decoupling caste from labour by ensuring that the project of mechanization is not a tool for ‘empowerment’ under a model of sanitation-based entrepreneurship but an essential state mandate regulated completely by the state and not private entities or intermediaries benefitting from the exploitation of workers engaged in sewage work under the neo-liberal order. Furthermore, policies must envision urban local bodies or responsible sanitation authorities like Delhi Jal Board, Public Works Department, Delhi Cantonment Board, etc., to adhere to an abolitionist framework that would not ‘systemize’ sewer entry, make it safer or more professional but

would seek to eliminate it through a technologically just and efficient model of mechanization and by ensuring that sanitation work is free from contractualization and performative dignity. Only by removing the state's paternalistic and techno-solutionist gaze can policies move towards technologically just solutions to absolute annihilation of social practices like manual scavenging and restore the 'inherent dignity' inalienable to a human being.

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## Effectiveness of the Kanyashree Scholarship in Promoting Girls' Educational Retention in West Bengal

Joy Karmakar<sup>1</sup>

### Abstract

*This paper assesses the effectiveness of the Kanyashree Programme, West Bengal's flagship conditional cash transfer scheme, in reducing school dropout among adolescent girls during the period 2017 to 2025. Using district level data, the study evaluates programme performance across multiple dimensions, including retention, renewal, and consistency. The results indicate divergent trends. While K2 scholarships, which support continuation at higher educational levels, exhibit relatively stable or positive growth, K1 scholarships, representing entry level participation, have shown a persistent decline since 2020-21, corresponding with the COVID-19 pandemic and broader disruptions in school enrolment. Indicators of retention and renewal reveal a mixed picture of consolidation and vulnerability. Several districts demonstrate high continuation rates, whereas others continue to experience sustained dropout pressures. The temporal consistency index of 0.85 suggests overall programme stability over time. However, the sharp decline in the Retention Index to 65.46 in 2024-25 points to renewed stress within the system. Spatial consistency has improved modestly, increasing from 89.02 in 2021-22 to 91.08 in 2024-25, indicating a reduction in inter district disparities. At the same time, the coexistence of improved spatial consistency with declining overall retention highlights systemic challenges affecting districts across the state. Therefore, the paper highlights both the achievements and limitations of the Kanyashree Programme. While it has played a significant role in delaying early marriage and supporting the continuation of girls' education, its long-term sustainability remains susceptible to structural and systemic pressures.*

**Keywords:** Retention, Renewal, Dropout, Conditional Cash Transfer

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## 1 Introduction

In 2025, West Bengal experienced a substantial decline of approximately 1.7 lakh students in undergraduate admissions to state run and state aided colleges, with enrolments falling from about 5.3 lakh in 2024 to 3.6 lakh. This decline appears paradoxical in the context of the state's flagship Kanyashree programme, a conditional cash transfer scheme specifically intended to reduce educational dropout and promote female participation in higher education. The persistence of declining enrolment despite such targeted interventions raises important concerns regarding structural weaknesses within the higher education system and the inherent limitations of incentive-based policy instruments. Existing scholarship attributes this downturn partly to systemic inefficiencies, most notably the nearly three-month gap between the declaration of examination results and the commencement of the admission process, which functions as an immediate deterrent to student enrolment. At the same time, the shift reflects deeper transformations in educational preferences, as an increasing number of students are opting for vocational and skill-oriented programmes that promise faster economic returns in comparison to conventional degree courses (Ghosh, 2025). This situation raises a broader question within debates on conditional cash transfers. If financial incentives such as Kanyashree are insufficient to sustain undergraduate enrolment, does this suggest a declining relevance of conventional higher education, or does it point to a policy gap in which monetary support alone cannot compensate for administrative inefficiencies and the misalignment between academic curricula and labour market aspirations.

The Kanyashree Prakalpa, a flagship initiative of the Government of West Bengal, has emerged as one of the most prominent social protection programmes targeting adolescent girls. Launched in 2012 under the Department of Women Development and Social Welfare, the programme was conceptualized as a conditional cash transfer scheme with dual objectives of promoting female participation in secondary education and preventing early marriage. Its international recognition was reinforced in 2017, when it received the United Nations Public Service Award, positioning it as a model of gender focused welfare intervention. The programme follows a two-tier scholarship structure. The first component provides an annual scholarship to unmarried girls aged thirteen to nineteen who remain enrolled in

education, thereby encouraging school retention. The second component offers a one-time grant to unmarried girls aged eighteen to nineteen, conditional on continued enrolment, which functions both as a symbolic and practical deterrent to child marriage. The subsequent introduction of Kanyashree Plus, with its emphasis on a graduation strategy, reflects an effort to move beyond welfare dependence by linking social protection with pathways towards productive and sustainable livelihoods. By the year 2019 to 2020, more than three million scholarships across both components had been sanctioned, indicating the programme's extensive reach. While these figures demonstrate substantial coverage, a critical assessment must also address persistent challenges related to equitable access across districts, the monitoring of long-term outcomes in education and labour force participation, and the structural conditions that continue to reproduce gender disadvantage. In this sense, the Kanyashree Prakalpa represents not merely a cash transfer mechanism, but a broader social intervention aimed at reshaping gender norms and expanding opportunities for adolescent girls in West Bengal.

One of the most concerning social outcomes observed during and after the COVID nineteen pandemic in West Bengal was the resurgence of child marriage and child trafficking. Reports in leading newspapers documented how prolonged school closures displaced many adolescent girls and boys from formal education, thereby increasing their exposure to early marriage and exploitative practices. Districts such as South Twenty Four Parganas, Dakshin Dinajpur, Malda, and Murshidabad were identified as particularly vulnerable in this regard (Singh, 2020). This pattern stands in contrast to trends observed in several other Indian states, which have recorded notable declines in both the prevalence and absolute numbers of child marriage, while West Bengal continues to face this challenge despite flagship interventions such as the Kanyashree Prakalpa (Singh, 2024). These developments underscore the need for a critical reassessment of the programme's effectiveness in achieving its core objectives of delaying marriage and sustaining educational participation among adolescent girls.

Against this background, the present study examines the temporal dynamics of Kanyashree scholarships, including both K1 and K2 components, over the period

from 2017 to 2024, with particular attention to growth patterns and district level variation. Emphasis is placed on spatial inequalities in achievement, renewal, and overall coverage across districts. To evaluate programme performance in a systematic manner, four analytical parameters are employed, namely retention, efficiency, renewal, and consistency. Taken together, these indicators provide a comprehensive assessment of the scheme's reach, stability, and equity of implementation.

The remainder of the paper is structured as follows. Section Two outlines the theoretical framework of social inclusion through conditional cash transfers, situating the Kanyashree programme within broader welfare debates. Section Three describes the methodology, including data sources, study area, and analytical techniques. Section Four presents the empirical findings and is divided into two parts. The first analyses temporal and spatial trends in K1 and K2 scholarships over the past eight years, while the second evaluates programme performance using indicators of retention, renewal, and consistency. Section Five concludes by synthesizing the principal findings and offering policy relevant recommendations.

### **1.1 Situating Conditional Cash Transfers within the Framework of Social Inclusion**

Conditional Cash Transfer (CCT) programmes have emerged globally as a distinctive approach to social assistance, offering both immediate relief and long-term pathways to social inclusion. Their core principle lies in linking financial support to verifiable behaviours, most often in the form of continued school attendance, regular health check-ups, or other investments in children's human capital. This represents a significant departure from traditional welfare policies that emphasized the direct provision of goods and services. Instead, CCTs recognize poor households as active agents, with responsibilities as well as entitlements, thereby fostering what has been described as a virtuous cycle between social protection and human development (World Bank, 2005). Social protection, once seen merely as a safety net, is increasingly framed as an investment in human capital and poverty reduction, while also strengthening the governance of public expenditure (Vakis, 2005).

By addressing both short-term consumption needs and long-term poverty alleviation objectives, CCTs seek to combine immediate relief with structural transformation. Their impact is particularly visible in societies marked by high inequality, where traditional social insurance tied to formal employment often excludes the most vulnerable. In such contexts, CCTs extend a redistributive function, reaching those at the margins of the labour market and fostering inclusion through education, health, and nutrition. It is within this international discourse that the Kanyashree Prakalpa of West Bengal stands out as a gender-focused adaptation of the CCT model, specifically designed to delay marriage and promote continued education among adolescent girls. Its recognition with the UN Public Service Award in 2017 further underscores its innovative character as a welfare intervention aimed at reshaping entrenched social norms (Singh, 2024).

Yet, while CCTs have demonstrated measurable success in improving short-term outcomes such as school enrolment, nutrition, and health care utilization, their long-term contributions to poverty reduction and social transformation remain contested. Many CCT programmes are still too recent for a comprehensive assessment of their sustained developmental impact (Brière and Rawlings, 2006). Kanyashree, however, has operated for more than a decade, offering an opportunity to reflect on its broader influence on the social development landscape of West Bengal (Karmakar, 2023). Nevertheless, questions remain about coverage gaps, spatial inequalities in implementation, and the programme's capacity to address structural drivers of gender disadvantage.

More broadly, debates around CCTs highlight both their promise and their limitations. On one hand, they compensate for market failures that perpetuate intergenerational poverty, while their conditionalities may help internalize positive externalities of education and health (Ravallion, 2003; Das, Do & Özler, 2005). On the other hand, concerns persist regarding targeting accuracy, administrative capacity in low-income contexts, and the replicability of success across different socio-political settings. From a theoretical perspective, the relationship between CCTs and social inclusion can be explored through three interconnected dimensions include their contribution to national social policy and poverty targeting, their

ability to reshape accountability relationships between governments, service providers, and beneficiaries, and their potential to extend support to historically excluded groups, particularly women (Brière and Rawlings, 2006). Within this framework, the present paper focuses on the accountability dimension, with specific reference to the Kanyashree Prakalpa in West Bengal. The programme provides an important lens to examine how conditional cash transfers not only establish new forms of engagement between the state and adolescent girls but also redefine accountability by linking government commitments with beneficiaries' educational participation and delayed marriage (Karmakar, 2023).

## **2 Methodology**

This section is divided into the following two parts

### **Data Source and Study Area**

The data utilized in this study has been obtained from the official West Bengal Kanyashree portal. The period under consideration spans from 2017 to 2024, with the analysis focusing on three specific years—2017-18, 2021-22, and 2024-25—in order to trace and compare progress over time. District-wise data have been collected for these three years, with particular emphasis on the sanctioned K1 and K2 scholarships across 23 districts. The districts include Darjeeling, Kalimpong, Alipurduar, Koch Bihar, Uttar Dinajpur, Dakshin Dinajpur, Malda, Murshidabad, Birbhum, Purba Burdwan, Paschim Burdwan, Nadia, Hooghly, Howrah, Bankura, Puruliya, Jhargram, Purba Medinipur, Paschim Medinipur, North 24 Parganas, South 24 Parganas, and Kolkata. Among these, Kolkata is a fully urbanized district, whereas the others are comparatively less urbanized. Notably, Murshidabad recorded the highest number of scholarship applications in 2024-25, while Kalimpong registered the lowest.

### **Methods Undertaken**

To evaluate the program, the analysis begins with an assessment of the temporal trends in both K1 and K2 scholarships. Subsequently, the Compound Annual Growth Rate (CAGR) is computed across districts to capture long-term growth dynamics. In order to assess program effectiveness, three indicators include Retention Index,

Renewal Rate, and Consistency Index (CI) are constructed for K1 as K2 is one time grant. The formulation of these indices is based on the following set of equations.

*Achievement Rate (AR) = (Total Sanctioned scholarship / Target scholarship) \*100....*  
(i)

*Retention index (RI) = [K1 Renewals (in year t)/ Cumulative K1 Fresh up to t-1]*  
*\*100 (ii)*

For instance, when calculating the Retention Index for 2024-25, the numerator comprises the total number of K1 renewals reported in 2024-25, while the denominator is taken as the cumulative number of K1 fresh sanctions between 2020-21 and 2023-24. The choice of a five-year reference period is based on the assumed academic trajectory of beneficiaries. A girl is typically sanctioned the K1 scholarship at entry into Class VIII (around age 13-14), and she remains eligible to renew the award annually through to Class XII. This corresponds to a maximum span of five academic years (Class VIII, IX, X, XI, and XII). Thus, taking cumulative fresh sanctions over the preceding four years (up to t-1) ensures that the denominator approximates the pool of students who could legitimately appear as renewals in year t. Accordingly, if 2024-25 is taken as the year of observation (t), then renewals reported in that year are measured against the cumulative fresh sanctions during 2020-21 to 2023-24, which reflects the maximum eligible cohort still in the system.

In the context of the Kanyashree programme, the Dropout Index (DI) measures the proportion of beneficiaries who discontinue participation rather than renewing their scholarship. It is constructed as the inverse of the Retention Index (RI). While the RI indicates the share of eligible beneficiaries continuing into the next stage, the DI captures the share who exit from the scheme at that point. The formula may be expressed as:

*Dropout Rate (DR) = (100-RI)*  
(iii)

While the Retention Index (RI) provides a cumulative measure of programme sustainability by comparing annual renewals against the total pool of fresh beneficiaries since inception, it may not always reflect the actual renewal

dynamics of specific beneficiary cohorts. In practice, a large denominator can dilute the indicator, and conversely, a one-year Renewal Rate may inflate values beyond 100 per cent because renewals in a given year often originate from multiple preceding cohorts. To address this, a modified Renewal Rate based on a rolling multi-year denominator is adopted. For instance, a three-year cumulative fresh intake (years  $t-1$ ,  $t-2$ , and  $t-3$ ) better approximates the effective pool of girls eligible for renewal in year  $t$ . This approach recognises the typical progression of beneficiaries across secondary classes (VIII-XII), where renewals span several years, while also ensuring the index remains within logical bounds. Thus, the multi-year Renewal Rate serves as a complementary measure to the Retention Index: the former capturing cohort-specific continuation, and the latter offering a broader picture of long-term programme sustainability. So, the Renewal Rate highlights continuation behaviour. The formula is:

$$\text{Renewal Rate } (RR_n) = [\{K1 \text{ Renewals (in year } t) / \sum K1 \text{ fresh (in year } t-1)\} * 100]$$

(iv)

The Consistency Index measures the degree of stability in the programme's performance across time or space. It indicates whether scholarship renewals or achievements are evenly sustained, rather than fluctuating sharply. To assess programme stability, both temporal and spatial consistency were examined using two separate formulas. Temporal consistency was measured using the following expression:

$$CI_T = \{1 - (\sigma_t / \mu_t)\} * 100$$

(v)

$\sigma_t$  = standard deviation of the retention index across years,  $\mu_t$  = mean of the retention index across years

$CI_t$  = Temporal Consistency

The following formula captures spatial performance of the programme across districts in a given year.

$$CI_S = \{1 - (\sigma_d / \mu_d)\} * 100$$

$\sigma_d$  = standard deviation of the retention index across districts,  $\mu_d$  = mean of the retention index across districts,  $CI_s$ = Spatial Consistency

The CI is a useful measure for assessing the effectiveness and stability of conditional cash transfers like Kanyashree in retaining adolescent girls within formal education systems until adulthood. A higher CI indicates that a large proportion of girls either renew their K1 benefits annually, thereby demonstrating sustained engagement and educational continuity. Conversely, a low CI highlights discontinuity in participation, which may point to dropout, child marriage, or migration.

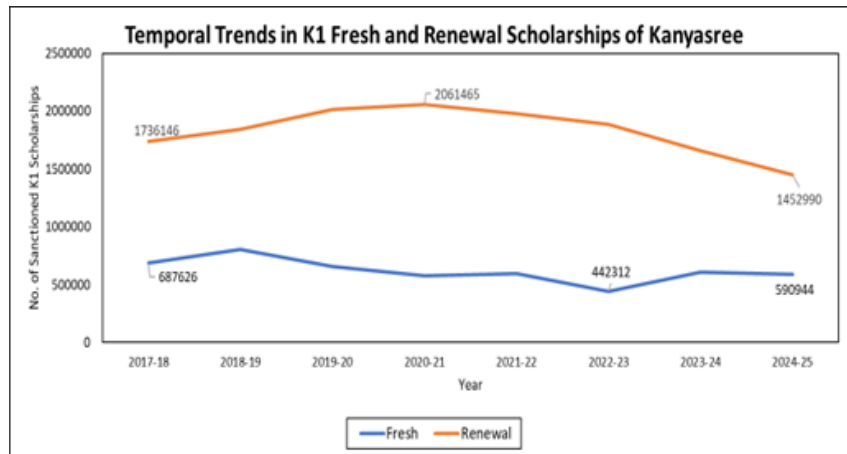
### 3 Findings and Discussion

#### Temporal and Spatial Dimensions of K1 and K2 Scholarships

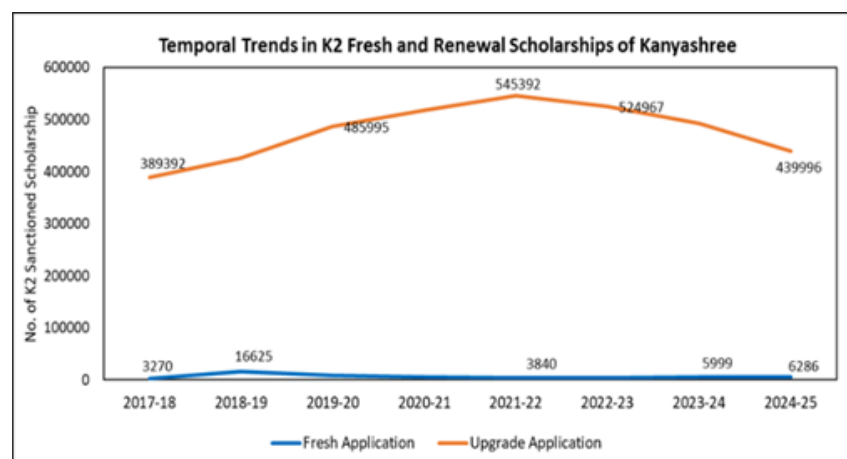
The implementation of the Kanyashree programme has had a significant impact on reducing dropout rates among girl students across educational stages in West Bengal. According to the statement made by the Chief Minister (CM) at the Kanyashree Day celebration, the primary level (Classes I-V) dropout rate among girls, which stood at 4.75 per cent in 2011-12, has now declined to zero. At the secondary level, the dropout rate, once recorded at 16.32 per cent, has decreased substantially to 2.09 per cent in the academic year 2023-24. Similarly, at the higher secondary level, the dropout rate has fallen from 15.41 per cent to 3.17 per cent over the same period, claimed by the CM. This section therefore examines these assertions in detail, particularly in terms of whether the programme has effectively reduced dropout rates in other words, whether the scholarship scheme has been successful in retaining students. Figure 1 illustrates the temporal trend in the number of fresh and renewal K1 scholarships, showing that both sanctioned fresh and renewal scholarships have exhibited a declining pattern over the past eight years. Figure 2 presents a similar pattern for the K2 component, where the number of sanctioned upgrade (renewal) applications peaked at around 5.45 lakh in 2020-21 before gradually declining to about 4.40 lakh in 2024-25, while fresh applications have remained consistently low. This trend suggests a stabilisation of

the eligible beneficiary base and a possible saturation effect as earlier cohorts transition out of the programme.

**Fig- 1 Temporal Trends in K1 Scholarship of Kanyashree**



**Fig- 2 Temporal Trends in K2 Scholarship of Kanyashree**



Source: Kanyashree portal,  
[https://www.wbkanyashree.gov.in/kp\\_4.0/dashboard.php](https://www.wbkanyashree.gov.in/kp_4.0/dashboard.php)

**Table 1 CAGR (2018-2024) of K1 Scholarships under Kanyashree across West Bengal Districts**

Compound Annual Growth Rate	Districts	No. of District
-5--0	Howrah, Jhargram, Purba Medinipur, Bankura, Bardhaman Purba, Malda, South 24 Parganas, Darjeeling, North 24 Parganas, Paschim Medinipur, Murshidabad, Hooghly, Birbhum, Uttar Dinajpur, Alipurduar, Coochbehar, Nadia, Jalpaiguri, Dakshin Dinajpur	19
0--1	Kolkata, Purulia	2
Above 1	Bardhaman Paschim, Kalimpong	2

Source: Kanyashree portal,  
[https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

The district-wise distribution of Compound Annual Growth Rate (CAGR) values for Kanyashree (K1) scholarships reveals a predominantly negative trend across West Bengal. A total of 19 districts fall within the range of -5 to 0, indicating a steady decline in sanctioned scholarships over the study period. This widespread contraction suggests that the downward trend is not confined to specific regions but is rather a general phenomenon across the state. In contrast, only two districts—Kolkata and Purulia—exhibit marginally positive growth (0 to 1 per cent), suggesting relative stability rather than substantial expansion. Furthermore, a limited number of districts—Bardhaman Paschim and Kalimpong—show growth rates above 1 per cent, highlighting them as exceptions to the overall declining trajectory.

**Table 2 CAGR (2018-2024) of K2 Scholarships under Kanyashree across West Bengal Districts**

Compound Annual Growth Rate	Districts	No. of District
-3-- 0	Coochbehar, Nadia, Jalpaiguri, Dakshin Dinajpur	4
0-3	Bankura, Bardhaman Purba, Malda, South 24 Parganas, Darjeeling, North 24 Parganas, Paschim Medinipur, Murshidabad, Hooghly, Birbhum, Uttar Dinajpur, Alipurduar	12
Above 3	Bardhaman Paschim, Kalimpong, Kolkata, Purulia, Howrah, Jhargram, Purba Medinipur	7

Source: Kanyashree portal, [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

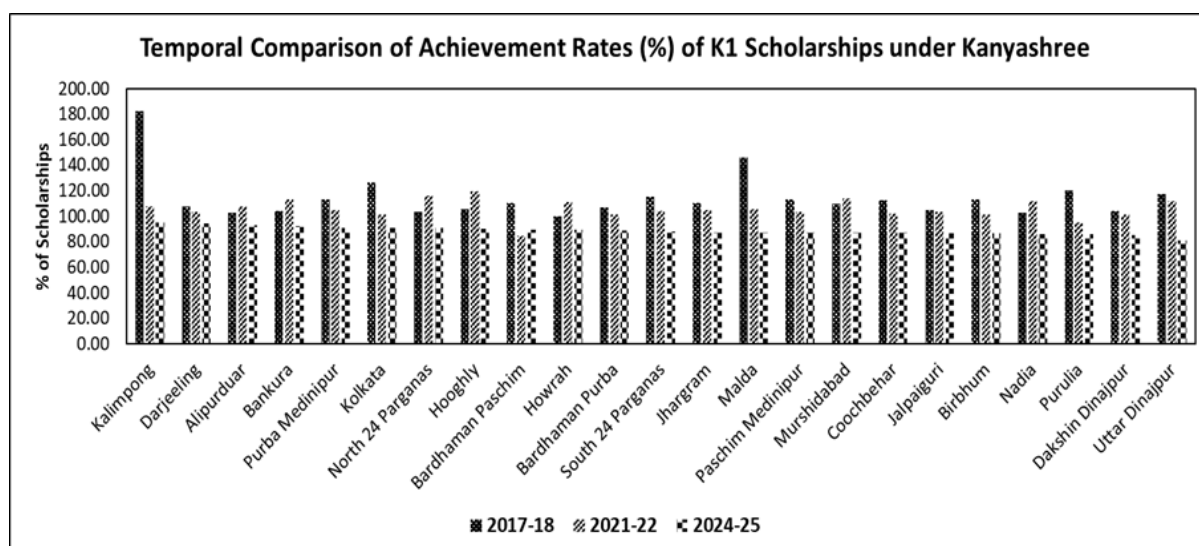
The Compound Annual Growth Rate (CAGR) analysis of K2 scholarships between 2018 and 2024 highlights a mixed but overall positive trend across West Bengal districts. Unlike K1 scholarships, where a widespread contraction was observed, K2 scholarships display a more balanced distribution of growth rates.

A relatively small group of districts—Coochbehar, Nadia, Jalpaiguri, and Dakshin Dinajpur (4 districts)—record negative growth (-3 to 0 per cent), suggesting a contraction in scholarship uptake. However, the majority of districts -12 in total fall within the 0 to 3 per cent range, including major regions such as Bankura, Bardhaman Purba, Malda, South and North 24 Parganas, Darjeeling, and Murshidabad. This indicates modest yet steady growth, reflecting a certain level of stability in the distribution of K2 scholarships. Interestingly, seven districts (Bardhaman Paschim, Kalimpong, Kolkata, Purulia, Howrah, Jhargram, and Purba Medinipur) show robust growth above 3 per cent. This comparatively higher rate suggests that in these districts, K2 scholarships have gained traction, either through improved programme implementation, greater awareness, or enhanced enrolment at higher secondary and tertiary levels.

Overall, the distribution of CAGR values underscores that while some pockets of decline persist, the dominant trend for K2 scholarships has been positive, with nearly half of the districts showing moderate growth and a significant cluster

demonstrating strong expansion. This pattern contrasts with the general decline in K1 scholarships, suggesting that retention into the K2 stage has been relatively more successful. This further implies that the impact of external disruptions, particularly the COVID-19 pandemic, has had a long-lasting effect on K1 scholarship uptake, with only a few districts demonstrating resilience or recovery.

**Fig- 3 Temporal Comparison of Achievement Rates of K1 scholarship**

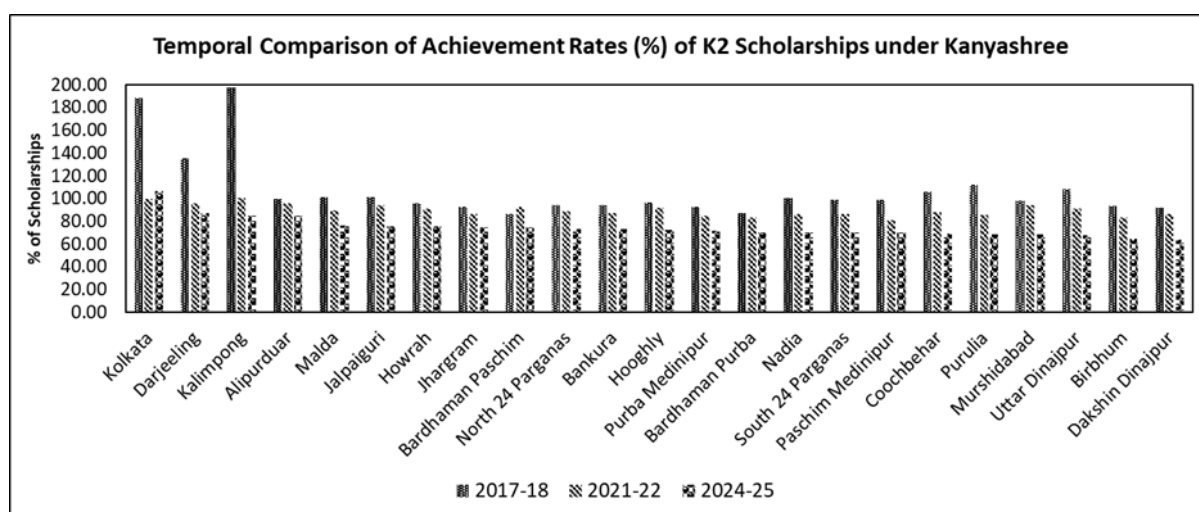


Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

In line with the CAGR findings, the temporal comparison of achievement rates (Figure 3) further substantiates the declining trajectory of K1 scholarships, highlighting how the weakening inflow of new entrants has persisted across most districts over time. Figure 3 presents the temporal comparison of achievement rates (%) of K1 scholarships across districts of West Bengal for three time points—2017-18, 2021-22, and 2024-25. The figure reveals a general downward trend in achievement rates over time. While most districts recorded relatively high achievement levels in 2017-18, subsequent years show visible declines, particularly by 2024-25. A few districts, such as Kalimpong and Malda, stand out with exceptionally high achievement rates in the initial period (exceeding 150 per cent in some cases), which may reflect either over-reporting in early phases of implementation or a surge in sanctioned applications relative to targets. However, by 2024-25, the rates in these districts, like most others, have contracted significantly.

The broad pattern of decline across nearly all districts is consistent with the negative CAGR values discussed earlier for K1 scholarships. This reinforces the argument that K1 uptake has been disproportionately affected by external shocks, particularly the COVID-19 pandemic, leading to reduced enrolment and sanctioning of fresh applications. In contrast to the relative resilience observed in K2, the decline in K1 achievement rates underscores the challenges of sustaining entry into the programme at the initial level. Taken together, the figure 3 and the CAGR analysis suggest that while the Kanyashree scheme has remained functional, its capacity to attract new entrants (K1) has weakened over time, posing a potential risk to long-term programme sustainability unless corrective measures are taken.

**Fig- 4 Temporal Comparison of Achievement Rates of K2 scholarship**



Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

Figure 4 illustrates the temporal comparison of achievement rates (%) of K2 scholarships across districts of West Bengal for the years 2017-18, 2021-22, and 2024-25. In contrast to the general contraction observed in K1 scholarships, the trend for K2 appears relatively more stable, with several districts maintaining or even exceeding 100 per cent achievement levels in the earlier years. Districts such as Kolkata, Kalimpong, and Alipurduar initially recorded exceptionally high achievement rates approaching or surpassing 180-200 per cent in 2017-18 though these values have gradually declined in subsequent years. Despite this decline, the overall pattern demonstrates that achievement levels for K2 remain comparatively

higher than K1 in most districts, suggesting that once students transition into the renewal or higher-level stage of the programme, they are more likely to be retained. Even by 2024-25, although the achievement rates have moderated, a broad base of districts still report significant participation.

This finding aligns with the CAGR analysis presented earlier, which showed positive or moderate growth in a majority of districts for K2, unlike the widespread negative growth for K1. The evidence collectively implies that the Kanyashree scheme has been more successful in sustaining student participation at the K2 level, while the real challenge lies in ensuring a steady inflow of fresh entrants into K1.

### **Measuring Effectiveness Beyond Numbers: Retention, Renewal, and Consistency Indices**

Building on this distinction between K1 and K2 trends, it becomes essential to move beyond aggregate growth rates and assess the programme's effectiveness through deeper indicators. Retention, renewal, and consistency indices provide such measures, capturing both temporal sustainability and spatial equity in participation. A key objective of the K1 scholarship is to ensure that girls remain in the education system for an extended period. Accordingly, this section examines patterns of retention, renewal, and dropout among girl students.

**Table 3 District-wise Comparison of K1 Scholarship Retention Index in 2021-22 and 2024-25**

District	Retention Index		District	Retention Index	
	2021-2022	2024-2025		2021-2022	2024-2025
Alipurduar	74.82	70.93	Kalimpong	54.45	57.37
Bankura	80.44	74.92	Kolkata	63.36	55.16
Bardhaman Paschim	62.60	62.52	Malda	54.69	56.71
Bardhaman Purba	74.82	67.71	Murshidabad	65.58	60.76
Birbhum	73.50	62.82	Nadia	80.45	70.11
Coochbehar	74.69	66.87	North 24 parganas	77.05	69.69
Dakshin dinajpur	74.37	64.40	Paschim Medinipur	79.53	68.42
Darjeeling	60.51	60.58	Purba Medinipur	76.00	70.45
Hooghly	80.50	72.09	Purulia	69.19	65.31
Howrah	77.20	73.23	Siliguri	69.66	66.80
Jalpaiguri	71.70	64.66	South 24 parganas	73.40	63.33
Jhargram	78.15	68.84	Uttar dinajpur	64.69	53.35

Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

The table 3 highlights a general decline in retention index across most districts between 2021-22 and 2024-25, indicating challenges in sustaining scholarship continuity over time. While a few districts such as Kalimpong (54.45 to 57.37), Malda (54.69 to 56.71), and Darjeeling (60.51 to 60.58) registered marginal improvements, the majority, including high-performing districts like Nadia (80.45 to 70.11) and Hooghly (80.50 to 72.09), witnessed a noticeable drop. Particularly concerning are the steep declines in districts such as Murshidabad (65.58 to 60.76) and Uttar Dinajpur (64.69 to 53.35), which point to deeper systemic challenges in sustaining scholarship retention over time. This pattern suggests that while the programme initially achieved high levels of retention in many regions, sustaining momentum has become increasingly difficult, pointing to systemic issues in renewal and progression mechanisms.

**Table 4 District-wise K1 Scholarship Dropout Rates in 2021-22 and 2024-25**

District	Dropout		District	Dropout	
	2021-2022	2024-2025		2021-2022	2024-2025
Alipurduar	25.18	29.07	Kalimpong	45.55	42.63
Bankura	19.56	25.08	Kolkata	36.64	44.84
Bardhaman Paschim	37.40	37.48	Malda	45.31	43.29
Bardhaman Purba	25.18	32.29	Murshidabad	34.42	39.24
Birbhum	26.50	37.18	Nadia	19.55	29.89
Coochbehar	25.31	33.13	North 24 parganas	22.95	30.31
Dakshin dinajpur	25.63	35.60	Paschim Medinipur	20.47	31.58
Darjeeling	39.49	39.42	Purba Medinipur	24.00	29.55
Hooghly	19.50	27.91	Purulia	30.81	34.69
Howrah	22.80	26.77	Siliguri	30.34	33.20
Jalpaiguri	28.30	35.34	South 24 parganas	26.60	36.67
Jhargram	21.85	31.16	Uttar dinajpur	35.31	46.65

Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

Based on the retention patterns discussed earlier, the dropout analysis (table 4) provides a complementary perspective on the challenges of sustaining participation in the Kanyashree scheme. While a handful of districts such as Kalimpong, Malda, and Darjeeling show slight improvements, the majority report rising dropout rates, with sharp increases in districts like Nadia, Hooghly, and Paschim Medinipur that were previously strong performers. Particularly concerning are the escalations in Kolkata and Uttar Dinajpur, where dropout has reached critical levels. However, it is important to note that in Kolkata many girls are opting for admission into private institutions rather than government schools, which means that higher dropout figures there may partly reflect shifts in enrolment patterns rather than actual withdrawal from education. In contrast, the steep rise in dropout in Uttar Dinajpur more directly signals exclusion from schooling. Taken together, the decline in retention and the concurrent rise in dropout highlight systemic constraints that

threaten the programme's primary objective of reducing girls' dropout from education.

**Table 5 District-wise K1 Scholarship Renewal Rates in 2020-21 and 2023-24**

District	Renewal Rate		District	Renewal Rate	
	2020-2021	2023-2024		2020-2021	2024-2025
Alipurduar	99.00	100	Kalimpong	71.03	84.58
Bankura	100	100	Kolkata	85.13	82.36
Bardhaman Paschim	83.45	94.30	Malda	74.00	86.15
Bardhaman Purba	97.72	100	Murshidabad	88.10	93.55
Birbhum	98.51	98.76	Nadia	100	100
Coochbehar	99.54	100	North 24 parganas	100	100
Dakshin dinajpur	98.78	100	Paschim Medinipur	100	100
Darjeeling	80.48	89.05	Purba Medinipur	99.56	100
Hooghly	100	100	Purulia	92.56	100
Howrah	99.11	100	Siliguri	90.38	96.89
Jalpaiguri	95.07	99.97	South 24 parganas	98.08	99.19
Jhargram	100	100	Uttar dinajpur	87.02	86.69

Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

The above concerns are further contextualised by the district-wise K1 Renewal Rates presented in Table 5, which reflect the extent to which beneficiaries continue within the scheme. The adoption of a modified Renewal Rate based on a rolling multi-year denominator allows for a more accurate assessment of cohort continuation, and the district-level patterns reveal both consolidation and divergence in outcomes. Several districts, including Bankura, Nadia, North 24 Parganas, Dakshin Dinajpur, Paschim Medinipur, Jhargram, and Hooghly, maintain Renewal Rates consistently at or near 100 per cent, suggesting strong programme stability despite dropout pressures. Others such as Bardhaman Paschim, Darjeeling, Kalimpong, and Malda show substantial improvement over time, pointing to

reduced dropout tendencies and more effective outreach. Murshidabad, Siliguri, Purulia, and South 24 Parganas demonstrate steady consolidation from already high levels. In contrast, Kolkata records a slight decline and Uttar Dinajpur remains stagnant, aligning with the dropout patterns noted earlier and indicating persistent localised challenges. Taken together, the evidence underscores the overall effectiveness of the scheme in moving towards near-universal continuation, while also reinforcing the need for targeted measures in specific districts where dropout and renewal gaps persist.

**Table 6 Temporal Trend in the Retention Index of West Bengal**

Year	Retention Index of K1
2017-18	44.42
2018-19	66.92
2019-20	72.08
2020-21	72.04
2021-22	72.48
2022-23	71.63
2023-24	72.96
2024-25	65.46

Source: [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

These district-level patterns gain further meaning when viewed against the temporal trend in the Retention Index for West Bengal as a whole (Table 6). The trajectory highlights both the achievements and the vulnerabilities of the scheme. Beginning from a relatively modest level of 44.42 in 2017-18, the index shows a sharp rise through 2018-19 and then stabilises in the range of 70 to 73 from 2019-20 onwards, which suggests that the programme was able to achieve a broad consolidation phase after the initial years of implementation. However, the notable dip to 65.46 in 2024-25 signals renewed stress in sustaining participation, and this pattern corresponds with the concurrent rise in dropout rates and the uneven renewal patterns observed across districts.

The calculated temporal consistency index of 0.85 for the period 2017-2025 indicates a relatively high degree of stability in retention over time, although the fluctuations, particularly the recent downturn, show that this stability is not

absolute. Instead, the pattern reflects both consolidation and fragility, since the scheme has successfully established a plateau of sustained participation for several years but remains vulnerable to systemic pressures that can reduce retention. This broader temporal trend resonates with the renewal analysis, as many districts demonstrate consistent continuation while a few mirrors the same vulnerabilities evident in the declining retention levels, underscoring the need for closer policy attention in lagging regions.

Alongside temporal patterns, the spatial dimension also reinforces the overall assessment. The spatial consistency index, which rose from 89.02 in 2021-22 to 91.08 in 2024-25, points to a gradual narrowing of inter-district disparities in retention performance. This improvement, though modest, signals that outcomes are becoming more evenly distributed across the state, with fewer districts significantly lagging behind. Importantly, the simultaneous rise in spatial consistency and fall in the state-level Retention Index highlights a dual reality: while gaps between districts are narrowing, the overall level of retention has weakened. This suggests that stressors affecting the scheme are systemic in nature, cutting across regions, and therefore require broad-based interventions rather than purely localised measures.

## 4 Conclusion

The Kanyashree Prakalpa has undoubtedly played a critical role in reshaping the educational landscape for adolescent girls in West Bengal by delaying early marriage and supporting continued schooling. The programme has achieved notable success in improving renewal and consistency rates, particularly for K2 beneficiaries. However, the persistent decline in fresh K1 enrolments, coupled with rising dropout rates in several districts after the COVID-19 pandemic, signals systemic vulnerabilities that financial incentives alone cannot address. While spatial consistency has improved, indicating reduced inter-district disparities, the overall fall in retention underscores deeper structural constraints, such as administrative inefficiencies, socio-economic pressures, and shifting aspirations toward vocational alternatives. Sustaining the programme's gains therefore requires recalibration by integrating financial transfers with institutional reforms,

ensuring better alignment between education and labour markets, and strengthening community-level engagement. Without such corrective measures, the long-term sustainability and transformative impact of Kanyashree will remain at risk.

To strengthen the impact and long-term sustainability of the Kanyashree Prakalpa, several measures are necessary. First, renewed efforts should be made to boost fresh K1 enrolments through targeted outreach in disadvantaged districts, while also addressing administrative bottlenecks such as delays in admission processes that often discourage continuation. Second, integrating vocational and skill-oriented pathways within Kanyashree Plus can align scholarships with employability and labour market demand, thereby making education more attractive to students. Third, district-specific strategies are required for areas with persistently high dropout rates, supported by digital platforms that simplify access, improve monitoring, and provide timely information to beneficiaries. Fourth, parental and community engagement must be prioritised to counter social pressures like early marriage and reinforce the value of education. Finally, linking the scheme with complementary social protection programmes in health, nutrition, and livelihoods, combined with real-time district-level monitoring and evaluation, can create a more holistic and adaptive framework to ensure that the scheme continues to support adolescent girls effectively.

## Availability of data and materials

The datasets generated and analysed during the current study are openly available at [https://www.wbkanyashree.gov.in/kp\\_dashboard\\_report.php](https://www.wbkanyashree.gov.in/kp_dashboard_report.php)

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## Role of Dairy Farming in Enhancing Farm Income: Experiences from Punjab and Haryana

Vikash Kumar<sup>1</sup> & Abhimanyu Singh Thakur<sup>2</sup>

### **Abstract**

*Despite extensive policy debates in Punjab and Haryana advocating crop diversification away from the wheat-paddy cycle to overcome the limitations of monocropping, tangible success remained elusive. Neither diversification within agriculture nor farm and non-farm activities have helped in increasing farm household's incomes in both the states, with farmer earnings showing signs of both decline and stagnation. Against this backdrop, the adoption of dairy farming emerges as a promising alternative. Drawing upon evidence from a large-scale study conducted by the authors in increasing farmers income in Punjab and Haryana, it was found that dairy farming contributed significantly in increasing farmers income across all categories of farmers in both Punjab and Haryana. In addition, dairy farming helps strengthen the rural economy through allied activities such as fodder cultivation, cooperative marketing, which in turn generate non-farm employment and strengthen local value chains. Thus, the paper examines how dairy farming can be positioned not merely as an income increasing activity but as a pathway toward more sustainable and resilient rural livelihoods in Punjab and Haryana.*

**Keywords:** Dairy Farming, Farm Income, Rural Economy, Agricultural Sustainability

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## 1 Introduction

In Punjab and Haryana, there has been a long-standing debate on the necessity of crop diversification to break the entrenched wheat-paddy monocropping cycle as a means of increasing farmers' income. However, despite sustained policy emphasis and various state-led initiatives, the outcomes of such diversification strategies have been limited, with little measurable success achieved till date. Farmers' incomes in the region continue to show signs of stagnation and, in some cases, decline after adjusting the year-on-year rate of inflation. Furthermore, both farm and non-farm income diversification strategies have thus far failed to generate significant improvements in household earnings.

**Table 1: Gross Area under Rice and Wheat in Punjab (Area in 000 hectare)**

Crops	Punjab		Haryana	
	2014-15	2023-24	2014-15	2023-24
Rice	2820	3179	1206	1778
Wheat	3470	3515	2497	2509

Source: Compiled from various reports of Economic Survey of Punjab and Haryana, 2014-15,2024-25.

**Table 2: Average Monthly Income of Agricultural Households (in Punjab and Haryana)**

States	Income (in Rs.)
Punjab	31433
Haryana	25655
All India	13661

Source: NABARD's All India Rural Financial Inclusion Survey (2021-22)

The table 1 shows that over the past decade, the area under rice and wheat cultivation in both Punjab and Haryana has remained largely unchanged, underscoring the persistence of the wheat-paddy monocropping system.

According to NABARD'S All India Rural Financial Inclusion Survey (2021-22), the average monthly income of agricultural households in Punjab increased from Rs. 18059 in 2012-13 to Rs. 31433 in 2021-22, reflecting an increase of over Rs 13374 per month. Whereas, the average monthly income in Haryana increased from Rs

14434 to Rs 25655 during the same period, an increase of Rs. 11231 (The Hindu Business Line, November 05, 2024).

Despite having one of the highest absolute farm incomes among all states, Punjab's growth rate in farm income is slower than that of some poorer states. Between 2013-14 and 2018-19, farm income in Punjab grew at an average of 6.73 per cent per annum, whereas states like Bihar and Uttarakhand registered much higher rates of 13.3 per cent and 19.3 per cent in the same period. While Punjab's farm incomes have increased in absolute terms, the growth remains moderate as compared to other states. In addition, high levels of indebtedness among farmers continue to reduce the real benefits of increased income (Hindustan Times, October 04, 2021)<sup>3</sup>. These facts point towards a lack of structural change in income levels and cropping patterns despite sustained policy efforts for promoting crop diversification.

Against this backdrop, dairy farming presents itself as a viable and supplementary source to address these persistent challenges. Drawing upon a comprehensive empirical study on "Quest for Increasing Farmers Income: A Study of Agri-Business Potential and Prospects in Punjab and Haryana" sponsored by the Indian Council of Social Science Research (ICSSR), New Delhi, the authors found that the dairy farming contributed positively to household income across all categories of farmers in both the states. The findings suggested that dairy farming not only supplements crop-based revenue but also provides a more stable and regular source of income, thereby mitigating the risks associated with seasonal crop cycles and market fluctuations. Moreover, dairy production strengthens rural economies by stimulating allied sectors such as fodder cultivation, veterinary services and cooperative marketing, creating forward and backward linkages that extend beyond the farm household. Thus, the integration of dairy farming into agricultural livelihoods can be understood as a practical pathway towards income stabilization, risk reduction, and long-term rural resilience in Punjab and Haryana.

There has been a significant growth in the value of output from the livestock sector - the contribution of livestock in total agriculture and allied sector rose from 25.6 per cent in 2011-12 to 31.2 per cent 2021-22 (as per the gross value of output at current prices), (Jose, S., et.al., 2024). During the period from 2012-13

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<sup>3</sup> [Income of farmers growing at slower pace in Punjab | Latest News India - Hindustan Times](#)

to 2021-22, the output value of the livestock sector experienced an average annual growth rate of 5.6 per cent, while the crop sector recorded a growth rate of 2.1 per cent (at constant prices). Further, milk production followed with a growth rate of 5.5 per cent (as shown in the table 1).

**Table 3: Average Growth Rate of Livestock vis-à-vis Crop Sector during 2012-13 to 2021-22**

Sectors	Growth rate (in %)
Crop	2.1
Livestock	5.6
Milk	5.5
Poultry meat	10.1
Egg	6.2

Source: RBI working paper series, 2024. Department of Economic and Policy Research.

Further, the sharp drop in spending on cereals has enabled families to diversify their diets, leading to more spending on milk, fruits, and eggs, fish, and meat. This decline can be linked to various factors such as government food security programs and changing dietary preferences. Changing consumer preferences and rising middle income class have transformed domestic demand for agricultural commodities in India. Moreover, globalisation has facilitated greater access to international markets for Indian farmers. As a result, the demand for dairy products, is rapidly increasing and is expected to grow in the future (Niti Aayog, 2023).

According to the report titled “Changes in India’s Food Consumption and Policy Implications: A Comprehensive Analysis of Household Consumption Expenditure Survey 2022-23 and 2011-12”, it was observed that there was an increase in the proportion of households consuming milk & milk products from 80.1 per cent to 92.2 per cent for rural households and 90.6 per cent to 95.9 per cent for urban households from 2011-12 to 2022-23. However, regional variation was observed in milk and milk products consumption. Northern states like Punjab, Haryana and Uttar Pradesh had significant higher rate of consumption than that of states like Chhattisgarh and Odisha.

## 1.1 Global Milk Demand

In 2023, global milk production increased by 2.2 per cent, nearing the ten-year average growth rate (2012-2022). This positive outcome signifies a recovery following the sluggish milk production growth observed in 2022.

However, world trade in dairy products continued to decline, primarily due to stronger local production in several regions and reduced demand for key importing countries (IFCN Dairy Report, 2024). Farm profitability in 2023 remained average, primarily due to reduction in input costs. The global milk price also experienced a decline, falling by 25 per cent with an average of 39.8 USD per 100 kg of milk for the year.

India remained the largest producer of milk in 2023, with a growth rate of 5 per cent, returning to its ten-year growth rate of 5.2 percent. In contrast the EU-27, if considered as single entity, would rank second, but milk production in the region stagnated, primarily due to stringent environmental regulations and high input costs faced by farmers. The United States saw a modest increase of only 0.9 per cent influenced by weather challenges and a reduced herd size. New Zealand experienced a 1.7 per cent rise in milk production, largely attributed to a base-year effect following poor output in 2022. Meanwhile, Latin America experienced a more modest growth of 0.8 per cent driven by unfavourable weather events, currency devaluation, and rising input costs.

Further if we look at global dairy demand which had been weak throughout 2022, despite regional variations. In 2023, however, demand rebounded primarily driven by higher per capita consumption, increased availability of dairy products, and a moderate recovery in milk production. Similar to the growth in milk production, global dairy demand increased by 2.4 per cent in 2023. A closer analysis revealed that milk demand rose by 0.9 per cent due to population growth and by 1.4 per cent as a result of increased per capita consumption.

Most of the uncertainties surrounding demand in 2023 were driven by an unstable macroeconomic environment and high inflation rates, which negatively affected consumer purchasing power. Per capita consumption was particularly impacted by high inflation in regions such as Southeast Asia, Africa and Latin America. While global exports declined in 2023, with the EU reducing its exports by 23 per cent, major importers also scaled back their purchases, contributing to down ward

pressure on prices. China the leading importer, focused on increasing domestic production, converting surplus milk into powder and reducing its import volumes. As global population and income levels rise, dairy consumption is expected to increase worldwide. Projections indicate that by 2031, per capita milk consumption (measured in milk equivalent) will experience the highest growth in low-middle-income countries, with an annual increase of 2 per cent (equivalent to 21.2 kg). In low-income countries, per capita consumption is anticipated to grow at a rate of 1.5 per cent annually (5.4 kg). In contrast, high-income countries are expected to see a slower rate of growth, with per capita consumption increasing by only 0.4 per cent per year (2.9 kg) by 2031.

In low-middle-income countries, fresh dairy products account for approximately two-thirds of the average per capita dairy consumption (in terms of milk solids). In contrast, consumers in high-income countries typically consume a greater proportion of processed dairy products. Overall, for countries across all income levels, per capita dairy consumption is projected to grow at an annual rate of 0.8 per cent, reaching 15.7 kg (milk solids equivalent, excluding the water content of milk or dairy products) by 2032 (MOFPI, 2024).

## 1.2 Milk Production in India

India remains the leading global producer of milk. Globally, India is ranked 1<sup>st</sup> in milk production i.e. 25 per cent of world production of milk followed by USA. The milk production for the years 2021-22 and 2022-23 were recorded at 222.07 million tonnes and 230.58 million tonnes, respectively, indicating an annual growth rate of 3.83 per cent. In the year 2022-23, the per capita availability of milk was 459 grams per day. During 2023-24 total milk production in the country reached 239.30 million tonnes and recorded an annual growth rate of 3.78 per cent. The per capita availability of milk was 471 grams per day (BAHS, 2023-24). The major role in increasing milk production in India was played by the National Dairy Development Board (NDDB). It was founded in 1965 with the objective of leading the development of India's dairy industry. Under the guidance of Dr. Verghese Kurien, often referred as the Father of the White Revolution, NDDB launched Operation Flood in 1970, which became the largest dairy development initiative globally.

Operation Flood aimed to establish a network of village level dairy cooperatives societies connected to district level unions and state level federations.

The implementation of Operation Flood, which occurred in three phases from 1970 to 1996, significantly enhanced the network of dairy cooperatives and facilitated the growth of organised private dairies. This combined with government initiatives aimed at boosting milk production has resulted in an increase in milk production from 127 million metric tonnes (MMTs) in 2011-12 to 231 MMTs in 2022-23. Consequently, the per capita milk availability of milk has risen from 281 grams per day to 459 grams per day. Further it has reached 471 gram per day in 2023-24. In terms of contribution to total milk production, cows account for 52 per cent, followed by buffaloes 45 per cent and goats for the remaining 3 per cent.

**Table 4: Milk Production with Annual Growth Rate (%) from 2011-12 to 2022-23 (All India)**

Year	Milk Production (in million tonnes)	Annual Growth Rate (%)
2011-12	127.90	5.01
2012-13	132.43	3.54
2013-14	137.69	3.97
2014-15	146.31	6.27
2015-16	155.49	6.27
2016-17	165.40	6.38
2017-18	176.35	6.62
2018-19	187.75	6.47
2019-20	198.44	5.69
2020-21	209.96	5.81
2021-22	222.07	5.77
2022-23	230.58	3.83
2023-24	239.30	3.78

Source: Annual Report 2023-2024. Department of Animal Husbandry and Dairying. Ministry of Fisheries, Animal Husbandry and Dairying. Government of India.

**Table 5: Indian Milk Production in Relation to World's Milk Production**

Parameters	Year 2021-22	Year 2022-23	% Growth
India milk production (MMT)	222.07	230.58	3.83
World's milk production (MMT)	951.60	965.47	1.4

Source: FAO Market Review Report, 2023.

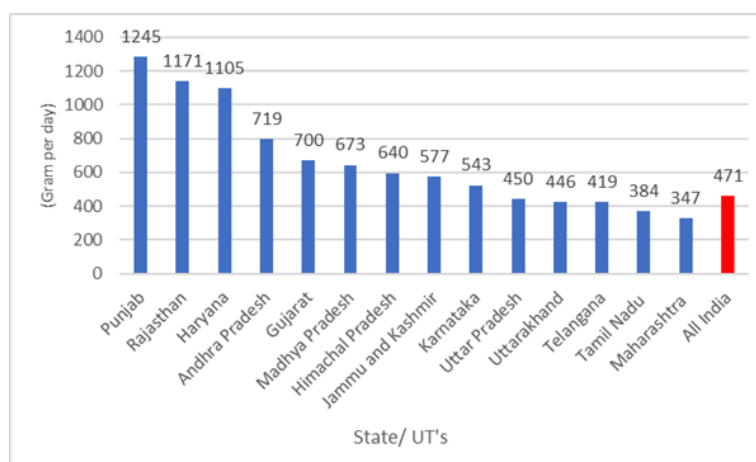
**Table 6: Per capita Availability of milk in India**

Year	Per capita Availability
2009-10	273
2010-11	281
2011-12	290
2012-13	299
2013-14	307
2014-15	319
2015-16	333
2016-17	351
2017-18	370
2018-19	390
2019-20	406
2020-21	427
2021-22	446
2022-23	459
2023-24	471

Source: Annual Report 2023-2024. Department of Animal Husbandry and Dairying. Ministry of Fisheries, Animal Husbandry and Dairying and Basic Animal Husbandry Statistics Government of India

In 2022-23 India’s per capita milk availability reached a daily average of 459 grams, surpassing the global average, which was around 323 grams per day in 2022 (FAO, 2023). Further it has reached 471 grams per day in 2023-24.

**Figure 1: State-wise Per Capita Availability of Milk for the year 2023-24**



Source: Basic Animal Husbandry Statistics, 2024. Department of Animal Husbandry and Dairying. Government of India.

As seen from the above figure, nine states demonstrate per capita milk availability that surpasses the national average, with Punjab (1245) showing the highest level of per capita milk availability followed by Rajasthan (1171) and Haryana (1105). According to the latest NSSO report on Income, Expenditure, Productive Assets, and Debt of Agricultural Households in India (2012-13), Punjab recorded the second-highest average monthly income of Rs. 5,303 from animal farming, following only Haryana (Rs. 6,089). The primary source of income generation was milk production, contributing 91.6 per cent to the total average monthly earnings from animal farming (Economic Census of Punjab 2023-2024). According to the 20th Livestock Census-2019, Punjab accounts for 1.3 per cent of India's overall livestock population. The majority share within the total livestock population was held by buffaloes at 57.4 per cent, followed by cross-breed cattle and indigenous cattle. In the year 2020-21, Punjab emerged as the region with the greatest per capita milk availability in the nation, reaching an impressive amount of 1271 grams per day.

**Table 7: Per capita availability of milk from 2019-20 to 2023-24 in Punjab and Haryana (in Gram/day)**

State	2019-20	2020-21	2021-22	2022-23	2023-24
Punjab	1221	1219	1271	1283	1245
Haryana	1118	1063	1081	1098	1105
All India	406	427	446	459	471

Source: Department of Animal Husbandry and dairying. Government of India.

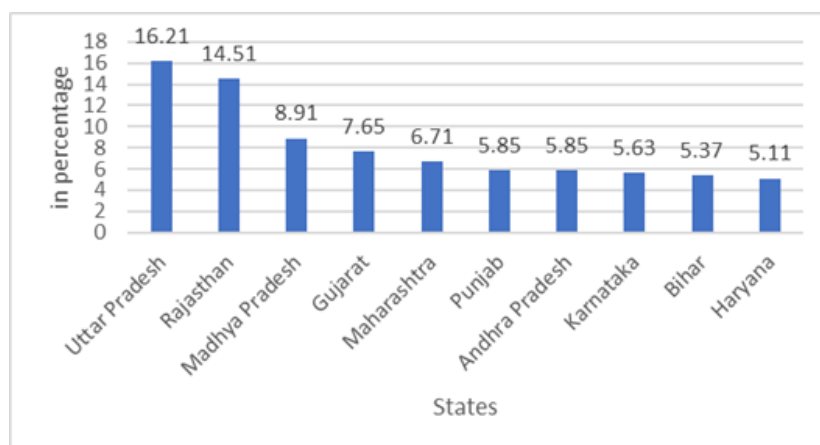
The Per capita availability of milk in Punjab and Haryana has showed an upward trend from 2019-20 to 2023-24, with both states consistently reporting levels that surpass the national average during the same period.

### 1.3 State wise Share of Milk Production 2023-24

Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat and Maharashtra are the leading states in percentage share of milk production for the year 2023-24 they together contribute 53.99 per cent of total milk production in India (Basic Animal Husbandry Statistics, 2024) followed by Punjab, Andhra Pradesh, Karnataka, Bihar, Haryana. Punjab, contributing 5.85 percent, and Haryana, with a share of 5.11

percent, rank among the top ten states in India for milk production for the year 2023-24 (as shown in figure below).

**Figure 2: Percentage share of milk production of 10 major milk producing states (2023-24)**



Source: Basic Animal Husbandry Statistics, 2024. Department of Animal Husbandry and Dairying. Government of India.

#### 1.4 Dairy Exports

India has established itself as a top producer of high-quality milk, meat and eggs. These exports include milk and milk products as India is the largest producer of milk in the world (FAO Statistics,2023), buffalo meat, poultry products, animal casings, and sheep/goat meat.

**Table 8: Exports of Animal Products in 2023-24**

Particulars	Export FY 24 (USD Mil)
Buffalo meat	3740.53
Sheep/Goat meat	77.68
Other meat	0.82
Poultry products	184.58
Dairy products	272.64
Animal casing	48.12
Processed meat	2.48
Casein	18.22
Albumin (Eggs and Milk)	20.93
Natural honey	177.52

Source: APEDA, 2023-24.

Against the above background, this paper tries to assess the socio-economic status of farmers involved in dairy farming in Punjab and Haryana, as also to identify specific possibilities of integrating agriculture and allied sectors especially in the dairy sector. The study also attempted to analyse challenges faced by farmers and other stakeholders in adopting dairy farming in the selected states of Punjab and Haryana.

It is important to mention here that this paper is an abridged version of the original study and only specific data are presented here.

## **2 Framework, Scope, Sample selection and Methods of Data**

### **Collection**

This study has used both primary as well as secondary data. An extensive field survey was undertaken in the states of Punjab and Haryana.

Two districts from each state (Punjab and Haryana) were selected based on the highest cattle population a per Livestock Census of 2019. To ensure a wide representation, 100 respondents of different farm holdings in the dairy sector from each selected state were interviewed- 50 each from two districts of Punjab and 50 each from two district of Haryana. Making a total of 200 respondents overall.

For the primary data collection from the field, a total of 200 dairy farmers were selected as sample respondents for the study, with an equal distribution of 100 farmers from each of the states of Punjab and Haryana. Within Punjab, 50 farmers each were selected from Ludhiana and Sangrur districts. While in Haryana, the sample comprised 50 farmers each from Hisar and Jind districts. Fieldwork was conducted for collecting primary data for dairy farming across 35 villages in Punjab and Haryana. This diverse village-level representation ensured a comprehensive understanding of dairy farming practices across varying regional and agro-economic contexts, especially agro-business and its potential, prospects and challenges.

## **3 Socio-Economic Profile of the Respondents**

The study shows that dairy farming in Punjab and Haryana was mainly practiced by farmers from the General category, with comparatively lower participation from the Scheduled caste and Other Backward Class (OBC). This disparity reflected broader socio-economic patterns including access to resources, land ownership,

and institutional support which tend to be more favourable for the general category.

**Educational Status:** A large portion of dairy farmers in both the states possess at least a moderate level of formal education, which may positively influence their ability to adopt improved dairy management practices, take benefits of government schemes, and engage with extension service. However, the relatively low percentage of graduates and post graduates indicates a need for targeted training and capacity building programmes to improve knowledge and productivity in the sector.

**Occupational Status:** The rural economy in the study area remains heavily dependent on agriculture as the principal source of livelihood. The relatively low representation in the formal employment sectors highlights limited diversification of income sources.

**Land Ownership:** The study found that the majority of farmers in both Haryana and Punjab were cultivating their own land. It was found that farmers across both Haryana and Punjab were engaged in the cultivation of staple crops such as rice, wheat and cotton. In Haryana a small number of farmers also reported cultivating millets, although this practice was limited. In addition to these staple crops many farmers also cultivated vegetables, indicating a growing interest in horticultural produce. Furthermore, the cultivation of fodder crops was reported by many farmers, reflecting the importance of livestock rearing. Promoting mixed farming systems that combine crop production with livestock and horticulture can help in overall farm productivity, improve income stability, and can contribute to more sustainable and resilient agricultural practices in the region.

**Land Holding Pattern:** Overall, 25 per cent of farmers were categorised as small, and an equal proportion (25 per cent) as semi-medium. Marginal farmers made up 24 per cent of the total, while large farmers accounted for 6 per cent, and medium farmers constituted 5 per cent. These figures highlight a dominance of small and semi-medium landholders in both Haryana and Punjab, reflecting the broader trend of land fragmentation in Indian agriculture. The relatively lower presence of large landholders underscores the structural limitations faced by many farmers in terms of land access, which has direct implications for productivity, mechanization, and income levels.

Land Taken on Rent/Lease: Among farmers cultivating land taken on rent or lease, the majority belonged to the marginal category, comprising a combined total of 16 per cent equally divided between Haryana (8 per cent) and Punjab (8 per cent). In contrast, a very small proportion of farmers fell into the small and large categories, each representing only 1 per cent, and both reported in Haryana. Notably, no small or large category farmers were found leasing land in Punjab.

### 3.1 Annual Income of farmers from agriculture

Out of the total 200 farmers interviewed, only 8 farmers (4 per cent) reported earning income from non-farm activities. Among them 2 per cent had an annual income of less than Rs 2 lakh, while the other 2 per cent earned between Rs 5 lakh and Rs 8 lakh. The type of non-farm activities reported included government jobs, private jobs, shopkeeping and driving.

**Table 9: Annual Income of farmers from agriculture**

Annual Income (Agriculture)	Respondents	Percent
Less than 2 lakhs	42	21.0
2-5 lakhs	54	27.0
5-8 lakhs	42	21.0
8-12 lakhs	30	15.0
More than 12 lakhs	24	12.0
Total	192	96.0

The above figure indicate that a majority of dairy farmers earned moderate income from agriculture. Around 21 per cent earned less than a Rs 2 lakh. Therefore, including dairy activities in supplementing household income becomes important especially for marginal and small farmers, as including dairy farming provides a regular and relatively stable source of income, helps reduce dependence on seasonal crops and ensures better livelihood security throughout the year.

Dairy farming remains a traditional livelihood activity, often passed down within families, reinforcing its cultural and economic importance in rural communities. In contrast only 15 per cent of the respondents had independently established their farms, reflecting a smaller but notable segment of first-generation dairy entrepreneurs. These farmers may represent individuals driven by factors such as

diversification of income sources, growing demand for dairy products, or government incentives promoting livestock-based livelihoods.

Dairy farming in the study area practiced on limited landholdings, often integrated within existing agricultural plots or homestead areas. The relatively low land allocation may reflect spatial constraints, prioritisation of land for crop cultivation, or the adaptability of dairy activities to compact spaces because as indicated above majority of the respondents were small farmers. This trend of small-scale land use underscores the importance of efficient resource management and infrastructure planning in sustaining dairy operations within limited spatial environment.

### **3.2 Nature of occupation**

The data of the occupational nature of dairy farming among farmers showed that 88 per cent of the farmers considered dairy farming as an ancillary or supplementary occupation, while only 12 per cent identified as their primary occupation. This suggests that for the majority of farmers, dairy farming functions as a secondary or additional source of income, likely integrated alongside crop cultivation or other livelihood activities. This was also found in another study (Singh and Datta, 2010) which has noted that dairy farming in rural India often complements primary agricultural activities contributing to income diversification and risk mitigation.

### **3.3 Value Addition**

The study found that a majority of dairy farmers 91 per cent did not engage in the production of value-added dairy products such as ghee, curd and paneer. These farmers reported that they exclusively sold milk, indicating a limited diversification of dairy related activities. In contrast, only 9 per cent of the farmers reported producing value-added products, primarily ghee and paneer, either for household use or for local market sale.

This trend highlights a predominant focus on primary milk production, with minimal participation in post-production processing. Similar patterns have been observed in earlier studies, where small scale dairy farmers often lack the necessary infrastructure, knowledge, or access to markets to engage in value

addition (Birtal et al., 2006; Kumar et al., 2011). The limited involvement in value-addition production may also be linked to storage constraints, perishability, and fluctuating market demand (Chatterjee and Ghosh, 2018). However, those engaging in value-addition may benefit from higher margins and better price realisation, pointing to potential opportunities for improving and supplementing farm income.

### **3.4 Marketing of Dairy Products**

The study found that the majority of farmers i.e. 98 per cent sold their milk and value-added-products in the local market indicating a strong dependence on informal channels. Only 1 per cent of the farmers reported selling their produce to wholesale buyers, while another 1 per cent engaged in dual channels, selling both in local markets and directly to consumers through offline methods such as door-to-door delivery or community-based sales.

Regarding milk pricing, 7 per cent of the farmers reported selling their milk at a rate between Rs. 40-50 per litre, 40 per cent sold it between Rs. 50-60 per litre, and the majority 53 per cent reported selling it at Rs. 60-70 per litre. This variation in price reflects differences in milk quality, fat content, and location specific demand, consistent with previous research on dairy marketing in India (Patel et al., 2015). The selling of milk in the local market may be attributed to lower transportation cost, immediate cash returns, although it suggests limited integration into more formal and more profitable value chains.

### **3.5 Dairy By-Products**

All the farmers interviewed across Punjab and Haryana reported that livestock dung was a key by-product of their dairy farming activities. In terms of utilisation, farmers reported using dung for making dung cakes (traditionally used as cooking fuel) and also used it as organic fertilizer for their agricultural fields. Moreover, beyond subsistence, a number of farmers reported economic gains from selling dung, indicating its potential as an economic by product. The sale way typically done on trolley-load basis, with farmers stating that one trolley of dung fetched between Rs. 1000-1200. Further, studies have shown that in addition to contributing soil fertility and energy needs, dung also holds market value,

especially in areas where organic farming practices are expanding (Singh et al., 2013). The commercialisation of dung reflects the growing awareness among farmers of resource recycling and income diversification within an integrated farming system.

**Herd Size and Annual Feed Cost:** The analysis of herd size in relation to feed expenditure offers important insights into the economics of dairy farming, especially regarding scale of operation and input intensity. Feed cost is a direct function of herd size, but variations also emerge based on management practices, access to fodder resources, and market dependency for feed procurement.

### 3.6 The Labour Dynamics

Out of a total 200 farmers surveyed, 190 farmers reported involving family members as primary source of labour in dairy farming activities. Among these 91 per cent relied on 1-2 family members, while 4 per cent reported employing 2-4 family members as labourers.

The estimated annual economic contribution of family labour ranged between Rs. 1-2 lakh for 82 per cent of the farmer, and Rs. 2-4 lakh for 13 per cent, highlighting the important yet often undervalued role of unpaid or semi-paid family labour in sustaining rural livelihood.

**Table 10: Economic value of family members (labour)**

Economic value	Frequency	Percent
1-2 lakh	164	82.0
2-4 lakh	26	13.0
Total	190	95.0

The labour costs appear to be influenced by regional economic structures and the availability of alternative livelihood options. Areas with better infrastructure and market connectivity often show higher labour rates due to increased opportunity cost (Chand et al., 2019).

Out of the total farmers interviewed, 35 per cent reported employing hired labour (along with self and family members) for dairy operations. Among these farmers, 16 per cent incurred an annual labour cost of less than Rs. 2 lakhs, while 10 per

cent spent between Rs. 2-4 lakhs, and 9 per cent reported labour expenses in the range of Rs. 4-6 lakhs per annum.

**Table 11: Labour cost per annum**

	Frequency	Percent
Less than 2 lakhs	32	16.0
2-4 lakh	20	10.0
4-6 lakh	18	9.0
Total	70	35.0

In addition to family labour, a number of farmers interviewed also employed hired labour to manage their dairy operations. Specifically, 16 per cent of the farmers reported employing 1-2 hired labourers, while 3 per cent has 2-4 hired labourers. The annual expenditure ranged from Rs. 1-2 lakh for 17 per cent of the farmers, and Rs. 2-4 lakh for 2 per cent, indicating a relatively limited yet economically significant reliance on external labour sources. The average monthly labour costs reported remained consistent with earlier district level findings.

This indicates that the majority of dairy farmers either self-manage operations or through family labour or opt for minimal external labour due to financial constraints. The relatively low proportion of farmers incurring higher labour costs also reflects the small and medium scale of most dairy enterprises in the region.

The heavy dependence on family labour serves as a cost saving mechanism but also reflects broader socio-cultural dynamics, including gender based and generational roles within rural households. It was also found in the study of (Kaur and Sharma,2020) that smallholder dairy farms in India heavily depend on intra-household labour, often without formal remuneration.

### **3.7 Transport Cost**

Nearly, 79 farmers reported to have incurred transport costs at some or the other in dairy activities. Among them, 25 per cent incurred transport expenses exceeding Rs. 8,000 annually. Additionally, 7 per cent of the farmers reported costs between Rs. 4,000-6,000, while 6 per cent spent between Rs. 6,000-8,000. A very small fraction, only 0.6 per cent, had transport expenses below Rs. 4,000. These figures suggest that transportation is a significant operational cost for a majority of dairy

farmers, potentially influenced by factors such as distance to markets, frequency of deliveries, and the lack of cooperative or government-supported logistics infrastructure.

### **3.8 Medical expenses**

Among the total farmers interviewed, 98 per cent reported incurring medical expenses related to dairy farming. Of these, 48 per cent spent less than Rs. 10,000 annually on animal healthcare. This was followed by 24 per cent who incurred costs between Rs. 10,000-15,000, while 7 per cent and 5 per cent reported expenses in the range of Rs. 15,000-20,000 and Rs. 20,000-25,000 respectively. Notably, 14 per cent of the farmers spent more than Rs. 25,000 on medical treatments.

These expenditures were primarily attributed to common livestock diseases such as Foot and Mouth Disease (locally known as Mukhor) and Mastitis. The high prevalence of such illnesses underscores the need for improved veterinary services and preventive health measures in the dairy sector. In the year 2023-24 livestock sector in Punjab faced negative growth of 5.42 per cent, mainly due to diseases like Foot and Mouth and Lumpy Skin disease, which affected milk yield in cattle and buffaloes (Economic Survey of Punjab, 2024-25).

The Animal Husbandry and Dairying Department of Haryana provides prophylactic vaccination to the livestock that is free of cost at the doorstep of the livestock owner. It covers vaccination to diseases such as Foot and Mouth (FMD), which was found to be most prevalent in our study. Other vaccination to diseases includes Haemorrhagic Septicemia (HS), Swine fever etc (Economic Survey of Haryana, 2024-25).

### **3.9 Annual Income and Profitability in Dairy Farming**

After calculating various types of input costs, the annual income was calculated based on the actual price realisations by the dairy farmers in both the states.

**Table 12: Annual Income from dairy farming**

		Respondents	Percent
Annual Income	Less than 5 lakhs	104	52.0
	5 lakh - 10 lakh	56	28.0
	10 lakh - 15 lakh	30	15.0
	15 lakh - 20 lakh	6	3.0
	More than 20 lakhs	4	2.0
	Total	200	100.0

The relationship between herd size and annual income reveals important patterns in dairy farming livelihoods. Based on the data collected, income levels generally increase with the number of lactating animals, although variations exist due to multiple influencing factors.

**Table: Annual Income according to herd size (Lactating Animals)**

		Annual income					Total
		less than 5 lakhs	5 lakh - 10 lakh	10 lakh - 15 lakh	15 lakh - 20 lakh	More than 20 lakhs	
Number of mature animals (lactating)	1-5	118(59.0)	20(10.0)	0	0	0	138(69.0)
	5-10	4(2.0)	20(10.0)	16(8.0)	4(2.0)	2(1.0)	46(23.0)
	10-15	2(1.0)	0	4(2.0)	0	0	6(3.0)
	15-20	0	0	0	0	2(1.0)	2(1.0)
	More than 20	0	0	4(2.0)	4(2.0)	0	8(4.0)
Total		124(62)	40(20)	24(12)	8(4)	4(2)	200(100.0)

Note: Figures in ( ) parentheses illustrate percentage

Overall, across all herd sizes:

- 62 per cent earned less than Rs 5 lakh,
- 20 per cent earned Rs 5-10 lakh,
- 12 per cent earned Rs 10-15 lakh,
- 4 per cent earned Rs 15-20 lakh, and
- 2 per cent earned more than Rs 20 lakh annually.

According to the study by Birthal and Jha (2005) also highlights that herd size is a significant determinant of dairy farm profitability. Larger herds typically allow for

economies of scale, better use of fixed assets, and higher total milk production. However, income disparities within similar herd sizes may be influenced by breed quality, feeding regimes, veterinary care, disease occurrence, and geographical market access (Chatterjee et al., 2016).

The variation in income levels can be attributed to multiple factors, including the herd size, number of lactating (milking) animals, breed quality, access to markets, availability of veterinary services, and overall farm management practices. These elements significantly influence productivity, milk yield, and ultimately profitability.

## **4 Issues and Challenges Faced by Farmers in Dairy Sector**

Around 99 per cent of the farmers interviewed reported encountering various challenges in dairy farming, including low productivity, inadequate access to veterinary medicines and vaccines, deficiencies in storage and packaging infrastructure, as well as financial constraints, and difficulties related to marketing and transportation. These multifaceted issues highlight the structural and logistical barriers that continue to affect the efficiency and profitability of small and medium-scale dairy enterprise.

### **4.1 Productivity Issues**

In relation to productivity challenges in dairy farming, the high cost of feed emerged as a universally reported issue. However, many respondents also highlighted additional overlapping constraints, indicating the complex interplay of economic, environmental, and operational challenges impacting dairy productivity. These included a combination of high feed cost and non-availability of labour, high feed cost coupled with high production costs, high feed cost, climate change, labour scarcity, and high labour wages, high feed cost, frequent disease outbreaks, and climate variability as core productivity barriers, of high feed and production costs, disease occurrence, climate-related changes, and labour-related difficulties

### **4.2 Issues of Medication and Vaccination**

With regard to bovine health, medicine and vaccine-related challenges, majority of the farmers mentioned issues affecting livestock health management. The existing literature supports these observations, noting that access to affordable

and effective animal health services is a cornerstone of successful dairy operations, especially for smallholder farmers (Kumar, Dey, and Singh, 2018). Strengthening the veterinary supply chain, ensuring regulatory oversight for quality control, and providing subsidised healthcare inputs could significantly improve the health and productivity of dairy animals. In Punjab, a multi-speciality Veterinary Hospital and Regional Research Centre are being established in Fazilka district, which is aimed at providing specialized veterinary care of animals in the region. In fiscal year 2023-24 Rs 4.28 crore budget had been allocated and the the projected will be completed in 2026-27 (Economic Survey of Punjab, 2024-25).

#### **4.3 Issues of Storage and packaging**

In relation to storage and packaging challenges in dairy farming, majority of the farmers 198 (99 per cent), reported infrastructure and logistical barriers that hindered efficient milk handling and distribution. Majority of the farmers cited the lack of adequate storage facilities at milk collection points as a key issue. While other farmers reported a combination of inadequate storage and long distances to the collection centres as problematic, high cost of packaging materials as a burden, and the perishable nature of milk as a core concern, especially in the absence of timely processing or refrigeration.

#### **4.4 Financial Challenges Faced by Farmers**

Farmers reported a combination of high initial investment requirements, non-availability of institutional credit, and the absence of government subsidies as the major financial hurdles, high capital costs as the sole barrier, high initial investment, unavailability of formal loans, lack of subsidies, and the exploitative interest rates charged by informal moneylenders, the absence of government subsidies as a key impediment, high capital requirements, inadequate working capital, loan unavailability, delays in loan sanctioning by banks, and lack of subsidy support, delays in bank procedures and working capital shortages, dual burden of high investment needs and limited state assistance.

These findings align with existing literature on agricultural financing in India. Scholars such as (Chand et al., 2011) and (Mahajan and Ramola, 2015) have emphasised that inadequate access to formal credit, combined with high input

costs, limits farmers' ability to invest in productive technologies or diversify into high-value agriculture. Furthermore, the dependency on informal credit sources, which often come with exorbitant interest rates, exacerbates the financial burden (Basu and Srivastava, 2005). The lack of timely and accessible credit from formal banking institutions not only delays crucial investments in seeds, fertilizers, and machinery but also pushes many small and marginal farmers into cycles of debt (RBI, 2020). Moreover, studies have consistently pointed out the ineffectiveness or inaccessibility of subsidy schemes, especially for farmers with limited landholding or weak institutional linkages.

The cumulative evidence from this study and the literature underscores the urgent need for structural reforms in agricultural credit delivery systems, enhanced transparency in loan processing, and broader outreach of subsidy and support programmes, especially for resource-poor and first-generation farmers.

#### **4.5 Marketing and Transportation Issues**

The data highlights that a wide range of marketing and transportation challenges are experienced by the surveyed dairy farmers, with 99 per cent of respondents indicating at least one or in combination of marketing-related difficulty.

The most frequently reported challenge was a combination of low market price, price fluctuations, non-availability of buyers, lack of proper marketing channels, and inadequate government support. Other challenges included low market price, price volatility, non-availability of buyers, lack of certification (e.g., quality grading or safety standards), poor marketing infrastructure, absence of government support, and high diesel costs when using personal vehicles for milk transportation. The inclusion of transportation cost, specifically diesel prices, illustrates how logistical expenses can erode profit margins, especially for smallholder dairy producers who must transport milk daily and rely on self-transport due to limited cooperative or private chilling infrastructure.

According to Birthal et al. (2007), dairy markets in India are often fragmented, with producers heavily dependent on local collectors or informal vendors due to poor access to formal cooperatives or milk federations. Moreover, price discovery mechanisms remain weak, and contract-based dairy farming is still limited, leaving small and marginal dairy farmers particularly vulnerable to market fluctuations

and delayed payments (Chand, 2012). The lack of formal certification systems for milk quality also restricts farmers from accessing premium markets or higher-value urban consumers.

## 5 Specific Recommendations

- The dairy farming in Punjab and Haryana was mainly practiced by farmers from the General category, with comparatively lower participation from the Scheduled caste and Other Backward Class (OBC). This disparity reflected broader socio-economic patterns including access to resources, land ownership, and institutional support which tend to be more favourable for the general category.
- The study found that a majority of dairy farmers did not engage in the production of value-added dairy products such as ghee, curd and paneer. These farmers reported that they exclusively sold milk, indicating a limited diversification of dairy related activities. This trend highlights a predominant focus on primary milk production, with minimal participation in post-production processing.
- Transportation was found to be an important operational cost for a majority of dairy farmers, potentially influenced by factors such as distance to markets, frequency of deliveries, and the lack of cooperative or government-supported logistics infrastructure.
- In the study it was found that only a small number of dairy farmers in both the states had have availed any government scheme which showed low participation in formal institution support mechanisms. The low uptake of government schemes underscores a persistent gap in policy outreach, awareness and accessibility for marginal and small holder dairy farmers. This highlights the need for targeted awareness campaigns and stronger local institutional support to ensure that the intended benefits of dairy schemes reach the grassroot level. Further it was found that no farmer from Haryana districts of Jind and Hisar reported having availed any government scheme related to dairy.
- Farmers in Punjab had expressed that government schemes often do not reach them. Many farmers mentioned that officials rarely visit villages to

inform them about available schemes, and even when they do find out, the application process is complicated and time consuming. Farmers suggested that if the government wants its schemes to benefit them, there should be awareness programmes at the village level to ensure they can access these opportunities.

- Participation in formal training, workshops, fairs, or awareness programmes related to dairy entrepreneurship was notably low among the farmers interviewed. The limited participation in training activities highlights a critical gap in knowledge dissemination and skill development within the dairy sector. Training programmes play a crucial role in improving farm management practices, herd health, feed efficiency, and overall profitability. The data suggest an urgent need to enhance outreach strategies, particularly targeting small and marginal farmers who may lack access to extension services or are unaware of available training opportunities (the above findings were also found in Singh, Devi, and Yadav, 2021; Kaur and Sharma, 2020).
- In relation to the issue of storage and packaging in dairy farming, majority of the farmers reported infrastructure and logistical barriers that hindered efficient milk handling and distribution. These findings indicate that many dairy farmers face critical gaps in post-harvest infrastructure, particularly cold chain facilities and storage access, which are essential for preserving milk quality and reducing spoilage. The perishable nature of milk necessitates efficient cold storage and timely transportation, and deficiencies in these areas often result in economic losses and discourage small-scale producers from expanding operations. Investing in village-level milk chilling units, cooperative storage infrastructure, and affordable packaging solutions could alleviate these challenges and support higher farmer incomes through reduced spoilage and improved product quality.
- The study found that the majority of farmers sold their milk and value-added-products (limited to ghee and cottage cheese i.e. paneer) in the local market indicating dependence on informal channels. The selling of milk in the local market may be attributed to lower transportation cost,

immediate cash returns, although it suggests limited integration into more formal and more profitable value chains.

- The majority of the farmers also mentioned that the big dairy companies like Verka and Vita often provide low prices for milk, due to which farmers receive minimal payment for their produce, while companies enjoy the majority of the profits. Further, many farmers also mentioned that timely payment is not also being done by the companies, they receive payment after 10-12 days. In Punjab few farmers reported that collection centres offer an incentive of Rs.50 per quintal if they deliver over 1 quintal of milk, but will not accept milk if it is less than 1 quintal. In such cases farmers are forced to sell their milk locally at lower prices. This issue, however, was not prevalent in Haryana.
- All the farmers interviewed across Punjab and Haryana reported that livestock dung was a key by-product of their dairy farming activities. Moreover, beyond subsistence, a number of farmers reported economic gains from selling dung, indicating its potential as an economic by-product.
- In relation to productivity challenges in dairy farming, the high cost of feed emerged as a universally reported issue, with 100 per cent of farmers in both the states identifying it as a major factor affecting their dairy operations.
- The majority of the farmers mentioned medicine and vaccine related challenges affecting livestock health management. Strengthening the veterinary supply chain, ensuring regulatory oversight for quality control, and providing subsidised healthcare inputs could significantly improve the health and productivity of dairy animals. In Punjab, a multi-speciality Veterinary Hospital and Regional Research Centre is being established in Fazilka district, which is aimed at providing specialized veterinary care of animals in the region. In fiscal year 2023-24 Rs 4.28 crore budget had been allocated and the project will be completed in 2026-27 (Economic Survey of Punjab, 2024-25).
- The majority of the respondents mentioned that training should happen regularly and should happen at village level. As they had to travel long distances for training which made it difficult for them.

## 6 Conclusion

The study found that in Punjab and Haryana, dairy farming proved beneficial across all categories of farmers, providing not only agricultural value but also a reliable means of supplementing farm income. The results of the study further highlight considerable untapped potential for value addition in the dairy sector, as the majority of farmers interviewed were engaged primarily in milk sales yet were able to generate profit. However, only a very small proportion of farmers were involved in value addition activities, highlighting the significant scope for diversification into processed dairy products. At the same time, the sector continues to face multiple challenges, such as productivity, financial, marketing and transportation, issues related to medicines and vaccines. Addressing these challenges through policy support, capacity building and institutional strengthening could help improve the viability of dairy farming. Despite these challenges, dairy farming emerged as a highly advantageous enterprise, offering considerable scope for increasing farmers' incomes in both the states. When integrated with traditional agriculture, dairy farming serves as an important and stable source of income for farmers, and the findings suggests that there exists a substantial untapped potential for further expansion and income augmentation in both states.

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## Unfolding India's Development Partnership In The Mekong Subregion: A Comprehensive Overview

Khath Bunthorn<sup>1</sup> & Ngin Chanrith<sup>2</sup>

### **Abstract**

*The Mekong subregion has received considerable attention from major powers due to its strategic location at the intersection of major Asian economies, wealth of resources, and increasing geopolitical significance. India was the first major power that initiated multilateral cooperation with this region in the early 2000s. However, India's development partnership in the region has not been given enough attention, particularly compared to traditional development partners. This paper highlights India's development assistance in the region through bilateral and multilateral cooperation frameworks. It provides a comprehensive overview of India's development partnership and aid projects that have benefited the region in recent decades. The paper draws on India's foreign aid data to explore the amount, geographical distribution, and development sectors to comprehend the model and motivations of India's development partnership in the Mekong subregion. The paper argues that India's development partnership in the Mekong subregion forms an essential aspect of its foreign policy and regional engagement, reinforcing its quest for leadership in the Global South. The paper contributes to a better understanding of development partnership in India's foreign aid policy towards the dynamic region and, thus, its broader Act East Policy.*

**Keywords:** Act East Policy, Development partnership, foreign aid, Mekong-Ganga Cooperation, Mekong subregion

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## 1 Introduction

There has been a consensus that India has become an emerging power in the last two decades (Apodaca, 2017; Pattnayak, 2007). With this global status, it is unsurprising that India tends to play a greater role in shaping the regional and international order while increasing its engagement with a broader range of regions. Like other major powers, India utilizes development partnerships in its regional engagement, especially in the Mekong subregion. The historical and civilizational connection makes the region special to this partnership. The South Asian and Mekong subregional countries have strong civilizational linkages. Scholars seem to agree that India shares strong bonds with the Mekong subregion, which no other country does comparatively in terms of language, culture, and civilization (Bunthorn, 2022; De, 2020). The current level of engagement between India and its eastern neighbors has been made possible by a continuous process carefully nurtured from antiquity to the contemporary (Muni and Mishra, 2019). The historical connection forms a solid base for mutually beneficial and trustworthy regional cooperation.

These enduring historical connections have laid the groundwork for the deepening of strategic partnerships in recent decades, reflected in India's focused engagement with the Mekong countries. In the contemporary, the Mekong subregion, which includes Cambodia, Laos, Myanmar, Thailand, and Vietnam, is integral to India's foreign policy towards Southeast Asia. From the widely known Look East Policy (LEP) to the Act East Policy (AEP), the region has been recognized as a cornerstone of New Delhi's regional engagement. The rising geopolitical contestation in the Indo-Pacific makes this region even more crucial for India and vice versa. India's regional presence offers Southeast Asian governments a counterbalance to China's growing influence (Grossman, 2024). For India, it has also envisaged the need to reduce the region's heavy dependence on Beijing, while expanding its own influence (Malik, 2012). Hence, this creates a convergence of strategic interests between India and its eastern neighbors. As part of its broader engagement in Southeast Asia, India has been playing a significant role in offering development support to developing countries in the Mekong region reinforcing its quest for leadership in Global South.

While significant attention has been given to the Mekong subregion's major development partners, such as China, Japan, the US, and the EU, India has not received enough focus, especially from local perspectives. In this context, the paper seeks to provide a comprehensive overview of India's development partnership pursuits and unfold their contribution to the Mekong subregion's socio-economic development through bilateral and multilateral cooperation frameworks. The paper has two research questions: (a) despite being one of the biggest aid recipients, why does India still provide foreign aid to other developing countries, and what are its foreign aid model and motivations?; and (b) how have India's development assistance and aid projects contributed to the Mekong countries, including Cambodia? The paper posits that India's development partnership in the Mekong subregion is a crucial component of its foreign policy strategy. This partnership not only enhances regional cooperation and economic integration but also underscores India's ambition to establish itself as a leading power in the developing world. By fostering strong ties with the Mekong countries, India aims to bolster its benign image in Southeast Asia, thereby contributing to its broader geopolitical objectives and reinforcing its status on the international stage.

The paper utilizes India's foreign aid data to explore the amount, geographical distribution, and targeted sectors. It relies on secondary sources, including books, scholarly articles, newspapers, speeches, and official websites, to comprehend the motives behind the Indian development partnership with the Mekong countries amid its emerging status as a global power. First, the paper examines the concept of foreign aid as a foreign policy instrument and delves into India's development partnership model. Then, it provides case studies of India's impact in the Mekong subregion and sheds light on its contribution to Cambodia's socio-economic development through development projects, human resource development, and capacity building and delineates the challenges and opportunities inherent in the development partnership, followed by a concluding section.

## **2 Understanding Foreign Aid as a Foreign Policy Instrument**

Foreign aid plays a crucial role in advancing foreign policy objectives by projecting the benevolent image and influence of the donor country in recipient countries

(Apodaca, 2017). Both traditional and emerging donors use foreign aid as a foreign policy instrument aiming to achieve economic benefits and enhance diplomatic relationships and strategic interests with partner countries. To understand foreign aid, it is important to examine its various terminologies, underlying motives, and the evolving landscape surrounding it.

It is imperative to understand the different aid-related terms, such as foreign aid, development assistance, development cooperation, and development partnership. According to the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD), foreign aid encompasses financial transfers, technical support, and goods aimed primarily at fostering economic development and improving welfare (OECD, 2024). This development component excludes aid for military or other non-development purposes and is provided in the form of grants or subsidized loans. Thus, foreign aid is closely related to the development assistance concept. On the other hand, the terms 'development assistance' and 'development cooperation' have different implications. The term development assistance implies an unequal relationship where the donor provides foreign aid, and the recipient receives it (Breuning, 2002). In contrast, the term development cooperation denotes a joint effort between the donor and the recipient to achieve the common goal of development. It indicates a more equal partnership between the two parties. In a broad sense, development cooperation is closely related to development partnership. The development partnership, on the other hand, emphasizes a more equal and mutually beneficial relationship between partners involved, where all parties contribute and benefit from development projects, such as infrastructure development or educational programs.

There are various motives for traditional and non-traditional aid donors to give foreign aid. First, foreign aid serves as both incentive and behavior modification. It can be used as a tool to influence a recipient country's policy choices or behaviors. Foreign aid can reward friendly or compliant regimes and induce changes in behavior by providing economic support. On the other hand, withdrawing aid can create economic hardship or destabilize unfriendly regimes (Apodaca, 2017). Second, foreign aid is also used to achieve strategic and commercial objectives. States utilize foreign aid to secure alliances, support friendly foreign leaders, and

gain influence within international organizations (Gamso, 2024). Aid can facilitate trade partnerships and investment opportunities; this is often called 'aid for trade' (Pettersson and Johansson, 2013). Aid for trade focuses on supporting trade-related projects and programs. This includes measures like building roads, ports, and telecommunications infrastructure that link domestic and global markets. It also involves investing in industries and sectors to diversify exports and improve economic growth.

The landscape of foreign aid is evolving, as developing countries such as India and China now provide foreign aid alongside traditional donors, drawing attention from scholars to their significant contributions to the study of foreign aid as a foreign policy instrument (Fuchs and Vadlamannati, 2013; Woods, 2008). Non-traditional donors often avoid placing conditions on their aid, which is different from the motives of traditional Official Development Assistance (ODA) donors, which press for human rights, democracy, transparency, and good governance (Apodaca, 2017; Dreher and Fuchs, 2015; Fuchs and Vadlamannati, 2013). With the emergence of non-traditional donors, 'foreign aid may be further reduced to the crass, self-interested motivations of commercial or political interests' (Apodaca, 2017). On the other hand, fungibility is a key challenge of foreign aid allocation, as aid can be diverted if recipient preferences differ from donor intentions (Apodaca, 2017). Imposing conditions also risks aid effectiveness and recipient sovereignty (Cherkaoui, 2022). Therefore, development partners need to be transparent about their aid intentions and accountable for ensuring that aid meets the needs and priorities of recipient countries. Development partnerships should aim for mutual benefit while balancing humanitarian welfare with commercial and political interests and going beyond traditional donor-recipient relationships.

### **3 India's Development Partnership Model**

Over the past decades, India has evolved from being a recipient of aid to becoming a significant provider of development assistance to other developing nations under bilateral and multilateral initiatives. India is frequently referred to as an emerging donor, although it has its own resource constraints and began its foreign aid program, especially for capacity building, since its independence (Chanana, 2009). As a non-traditional donor, New Delhi has significantly increased its level of

development assistance to developing countries. The Mekong subregion holds a crucial strategic position in India's regional engagement and development partnership under the LEP and the AEP, in addition to its Neighborhood First Policy. Indeed, geographical, and cultural proximity plays a significant role in guiding India's foreign development cooperation practices. To understand this, we need to delve into the model and motivations, institutional structure, and direction of India's development cooperation.

### **3.1 Model and Motivations**

India draws the motivations for its international development assistance from various sources. In consonance with Mahatma Gandhi's concept of patriotism, associating with 'the good of mankind in general,' the recently rising popular mantra of Vasudhaiva Kutumbakam or 'the world is one family,' and solidarity with other developing nations with a shared history and colonial experience, New Delhi adopts a distinctive development strategy focused on humanity, characterized by respect, diversity, and sustainable practices, ensuring care for the future (MEA, 2022a). From these motivations, India appears to stress the egalitarian ethos of engagement in its foreign aid policy towards the developing countries in the Global South.

It has been argued that since its independence in 1947, India's development partnerships are in line with the principles of South-South Cooperation (SSC), which involves technical collaboration among developing nations in the Global South (Chaturvedi, 2012). India's agenda during its G20 presidency indicates its alignment with these principles, as it declared that it represented the voice of developing countries in the Global South. To this end, New Delhi convened a virtual summit under the theme 'Voice of Global South Summit,' which saw the presence of leaders and ministers of more than 120 developing countries (including Cambodia), demonstrating India's 'coming-of-age as a global power' (Shah and Morande, 2024, p. 55). Subsequently, the India-led summit has been institutionalized as an annual event representing the voice of developing countries. India's most recent model of international development partnership is said to have been fundamentally guided by the needs, priorities, or demands of recipient countries and without any conditions. It is a unique 'demand-driven' approach that provides autonomy to aid recipients while contradicting the Western approach,

which imposes conditions such as respect for the rule of law, democracy and human rights. As in a quote featured on the front page of the Indian Technical and Economic Cooperation Programme (ITEC) website, Indian Prime Minister Narendra Modi emphasized that:

India has always played a constructive role on the world stage. Our offer of development aid, our development model is not based on 'give and take', but is guided by the developmental requirements of partner countries. Our focus has always been on Capacity Building and Resource Development. We have always strived for collective team work at all forums of our developmental partnerships. (ITEC, 2023)

By highlighting India's approach to international development, the statement emphasizes that India plays a positive role globally by providing development aid based on the needs of partner countries, rather than expecting something in return (e.g., natural resources). The focus is on building capacity and developing resources in these countries through teamwork and collaboration. Nevertheless, as an emerging economy and aid recipient, India prefers development partnership and development cooperation to development assistance. In other words, it favors being referred to as a development partner instead of an aid provider. In this connection, Saran (2014) differentiated India's foreign aid model from ODA by maintaining that:

The economic assistance which India extends to other developing countries is voluntary and not an obligation like ODA is. India characterizes such assistance as "development cooperation" and not foreign aid. Unlike ODA, we do not posit a donor-recipient relationship; in fact we see our assistance as a reflection of a mutually beneficial partnership. (p. 2)

Encompassing the above statements, the Delhi-based think tank, Research Information System for Developing Countries (RIS), makes India's development partnership model more coherent by consolidating nine essential principles. These principles encompass respect for national sovereignty, solidarity, national ownership, independence, equality, non-conditionality, non-interference, mutual benefit, and demand-driven (RIS, 2022). However, critics often draw parallels between India's and China's models of foreign aid, which are non-conditional with respect to democracy, human rights and the rule of law as opposed to traditional

donors (Apodaca, 2017). On the other hand, an empirical analysis indicates that 'India's aid allocation is guided by India's political and commercial self-interests' (Fuchs and Vadlamannati, 2013, p. 113). In this connection, Saran (2014) demonstrates that 'to the extent that we see our economic assistance programs as mutually beneficial partnerships, they can, in a long-term perspective, enlarge our own prospects by creating bigger trade and investment opportunities' (p. 4). In fact, it is widely acknowledged that self-interests play a role in India's development cooperation and foreign aid policy. At the same time, it produces positive results for broader political and socio-economic partnerships when it meets the development needs of the recipient countries. Therefore, India's development partnership is also motivated by 'aid for trade' prospects. It means that aid projects primarily focus on enhancing trade capabilities and infrastructure, including constructing roads, seaports, and airports (Bhogal, 2016). The aim is to reduce the time and costs associated with trading with these nations, thereby promoting economic growth.

### **3.2 Institutional Structure**

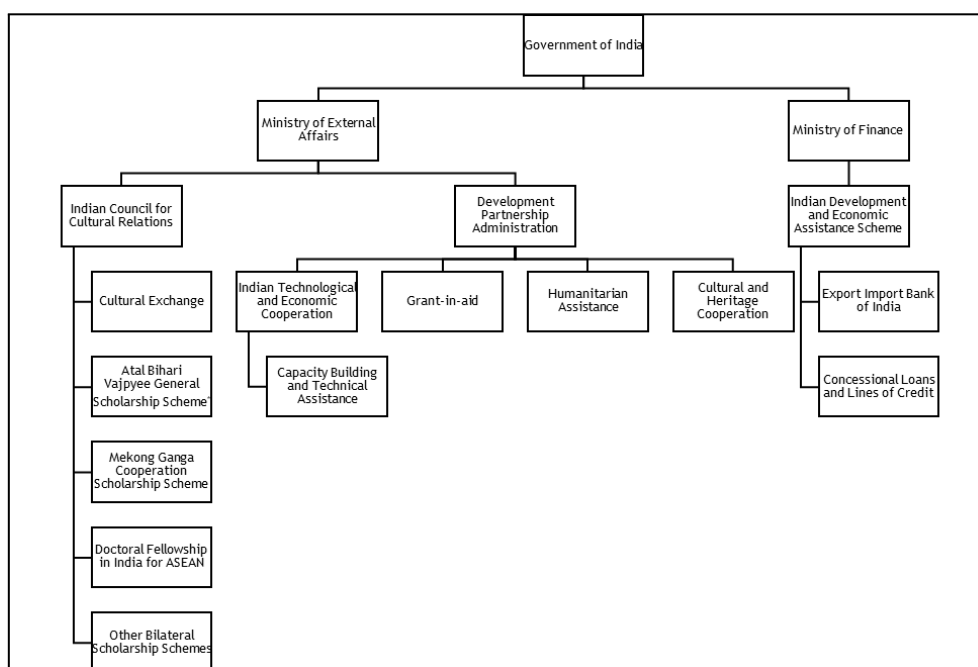
India's development partnership structure has gradually evolved to efficiently oversee foreign aid, yet it still exhibits fragmentation. However, India did not have a unified international development cooperation structure until the Development Partnership Administration (DPA) was formed within the MEA in early 2012, eventually bringing overall control of development cooperation under one central body (Howes and Pryke, 2016).

The DPA coordinates and manages bilateral development cooperation with developing countries. Its subordinate, the ITEC, is responsible for foreign capacity building, a key aspect of Indian development partnerships. The Ministry of Finance's Indian Development and Economic Assistance Scheme (IDEAS) is responsible for extending concessional loans and lines of credit (LoCs) to development partner countries through the Exim Bank of India on the recommendations of the MEA (Mathur, 2021). Additionally, the 1950-founded Indian Council for Cultural Relations (ICCR), which operates under the administrative oversight of the MEA, administers cultural exchanges, scholarships, doctoral fellowships, and other cultural activities with other countries. As can be seen from

Figure 1, the institutional frameworks of India's development cooperation remain 'fragmented' (in the sense that it has no an international development cooperation agency), and the Ministry of External Affairs + nodal institutions (Mukhopadhyay, 2022).

Like traditional donors, India employs several instruments to provide foreign aid to the partner countries. According to the DPA website, multiple instruments fall within development partnerships. These include LoC, grant-in-aid, capacity building and technical assistance, humanitarian assistance and disaster relief (HADR), and cultural and heritage cooperation (MEA, 2023).

Figure 1. Institutional Structure of India's Development Partnership



Formerly General Cultural Scholarship Scheme Source: Authors

### 3.3 Provision and Direction of India's Foreign Aid

In line with India's foreign policy objectives and development partnerships, the budget allocation for the MEA was increased over time and its Provision and Direction are primarily influenced by political and commercial interests and strategic consideration, for instance the Neighborhood First Policy.

According to the Union Budget of the Ministry of Finance (2023), the MEA received US\$2.3 billion (₹18,050 crore) for the financial year 2023-2024, an increase of around 4.64% from US\$1.32 billion (₹17,250 crore) in the previous financial year. In

the current financial year, the DPA comprising the MEA's 'aid-heads' continues to be a priority as it has aggregated at 32.40% of total budget allocation, approximately amounting to US\$745 million (₹5,848.58 crore). Apart from that, India has also extended concessional LoCs worth US\$30.59 billion to several partner countries across continents for developmental projects (MEA, 2022b).

Upon assuming office in 2014, Prime Minister Modi adopted the Neighborhood First Policy, designed to enhance India's ties with the countries of the South Asian Association for Regional Cooperation (SAARC). Under this policy, India prioritizes providing aid and LoCs to its immediate neighbors (Ministry of Finance, 2023). Interestingly, Bhutan remains the primary recipient of India's foreign aid, comprising 41.05% of the MEA's total foreign development assistance, followed by Nepal (09.40%), the Maldives (06.84%), Myanmar (06.84%), Afghanistan (03.42%), Bangladesh (03.42%), Sri Lanka (02.56%), and others (26.47%) (Ministry of Finance, 2023). Comparatively, Myanmar is the only member country of the Mekong Ganga Cooperation (MGC) that receives significant development aid from India. This is primarily driven by Myanmar's strategic significance in New Delhi's foreign policy, driven by the aim to counterbalance China's expanding influence in the region (Nikkei Asia, 2018). Further, the practical manifestation of India's development partnership model and approach is evident in its targeted projects across the Mekong subregion, as explored in the following case studies.

#### **4 Case Studies: India's Impact in the Mekong Subregion**

In Southeast Asia, the Mekong subregion has emerged as a significant geopolitical battleground following the maritime disputes in the South China Sea, drawing strategic interest from major powers such as the US, China, and India. Initially, India engaged with this region through the LEP, one of the pillars of its foreign policy, which was further strengthened by the Modi government under the AEP, seeking active engagement with the region. For this reason, India renders development assistance to the Mekong countries through ASEAN mechanisms, such as the Initiative for ASEAN Integration (IAI), the MGC initiative, and bilateral initiatives with development partners. As a developing country, Cambodia has gained significant socio-economic benefits from this regional cooperation.

#### 4.1 The Mekong Subregion in India's Strategic Interest

With cultural and civilizational proximity, India and the five Mekong nations were determined to enhance and strengthen regional partnerships. India and these five countries established the MGC in November 2000 in Vientiane, Laos. As the region's oldest forum of its kind, the MGC has four traditional areas of cooperation: tourism, culture, education, and transportation (which were expanded further in the later stage). With the launch of the MGC at the turn of the twenty-first century, India was considered the first major power to institutionalize its engagement with Mekong countries, much earlier than other regional initiatives. These include the US-led Lower Mekong Initiative, established in 2009, and upgraded to the Mekong-US Partnership in 2020, and China's initiated Mekong-Lancang Cooperation, founded in 2016.

The MGC is a subregional initiative in India's broader regional engagement with ASEAN under its LEP, developed in the early 1990s when the country liberalized its protectionist, heavy-state interventionist economy. At the outset, India's foreign policy interest in the Mekong subregion was driven by four factors. First, India's liberalization and reform that opened up its economy in the post-Cold War perceived Southeast Asia's fast-growing economies with attraction; second, the expansion of ASEAN to include CLMV (Cambodia, Laos, Myanmar, and Vietnam), which were least developed, provided India with opportunities to extend aid, assistance, and technology transfers to these countries; third, ASEAN expansion led to the establishment of the geographical connection between India and Southeast Asia via its northeast region while offering opportunities for New Delhi to develop this strategically important region as a gateway to the Mekong countries; and fourth, the unprecedented rise of China which renewed the US interest in the Mekong subregion and the geopolitical contestations between them by establishing and upgrading the competing regional initiatives, namely, the MLC and the MUSP, respectively, has invigorated Indian interest to revitalize the MGC (Singh, 2022). In other words, the end of the Cold War and the disintegration of the Soviet Union suggested that ideological polarization no longer shaped international politics the way it used to be, and that India was compelled to move beyond its traditional non-aligned foreign policy, which became less relevant in the unipolar world order dominated by the US. The LEP was, therefore, one of the milestones in India's

foreign policy shift towards Southeast Asia while also receiving bipartisan support from New Delhi's political establishment (Sundararaman, 2016).

In 2014, Prime Minister Modi transformed the LEP into the AEP, signifying a more proactive and action-oriented approach towards Southeast Asia, consequently giving new momentum to the MGC initiative. Accordingly, since 2016, the MGC has expanded to new areas of cooperation, namely MSME cooperation, agriculture and allied sectors, public health and traditional medicine, water resources management, science and technology, and skill development and capacity building, in addition to the four sectors mentioned previously (MGC, 2021). At the same time, India has also expanded its development assistance in the Mekong subregion bilaterally and multilaterally.

#### **4.2 The Initiative for ASEAN Integration Mechanism**

In the post-Cold War period, the Mekong subregion gained traction in India's regional engagement in Southeast Asia. In that, its relations with ASEAN have continued to grow over time and its leading role in development cooperation has grown. Given the least developed status of most Mekong countries, such as CLMV, New Delhi has had the opportunity to contribute to bridging the development gap within ASEAN, particularly between its older Member States (Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) and the newer CLMV Member States, mainly through development programs under the IAI framework.

Within the ASEAN cooperation frameworks, India supported the IAI, which was launched in 2000. The IAI activities aim to narrow the development gap between the regional grouping's older and newer Member States, thus enhancing their capacity to fully participate in the regional economic cooperation and integration process. Under the IAI, wealthier ASEAN countries and ASEAN development partners are galvanized to support the development of CLMV in a wide area of capacity building and technical assistance. As one of the ASEAN Partners, India has been actively involved in various projects under the IAI for socio-economic development in CLMV over the past three decades. These projects include the Training of English Language for Law Enforcement Officers in CLMV and the training of professionals dealing with capital markets in CLMV by the National Institute of Securities Management Mumbai. To foster India-ASEAN people-to-people

contact and deepen ASEAN-India relations, India has also implemented several programs, including Scholarships for ASEAN students for higher education at Nalanda University (NU), ASEAN-India Network of Universities with NU as the nodal institution, Doctoral Fellowship in India for ASEAN at the Indian Institutes of Technology (IITs), Training of ASEAN Civil Servants in drought management, disaster risk management, and sustainable groundwater management. Moreover, India also implemented Training Program for ASEAN Diplomats as well as Participation of ASEAN students in the National Children's Science Congress. Similarly, India and ASEAN countries hold various high-level annual events, such as the Delhi Dialogue, ASEAN-India Eminent Persons Lecture Series, ASEAN-India Network of Think Tanks, Exchange of Parliamentarians, ASEAN-India Youth Summit, and ASEAN-India Media Exchange.

Digital connectivity has become a new frontier in India's engagement with the Mekong countries. Further boosting digital connectivity with this region would provide India with unprecedented opportunities to increase its presence in Southeast Asia, given its competitive strengths in this area. To this end, India is committed to promoting IT skills in CLMV by setting up four Centers of Excellence for Software Development and Training (CESDT) using the ASEAN-India Cooperation Fund. For one center in Cambodia, the CESDT is situated at the Cambodia Academy for Digital Technology, Phnom Penh. Earlier, India also established various human resource development centers to boost skill development across Mekong countries, including Entrepreneur Development Centers (EDCs), Centers for English Language Training (CELTs), and Vocational Training Centers (VTCs).

India has also been active in providing humanitarian assistance to the partner countries during natural disasters and pandemics and it is a vital component of the AEP. For instance, New Delhi delivered COVID-19 vaccines to over 150 countries worldwide through its Vaccine Maitri (Vaccine Friendship) initiative and ASEAN Quad Vaccine Initiative during the global pandemic. In solidarity with ASEAN countries during the humanitarian crisis, India provided US\$1 million in aid to ASEAN's COVID-19 Response Fund and expanded support to the ASEAN Member States through bilateral mechanisms in fighting the COVID-19 pandemic (ASEAN, 2022). India's humanitarian support reinforces its commitment to ASEAN, fostering stronger diplomatic and economic relations.

### 4.3 The MGC Initiative and Bilateral Development Partnership

The MGC, as a subregional cooperation between India and the Mekong nations, provides a meaningful platform for developing regional partnerships. It supports India's broader foreign policy goals under the AEP towards Southeast Asia. In addition to providing LoCs and concessional loans, the Quick Impact Project (QIP) scheme under the MGC mechanism is one of India's latest examples of modest foreign aid in this region. The ITEC, on the other hand, is the key capacity-building program that the Indian government bilaterally uses to share its socio-economic development experience and build stronger ties with countries in the Mekong subregion.

The QIP is the major element of India's development partnership in the Mekong subregion. Under the MGC framework, India launched QIPs in 2012, but actual projects started in 2015-2016. This initiative expands India's foreign aid to the Mekong subregion while expanding its focus beyond human resource development and capacity building. The value of QIPs is relatively small, not more than US\$50,000 per project, and their implementation period is short, aiming to complete the project within one year. Still, their impact is quick and visible, targeting the priority areas of social development that immediately benefit the local communities in CLMV. The projects cover a wide area, such as physical and digital infrastructure, education, health, environment, agriculture, sanitation, water resource management, and women's empowerment. To finance the QIP, the Indian government established an India-CLMV QIPs Revolving Fund, which has committed an annual contribution of US\$1 million through this fund for various projects in CLMV. The amount was increased to US\$1.25 million in 2018 and again to US\$2 million in 2020 to cover implementing ten projects in each country yearly, an increase from five QIPs (MGC, 2023, 2024).

So far, India implemented 105 QIP projects in Cambodia, Laos, and Vietnam between fiscal year 2015-2016 and 2023-2024, at a total cost of US\$3.9 million (MGC, 2023). Of these projects, 48 were in Cambodia (34 completed), 11 in Laos (7 completed), and 46 in Vietnam (37 completed) (see Table 1). There is no evidence of the implementation of QIP in Myanmar. However, at the time of writing this

paper, India and Myanmar signed two QIPs to construct a multi-purpose hall, a bridge, a route and four box culverts (Myanmar News Agency, 2024).\

**Table 1: India's Quick Impact Projects in CLMV**

<i>Sanctioned year</i>	<i>Cambodia</i>	<i>Laos</i>	<i>Myanmar</i>	<i>Vietnam</i>
QIPs sanctioned in 2015-2016	5	-	-	-
QIPs sanctioned in 2016-2017	5	-	-	5
QIPs sanctioned in 2017-2018	5	-	-	5
QIPs sanctioned in 2018-2019	1	3	-	-
QIPs sanctioned in 2019-2020	10	-	-	5
QIPs sanctioned in 2020-2021	8	-	-	12
QIPs sanctioned in 2021-2022	4	4	-	10
QIPs sanctioned in 2022-2023	7	4	-	-
QIPs sanctioned in 2023-2024	3	-	-	9
<b>Total</b>	<b>48</b>	<b>11</b>	<b>-</b>	<b>46</b>

Source: Authors' compilation based on data from the official website of the MGC, 2024

Some other initiatives in the MGC framework regarding India's role in the region should be mentioned. First, under the Mekong Ganga Scholarship Scheme (MGSS) of the MGC capacity building contribution, the Indian government has since 2005 provided 50 scholarships annually for students from the Mekong countries to undertake various study programs at Indian universities. Second, to exhibit the rich cultural heritage of the MGC member countries, the Indian government provided a grant of US\$1.8 million to establish the MGC Asian Traditional Textile Museum (ATTM) in Siem Reap, Cambodia (Embassy of India in Phnom Penh, 2023). The MoU for the museum between India and Cambodia was signed in June 2004, and the museum was subsequently opened to the public in April 2014. The ATTM displays

textiles from the Mekong-Ganga region while also providing interactive facilities and holding cultural activities. It has a training center and workshop in textiles as well as an ethnic fashion design and development center. The museum was headed by an Indian director appointed by the ICCR. The ATTM is considered one of MGC's apparent successes in the field of cultural cooperation.

India also proposed a US\$1 billion LoC for ASEAN countries at the India-ASEAN Summit in Kuala Lumpur in November 2015, a shift in its traditional non-monetary approach to foreign development assistance. In line with New Delhi's AEP goals, the LoC is utilized to finance projects that enhance physical and digital connectivity between India and ASEAN, thereby diminishing ASEAN countries' exclusive reliance on China (Singh, 2018). However, it was reported that after 40 months, only a few ASEAN countries were interested in acquiring LoCs from India. Thus, India decided to offer a grant of US\$40 million for pilot projects in CLMV to provide an impetus to the credit line (Singh, 2018). No exact reason for the lack of interest from the region was reported. However, the likely reason is that the terms of reference for India's LoC might not be attractive to the targeted countries, especially when compared to China's. Recent media reports confirmed this, and the Indian government is considering reviving the LoC rule to make it more attractive (Grover, 2023).

Particularly, India has extended the LoC to the Mekong countries for development projects over the years (since 2003). LoCs were granted to CLMV under the bilateral track, totaling approximately US\$1.76 billion for various projects, including hydropower, water resource development, infrastructure development, digital connectivity, rural electrification, irrigation, and the installation of transmission lines (MGC, 2023).

The ITEC program is a key element of India's dedication to enhancing capacity building and human resource development in the Mekong subregion, as it shares its best practices, knowledge and skills in economic development with partner countries. Established in 1964 and administered by the DPA of the MEA, the ITEC is a bilateral flagship program for international capacity building. Through this program, more than 200,000 officials from more than 160 countries in the Global South have been trained to date. Nearly 400 training courses include themes related to public administration, industry, agriculture, management and

entrepreneurship, power/renewables, and development studies (ITEC, 2023). It also provides customized courses for specific ministries in partner countries upon request. So far, it offers fully funded in-person training and scholarship opportunities to nearly 10,000 persons across the globe to study at Indian premier institutions every year.

#### **4.4 India's Role in Cambodia's Socio-Economic Development**

Over the past decades, India has contributed positively to Cambodia's socio-economic development under bilateral and multilateral cooperation concerning technical assistance, development projects, capacity building, and skill enhancement. The development partnership covers many areas, including culture, education, health, science, and information technology. Despite relatively small bilateral economic relations, Cambodia has been one of the major recipients of India's development assistance in the Mekong subregion. While recognizing India's contributions, it is essential to address certain shortcomings to enhance the efficiency and effectiveness of its development partnership in Cambodia.

ITEC Program. India has contributed meaningfully to Cambodia's capacity building and human resource development through the ITEC program with customizable training courses. The ITEC program also offers technical assistance to Cambodia, particularly to restore and preserve cultural heritage. The Archaeological Survey of India (ASI) sent its experts to Cambodia to carry out various projects funded by the Indian government to conserve and restore ancient Hindu-Buddhist temples, including Angkor Wat (1986-1993). The ASI also undertakes restoration work for the other two temples. Restoration work on Ta Prohm began in 2003 with a grant of US\$4.20 million for phase one, followed by US\$4.10 million for phase two (2014-2015), and US\$4.50 million for the current third phase. Additionally, India allocated a grant of US\$5.50 million for the restoration of Preah Vihear during the 2020-2021 period (RIS, 2022). The conservation and restoration of ancient heritage sites have boosted the cultural tourism industry in the Kingdom. Currently, the ASI team is undertaking restoration work at Ta Prohm temple. Along with China, India is also co-chair of the International Coordinating Committee for the safeguarding and development of the UNESCO-listed Preah Vihear. All of these have been implemented under the ITEC program.

Training and skill development under the ITEC program are unique components of India's development assistance. This program has been particularly beneficial for Cambodian civil servants from various departments and ministries. The number of slots available for Cambodian civil servants in the ITEC program has increased from 150 in 2018 to 250 in 2022 (MEA, 2022c). More than two thousand Cambodian civilians and defense officers have received training under the ITEC scholarship program for a period ranging from a few months to twelve months (Khmer Times, 2023). Reflecting a demand-driven development partnership, the ITEC program can also be tailored to meet Cambodia's specific training needs and priorities. In this manner, India has provided customized training courses to groups of 10 to 40 government officials from various notable Cambodian ministries, including Ministry of Foreign Affairs and International Cooperation, Ministry of Rural Development, Ministry of Justice, Ministry of National Defense, Ministry of Women Affairs, Ministry of Planning, and National Bank of Cambodia.

Further collaboration is expected to strengthen civil service capabilities and promote effective governance and public administration in Cambodia. India and Cambodia signed a Memorandum of Understanding (MoU) in April 2024, aimed at enhancing human resource development in civil service (Press Information Bureau, 2024). The key objectives of the MoU include enhancing dialogue between India's Personnel Administration agencies and Cambodia's Ministry of Civil Service, implementing targeted training and development initiatives for Cambodian civil servants, and fostering connections between governance institutions of both countries for better governance practices. In the fiscal year 2024-2025, plans are set to expand these initiatives, with six programs scheduled to accommodate 240 Cambodian civil servants. This MoU represents a deepened commitment between India and Cambodia to strengthen civil service capabilities, promote effective governance, and enhance human resource development while contributing to a more coherent development partnership mechanism for government officials.

Scholarship Program. The scholarship program is a longstanding instrument for India to boost people-to-people connection with Cambodia. India has provided Cambodian students with scholarships under various schemes to pursue higher education in its prestigious universities. These include the Mekong Ganga Cooperation Scholarship Scheme (MGCSS) with ten slots, the Atal Bihari

Vajpayee General Scholarship Scheme (ABVGSS) with 20 slots, the ASEAN Scholarship at Nalanda University with five slots, and other scholarships announced by various Institutions of Government of India (Embassy of India in Phnom Penh, 2025). During Vice President Dhankhar's visit to Cambodia, India agreed to raise the total number of scholarship slots under various schemes for Cambodian students at Indian universities under the ICCR from 30 to 50, starting from the 2023-2024 academic year (MEA, 2022c). This gesture was to commemorate the 70th anniversary of Cambodia-India diplomatic relations and respond positively to Cambodia's request.

QIP Program. As mentioned earlier, Cambodia also significantly benefits from the QIPs program under the MGC initiative compared to other member countries. Interestingly, India launched the first five QIPs in Cambodia in fiscal year 2015-2016. After that, various projects were annually implemented in critical areas of social and physical infrastructure. According to the MGC website, the Kingdom has received 48 QIPs, the highest number of projects sanctioned by India in CLMV since its inception (see Table 1). Of these 48 projects, 34 were completed in critical areas of social infrastructure such as water resource management, women empowerment, information and communication technology, and community development. Some completed projects under QIPs in Cambodia include, for instance, Improving Community Livelihood through Small Scale Water Supply and Integrated Food Security (2018), Women's Economic Empowerment through Information and Communication Technology undertaken by the Ministry of Women's Affairs (2019), Building Capacity on Digital Public Services Implementation and Cyber Security for Government Agencies (2021-2022) and the fully equipped SBU IT Centre undertaken by Preah Sihanouk Raja Buddhist University (2023). These projects have a quick and visible impact on the lives of the local communities, thereby generating goodwill for India.

The ITEC training courses and various scholarship schemes have contributed to boosting the skills and knowledge of government officials and students, while the QIP directly benefits the local communities in the recipient countries. However, India faces certain challenges and opportunities in its development cooperation in the Mekong subregion concerning scholarship utilization and project management. First, the allocated slot of scholarships, and the utilized slot of scholarships did not

match, particularly in Cambodia. For long, the number of Cambodian applicants admitted to Indian universities through the ICCR scholarship program was lower than the allocated slots (authors' observation). Second, the ITEC courses are currently targeted at government officials. To be more inclusive, it should also be available to non-government applicants from civil society organizations, research institutions, academia, and the private sector, who are interested in undertaking training in India. And third, there appears to be a discrepancy between the promises made and the actual number of annual QIPs approved. After approving 20 projects for CLMV in 2020-2021, the number decreased to 18 in 2021-2022, 11 in 2022-2023, and 13 in 2023-2024 (see Table 1). Also, there have been delays in completing some of the projects, making the QIP impact slow. Moreover, it has been observed that India's development projects have certain deficiencies, such as bureaucratic delays and poor implementation and management (Arora and Mullen, 2017; Deshpande, 2023). Accordingly, addressing these challenges will enhance India's development partnerships and achieve the core objective of building a positive image in the recipient countries and expanding political and economic cooperation in the Mekong subregion.

Above all, development cooperation is a key component of India's engagement in the Mekong subregion under the broader framework of the AEP. Scholarship programs and ITEC training schemes not only contribute to capacity building and skill development for the partners but also enhance people-to-people connections. On the other hand, the QIP program is significant to the AEP. These projects have a direct link between India and the beneficiary communities, villages, and towns and help generate goodwill among the people; this goodwill is the most significant capital in the business of diplomacy (Deshpande, 2023). As testimony to that, the subsequent joint statements of the MGC meetings show that leaders of Mekong countries 'appreciated' India's socio-economic development assistance under the QIP program (MGC, 2023).

## 5 Conclusion

Development assistance and foreign aid play a crucial role in the world's advanced economies in establishing stronger ties with recipient countries. However, it is a puzzle why some developing countries also provide foreign aid to other developing

countries. India has been the case as it has been recognized as an emerging player in the development assistance arena. Like other countries, India's foreign aid strategies are closely aligned with its national interests by linking its development assistance with trade and targeting countries with cultural, political, and economic significance for New Delhi. Such strategies are part of a broader foreign policy framework aiming to build partnerships and influence on the global stage and establish itself as a leading power of the Global South.

New Delhi's development partnership is characterized as a responsive and demand-driven model, aiming to generate long-term employment and income for the receiving partner countries by focusing on productive sectors. India's foreign aid program focuses on delivering non-monetary development assistance through technical assistance and capacity building, while also providing concessional loans and grants to other developing countries. The mutually beneficial development cooperation is crucial to the country's overall diplomatic strategy. A significant share of its development aid goes to its immediate neighbors driven by the Neighborhood First Policy. At the same time, India has actively engaged with its extended neighbors in the Mekong subregion under the AEP, providing foreign development assistance to the region through bilateral, multilateral, and project-based mechanisms.

Cambodia has comparatively gained significant benefits from India's development partnership under the IAI, the MGC initiative, and other bilateral cooperation, although the overall amount remains relatively small compared to other major development partners. In fact, Cambodia was chosen as the location of ATTM under the MGC and received the first and largest number of QIPs completed and under implementation compared to other member countries. Moreover, thousands of Cambodian officials have benefited from technical training and human resource development under the ITEC program while Cambodian students have benefited from various scholarship opportunities under the ICCR. At the same time, it is crucial to address development cooperation deficiencies, including bureaucratic delays and poor implementation and management of the projects, and to promote and enhance the effectiveness and efficiency of scholarship utilization.

Nevertheless, the bilateral cooperation initiatives have certainly contributed to capacity building and human resource development in the Mekong subregion while

also strengthening the overall bond between the two regions. This underscores the importance of India's development partnership with the region as one of the fundamental aspects of its foreign policy and its quest for leadership of the Global South, while also providing the foundation for long-lasting relationships between the Mekong and Ganga regions and particularly for the expansion of bilateral cooperation between Cambodia and India.

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## Report Review

# AI and the Future of India's Technology Services Industry: A Report Review

Atharva Salunke<sup>1</sup>

*India's Technology Services - Reimagination Ahead (February 2026) is a strategic policy roadmap prepared by NITI Aayog and the NITI Frontier Tech Hub that examines the future of India's technology services sector in the era of artificial intelligence and digital transformation. Published by the Government of India with contributions from industry leaders, policy experts, and technology stakeholders, the report evaluates the structural challenges facing India's traditional services model while proposing a long-term framework focused on AI-led innovation, infrastructure expansion, workforce transition, and global competitiveness. This report review critically examines the report's strategic vision, policy recommendations, and its implications for India's evolving role in the global digital economy.*

**Keywords:** *Artificial Intelligence, Technology Services Industry, Digital Transformation, Industrial Strategy, Economic Sovereignty*

There has been sustained policy and industry discourse on the centrality of India's technology services sector to national growth, exports, and employment. Yet the contemporary challenge extends beyond scaling an established model; it concerns redefining that model in response to artificial intelligence, automation, and geopolitical realignments. India's Technology Services - Reimagination Ahead (February 2026), released by NITI Aayog and the NITI Frontier Tech Hub, enters this debate by situating the \$265 billion industry at what it terms an "AI inflection point." The report aims to re-evaluate the structural viability of effort-driven, labor-intensive models of delivery in the context of AI-native enterprise change.

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The report redefines the future of the industry in terms of strategic reinvention, with an ambitious vision of achieving \$750-850 billion in annual revenues by 2035, and finds a \$250-300 billion gap between the industry's current growth path and this vision. By highlighting the importance of outcome-based models, platformization, IP development, and collaborative industry-government efforts, the report portrays AI as both a disruptor and a growth enabler. In this process, it also highlights the next decade as a critical period for determining whether India can continue to be a scale-focused services player or become an innovation-driven architect of the global digital economy.

Chapter One discusses the Technology Services Sector's \$265 billion in scale as a foundational element of India's economic growth and as one that has experienced significant structural disruption. Historically the sector accounted for about 7% of GDP and roughly twenty (20%) of the world's Technology Service Sector; its previous growth relied heavily on Cost and Engineering Competitiveness, and Export Orientation. However, in the coming decade it will be defined more by transformation than continuity. Following the COVID-19 pandemic's end, and also considering the macro-economic crises we have experienced, tightening visa policies and rising geopolitical instability are leading to a reduction in the sector's growth rates of around four to five percent (4% to 5%) per year.

The most impactful element covered in Chapter One is Artificial Intelligence (AI) as a Structural Discontinuity. The introduction of both Generative and Agentic AI is reducing the size of the pools of service value provided in traditional Develop and Delivery of Software methodology, as these AI types provide automation of code writing, code testing and workflow execution throughout the development and delivery of Software Products. At the same time, the implementation of Data Localization Laws, Digital Sovereignty requirements and geopolitical trade implications are fundamentally changing how technology services are delivered and governed. As such, Chapter One provides insight into the urgency of a Strategic Recalibration by providing a foundation to consider the Technology Services Sector, not just as a U.S. Export Engine, but also as a Potential Growth Lever in India's efforts to achieve a \$30 trillion economy by 2047.

Moving from diagnosis in Chapter one to ambition in Chapter two, it sets a goal of \$750-850 billion in revenues per year by 2035 in alignment with the Viksit Bharat

vision. At present, a growth projection of 5-7% for the industry suggests that there is a likely gap of \$250-300 billion between current outcomes and national aspirations. In order to close this gap, there will need to be significant double-digit growth as well as structural transformation of the overall operating model of the industry.

Chapter two also defines a two-prong strategy: to protect the core whilst pushing into new growth areas. Protecting the core means increasing India's leadership in AI, cloud computing, cyber security, digital engineering and expanding to new geographies (Japan and the Middle East). The pivot strategy consists of five major themes: Agentic AI, Software, Infrastructure, Innovation and India-for-India, all of which will help tap into additional enterprise spending pools that are estimated globally at \$14 trillion. Each of these strategies will require a shift away from service-oriented models to full-stack digital enablement that will integrate platforms, intellectual property and AI-native delivery architectures. Collectively, these strategies are expected to generate an incremental value of \$100-120 billion through FY 2035.

Chapter three takes out of Strategic Direction into Implementation Recommendations. It emphasizes the need for Industry to rearchitect the delivery models of current service offerings (to be outcome-based and AI-enabled) such that there is integration of Human Expertise, AI agents and platform orchestration. The chapter articulates the need to: increase R&D investments to 1-2% of revenues; scale up defensible IP; accelerate mergers/acquisitions (M&A) focused on AI; and build & develop deep domain capabilities in high-growth industries, such as Healthcare, Semiconductors, Defence and Cybersecurity.

For the government, the chapter recommends improving ease of doing business by establishing a fully transactional National Tech-Services Single Window, improving global market access for small and specialized enterprises, and implementing the India AI Talent Mission. The transition of the workforce is identified as a key policy agenda, which involves the mapping of new and sunset sectors, common skilling architectures, and curriculum upgrades. The chapter makes it clear that industry transformation cannot be an isolated process but rather requires harmonized institutional change.

Chapter Four concludes by framing AI transformation as a national imperative rather than a sectoral adjustment. It warns that delay in adapting to AI-led shifts could erode India's global technology leadership, threaten employment stability, and reduce the country's ability to capture emerging data-driven value pools. With an estimated 7.5-8 million technology professionals facing varying degrees of disruption, the chapter emphasizes redeployment over displacement, arguing that proactive reskilling could protect approximately 1.5 million at-risk jobs.

But looking beyond the manpower issues, the chapter positions technology as a strategic tool in international trade and the geopolitics of digital technology. With data, AI infrastructure, and critical technologies rising as drivers of economic diplomacy, the capacity of India to make the leap and become an AI-native architect of the global digital architecture from being the "back office" of the world will be at stake. The chapter again emphasizes that the roadmap is not a prescription but an appeal for collective action.

All four chapters together present an integrated story that moves from diagnostics of the structure to strategic aspirations, from policy recommendations to urgency for action at the national level. India's Technology Services - Preparing for Reimagination regards the sector as a high-performing export industry, but a primary foundation of long-term economic and technological sovereignty for India. The key insight from India's Technology Services - Preparing for Reimagination is that artificial intelligence will not simply be incremental changes to current operations of technology service providers; rather, the emergence of AI represents a fundamental shift requiring that technology service providers rethink their delivery models; how they allocate capital; how their workforce is organized; and how regulations are defined for technology service providers.

Ultimately, the success of the roadmap will be determined less by the visionary aspirations set forth in the report and more by discipline in execution of the roadmap. Continued growth, deeper ownership of intellectual property, coordinated transitions of the workforce, and institutional agility will be the key determining factors whether India has successfully consolidated its global leadership position within the new digital order or whether it will have experienced stagnation due to a lack of strategic vision and implementation. In this way, this report serves both as a roadmap for the future of technology services

in India and a moment of reckoning regarding the future of the technology services economy in India.

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# Recalibrating Multilateralism: The Emerging Architecture Of Global Water Diplomacy In The Anthropocene

Jyotsna Choudhury<sup>1</sup>

## Abstract

*The accelerating pressures of the Anthropocene marked by climate stress, groundwater depletion, and rising geopolitical tensions are reshaping the global landscape of water diplomacy. As traditional multilateral frameworks struggle to address complex hydro-political challenges, emerging models emphasize polycentric governance, scientific cooperation, and localized action within global norms. This essay examines the evolving architecture of global water diplomacy, focusing on India's Jal Jeevan Mission (JJM) as an illustrative case of how national initiatives are increasingly embedded in international water governance discourse. It argues for a recalibrated, science-driven, and equity-oriented multilateralism fit for 21st-century water realities.*

**Keywords:** *Geopolitical Tensions, Groundwater Depletion, Water Diplomacy, Jal Jeevan Mission*

## 1 Introduction

The Anthropocene marks a transformative epoch in which human activity has permanently altered planetary systems. Among these transformations, water has emerged as the most contested and diplomatically sensitive resource. The combined effects of climate-induced hydrological instability, rapid groundwater depletion, and intensifying geopolitical tensions have pushed the global community to rethink how water is governed, shared, and secured. The traditional multilateral frameworks that once mediated water relations are increasingly insufficient for this new reality. A new form of global water diplomacy has emerged as a result of these changes.

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This article discusses changes in the way diplomats do their jobs; how the relationship between Science and Policy has improved due to new opportunities to work together; how non-state actors play a larger role in shaping water policy than they have in the past; and a detailed examination of India's Jal Jeevan Mission, a national policy initiative that aligns with the global governance of water. Traditional frameworks that existed remain overly state centric, surface water focused and reactive rather than anticipatory, often paying less attention to local actors and groundwater systems. In the Anthropocene, water diplomacy must be flexible, polycentric, and responsive to rapidly changing environmental realities.

## 2 Reconfiguring Global Water Diplomacy in the 21st Century

The 21st century marks a shift from treaty based multilateralism to networked, science informed governance.

### Polycentric Governance

Polycentric water governance disperses authority across multiple actors and scales. Instead of relying on central negotiation tables, decision-making occurs through overlapping networks of:

- National governments
- Basin-level institutions
- Local water committees
- Civil society organizations
- Scientific and academic bodies
- International agencies

As authority is dispersed across multiple scales from national governments to local water committees and scientific networks. This model is more adaptive, allowing decisions to evolve alongside scientific knowledge and environmental change.

### Normative Shifts: From Resource Allocation to Water Justice

The emerging diplomatic architecture incorporates global norms such as:

- The human right to water
- Gender equity in water governance
- Indigenous rights
- Environmental justice
- Sustainability and climate adaptation

## **2.1 Local-Global Integration**

The concept of the Anthropocene has brought about a new dimension in Global Water Diplomacy, with Global Water Norms now being realized in varying degrees through local water governance Development and Implementation. The impact of International Frameworks on Domestic Country Policies as well as Innovative Developments by Local Governments to inform the International Community about co-operative opportunities in the management of Water Governance are both examples of how Global Water Norms are creating substantial impacts on Local Water Governance. India's Jal Jeevan Mission demonstrates the linkages between the two relationships, and forms part of a larger concept (Water Diplomacy) at both the national level in India, as well as internationally. India lies at the center of Hydro-Political dynamics within South Asia, and it has a significant presence in a number of Trans-Boundary Basins. A combination of factors such as the need for Water Security, increases in the population, and Climate Change, have led Countries to categorize Water as a National Security issue and one of their top Diplomatic Priorities. The Internal Reform efforts and restructuring of the Water Governance processes in support of, and for the purpose of establishing a Sustained Sustainable Management of Water resources, will add to India's International Diplomatic Credibility as well as assist India in achieving their Domestic Goals. The Jal Jeevan Mission can be used as a case-study to demonstrate the direct relationship between Water Governance and Building a Nation's Foreign Relations (International Joint Commission, 2020).

## **3 Jal Jeevan Mission: A Domestic Program with Global Relevance**

The Jal Jeevan Mission or "JJM" began in 2019 and aims at providing functional drinking water supply through a household tap connection to all rural households throughout India. JJM is a primarily domestic initiative; however, as a programme its governance structure is progressive indicative of contemporary global practice.

### **3.1 Polycentric and participatory structure**

Jal Jeevan Mission engages multiple stakeholders from central ministries to village water committees mirroring the multi-actor ethos of modern global water governance.

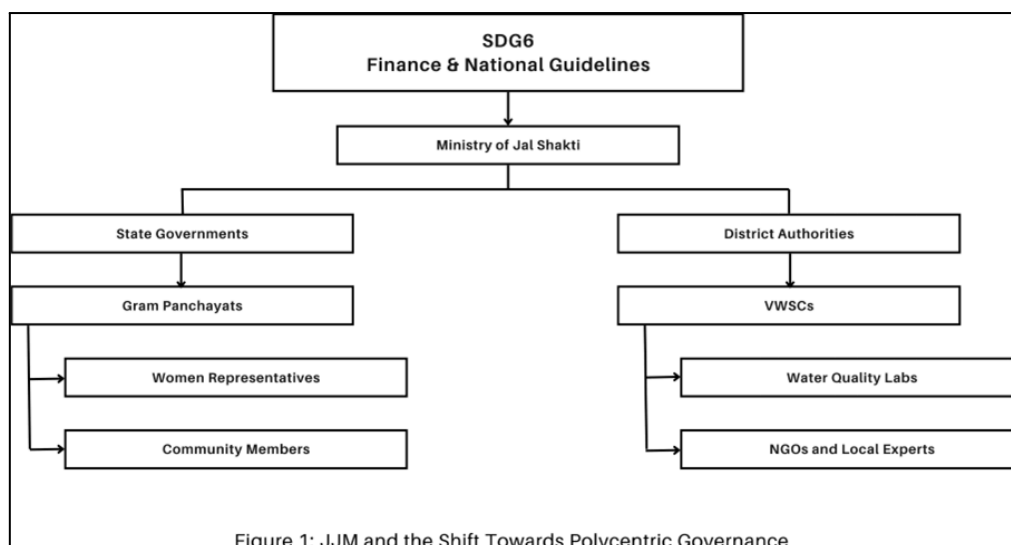


Figure 1: JJM and the Shift Towards Polycentric Governance

As depicted in Figure 1, JJM operates in a layered governance architecture in which authority is vertically coordinated yet horizontally dispersed. Although the Secretary of the Ministry of Jal Shakti has created both financial and norm-based frameworks supporting Sustainable Development Goal No. 6 (SDG-6), the authority for implementation resides with the State Governments, District Governments and the Gram Panchayats. Village Water & Sanitation Committees serve as the independent, local decision-making entities that are responsible for planning, monitoring, and sustaining sources of water supply. This system includes members from the community, women’s representatives, non-governmental organizations (NGOs) and technical labs and institutionalizes participatory monitoring of all services in an integrated manner. Thus, the system is distributed yet coordinated in a way that reflects the fundamental characteristics of polycentric governance.

### 3.2 Groundwater Diplomacy

Groundwater is the main water source for the majority of rural water supply systems. JJM’s focus on monitoring these systems through community involvement and ensuring the sustainability of each source will also help to promote better governance of groundwater sources, which is becoming an increasingly important issue globally.

### **3.3 Alignment with SDG-6**

By aligning with global commitments surrounding access to safe drinking water, equitable and sustainable use of resources related to water, JJM will contribute toward achieving the Sustainable Development Goals. The promotion of greater participation by women and the usage of community-owned systems reflects international equity and justice norms.

### **3.4 Data-Driven Governance**

The use of real-time monitoring dashboards, village-level surveys, and water quality testing facilities as a vehicle for producing scientific evidence that supports policy implementation represents a key feature of the new international water diplomacy architecture (Government of India, 2019).

## **4 Recalibrating Multilateralism: Pathways Forward**

Multilateralism should be evolved in a few key ways as a means of addressing the water challenges we face because of the Anthropocene.

- Groundwater is a large contributor to the world's drinking water; however, it is still underrepresented in many treaties and agreements. Diplomatic frameworks and organizations should prioritize the development of transboundary aquifers, aquifer recharge strategies, and sustainable extraction practices.
- Diplomatic dialogue/negotiations should integrate climate models, satellite data, and modelling of aquifers into the decision-making processes. Experts in these fields should guide political decision-making rather than only informing them. If we want water governance to be effective, it needs to be done at the local level (village/district).
- Youth and research-driven diplomacy will provide new analytical perspectives to the current debates in the international community. Providing young scholars, researchers and practitioners in the Global South with the tools they need to contribute to the debates that will shape how we tackle the issues related to water depletion, water governance (rural) and climate vulnerability will create new ways to look at old issues.

## 5 Conclusion

In the Anthropocene epoch, the discipline of water diplomacy finds itself at a pivotal juncture. Traditional frameworks for international relations concerning freshwater resources have become obsolete due to their reliance on state-centric approaches and stable environmental conditions. New models based on polycentric governance (i.e., multiple governing bodies working together), scientific knowledge, inclusiveness, and adaptability to rapidly changing water conditions have begun to emerge. For example, India's Jal Jeevan Mission demonstrates how national-level programmes can fit into global norms of water governance, and can provide insights into participatory and sustainable approaches to managing water. The evidence emerging from research about groundwater diplomacy, as well as its role in climate resilience and multilateral cooperation, makes it clear that it is necessary to recalibrate water diplomacy; indeed, this transition is both required and urgent.

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Jyotsna Choudhury: Recalibrating Multilateralism: The Emerging Architecture Of Global Water Diplomacy In The Anthropocene | Young Voices

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# Post Harvest Losses In Fisheries: A Barrier To Marine Export Growth In India

Aditi Tiwari<sup>1</sup> & Akshai Suresh<sup>2</sup>

## Abstract

*India stands as the third-largest fish producer in the world. Despite this achievement, its fisheries exports have been constrained by significant post-harvest losses in fisheries (PHLF), estimated at 25-30%, caused by inadequate infrastructure, weak cold-chain networks, and poor value addition. These inefficiencies undermine both domestic livelihoods and India's competition in global seafood markets. PHLF is therefore a matter of serious concern for the country, as it significantly compromises the immense potential of its blue economy. This paper explores the ways in which PHLF limits India's fish export potential, calling for the urgency of port logistics modernisation while positioning PHLF mitigation as both an economic necessity and socio-political imperative towards livelihoods and the blue economy.*

**Keywords:** Fisheries, Post-Harvest Losses in India, infrastructure, cold-chain, exports

## 1 Introduction

The fisheries sector has emerged as a critical pillar of agricultural transformation, food security, and livelihood generation worldwide. In India, the fisheries sector contributes nearly 1.07% to the National Gross Domestic Product (GDP) and 6.72% to agricultural Gross Domestic Product (GDP) (MoFAHD, 2022-23), supporting the livelihoods of approximately 14 million people directly engaged in fishing and aquaculture. Despite this, the sector continues to face significant inefficiencies,

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particularly in the form of post-harvest losses (PHL), which in turn reduce profitability, undermine export competitiveness, and compromise the income security of fisherfolk. Globally, developing countries lose about 20-25% of fish harvests post-harvest, largely due to weak infrastructure, poor marketing, and inadequate cold-chain systems. In Ethiopia's Amhara region, such inefficiencies caused losses of 164.4 tons of fish between 2012-2018, amounting to over USD 397,600, which underscores how systemic gaps undermine both livelihoods and national productivity.

Pradhan Mantri Matsya Sampada Yojana (PMMSY) was launched in 2020 with an outlay of Rs. 200,500 million to drive a "Blue Revolution" and consolidate fragmented fisheries initiatives. Positioned as the country's most ambitious fisheries policy, PMMSY aims to enhance productivity, modernise the value chain, double fishers' incomes, boost exports, and ensure social and economic security. A critical focus is on strengthening post-harvest management, as PHLF, estimated at 10-25% or about Rs. 610,000 million annually, directly undermines India's export targets. While PMMSY envisioned doubling exports from Rs. 465,890 million in 2018-2019 to Rs. 1,000,000 million by 2024, actual exports in 2021-2022 were only Rs. 575,860 million. Comparative port-level data highlights how deficits in infrastructure and PHLF constrain India's global competitiveness, making modernisation of post-harvest systems not just a technical but an economic necessity.

This paper, therefore, analyses the policy objective of modernising and strengthening the fisheries value chain, with special emphasis on post-harvest management and quality improvement, as the fulcrum for achieving PMMSY's broader goals of inclusive growth, enhanced productivity, and global competitiveness. By situating India's experience alongside international evidence on post-harvest fish losses, the study seeks to critically assess how reducing inefficiencies in the value chain can be translated into sustainable livelihoods, improved nutritional security, and strengthened export performance.

## 2 Methodology

This study employs a qualitative policy analysis approach supported by quantitative insights to examine how post-harvest losses in fisheries (PHLF) constrain the export

potential of India. The methodology adopted here is primarily based on secondary data analysis and review of existing literature, drawing from both national and international sources. Official government publications, including the Handbook of Fisheries Statistics, Annual Reports of the Ministries of Fisheries, Animal Husbandry and Dairying, and reports of the Parliamentary Standing Committee, were assessed to capture trends in fisheries production, contribution to GDP, and export earnings, alongside academic studies on fisheries and post-harvest management.

To assess the export implications of PHLF, port-wise export performance between 2010 and 2022 was analysed and logistics capacities across ports. Through this combination of literature review, secondary data analysis, and institutional mapping, the study attempts to understand and address the impact of PHLF on the export potential of fish and fish products from India.

### **3 Review of Literature**

Post-harvest losses in fisheries have long been recognised as a critical challenge for food security and fisher livelihoods, with global estimates ranging between 30-60% across different contexts. Scholarships in this domain has advanced considerably in terms of measurement techniques and typologies. For instance, international research such as Ayalew et al. (2018) applies rigorous FAO-recommended field methods to generate micro-level estimates of physical and monetary losses, identify proximate causes, and highlight differentiated policy needs. In parallel synthesis studies like Keerthana et al. (2022) aggregate national and cross-country data to categorise drivers and interventions, framing the magnitude of the problem at scale. Collectively, this literature shows that PHLF is not only a technical concern but also a governance issue, with direct implications for markets, livelihoods and food systems.

In India, even as one of the largest inland and marine fish producers, scholarly studies on PHLF are scarce and primarily descriptive. Most of the literature is based on policy documents such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) that set out high-level goals but contribute little in the way of empirical data on effectiveness, heterogeneity, or governance constraints. There are few peer-reviewed micro-studies that use hard diagnostics, with key evidence gaps remaining in how to design cost-effective and localised interventions. Ayalew et

al.'s (2018) Ethiopian case shows the scale of the problem: with FAO field procedures and Generalised Linear Model, GLM models, it estimated a 1-7 kg per fisher loss per day and total weight losses of up to 46%, equivalent to close to USD 400,000 over six years. The results are indicative of the significance of cold-chain facilities, value-preserving technologies (e.g., salting, sun-drying), and geographically segmented interventions. Institutional actions- cooperatives, market diversification, and legal enforcement- were also hinted at though not elaborated on.

These findings are applicable to India's context, with weak conservation systems, splintered cold-chains, and market uncertainty prejudicing small fishers in disproportionate ways and leading to severe income loss. Operationalizing PMMSY by way of focused cold-chain investments, value-addition, and robust institutional coordination is therefore essential to addressing systemic inefficiencies and allowing India to achieve its full fisheries export potential.

Throughout the literature, PHLF drivers are consistently listed as poor cold-chains, thermal spoilage, distance to market, bad handling, and seasonality. However, Ayalew demonstrates these differ by lake and actor, highlighting the constraints of one-size-fits-all solutions. Intervention measures range from low-cost preservation (salting, sun-drying) to high-capital infrastructure (cold storage, chilling). International reviews recommend multi-level, cost-effective measures, whereas Indian initiatives such as PMMSY institutionalise these through large-scale funding and the development of infrastructure.

Yet, gaps in governance and implementation are still essential. Research warns that infrastructure cannot deal with structural problems such as wholesaler dependency, behavioral limitations, or ineffective monitoring systems. Notably, equity and livelihood aspects- losses to the income of fishermen, welfare impacts, and inclusive targeting in PMMSY- are under-researched yet important to successful reduction of PHLF.

In summary, PHLF is a quantifiable economic and nutritional problem to be addressed with context-specific technical, market, and governance interventions. Whereas micro-level evidence highlights the necessity for site-specific interventions, macro frameworks offer the policy scaffolding, with achievement

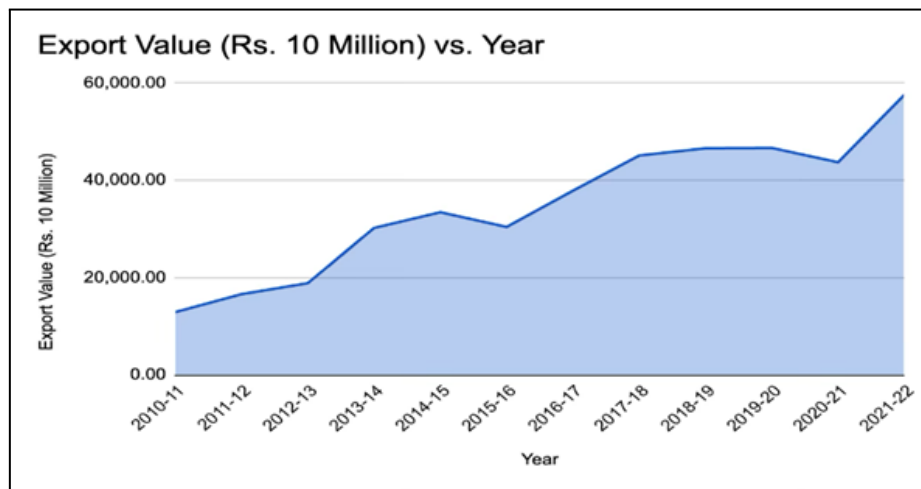
depending finally on closure of the evidence- governance gap through pilots, assessments, and local empowerment.

#### **4 Key findings and discussion**

The analysis of post-harvest fisheries loss in connection with the export of fish and fish products assumes importance due to the significant relation the former share with the latter. According to the Department of Fisheries, the poor post-harvest facilities in India lead to wastage of 25% to 30 % of fisheries resources in India. The gravity of this issue is highlighted in a report by the Parliamentary Standing Committee on Agriculture that finds Rs. 610,000 million worth of annual post-harvest losses in the production of marine and freshwater fisheries in India. The PHLF is, therefore, of major concern to India as it heavily compromises with the share of fish and fish products exported from here. This significantly slashes the income generated by the blue economy.

Through the scheme of PMMSY, India aims to double its export earnings in the fisheries sector from Rs. 465,890 million in 2018-2019 to about Rs 1,000,000 million by 2024-2025. However, the data from the latest Handbook of Fisheries Statistics shows the following trend (Figure:1). In the FY 2021-2022, the share of fish and fish products in export value in million was just at Rs. 575,860 which is way below the anticipated export value of Rs. 1,000,000 million just two financial years before the targeted FY 2024-2025. This is where the PHLF value of Rs. 610,000 million mentioned earlier assumes relevance.

Figure 1: Graph showing the export value of fish and fish products from India for various years (Source: Handbook on Fisheries Statistics, 2023)

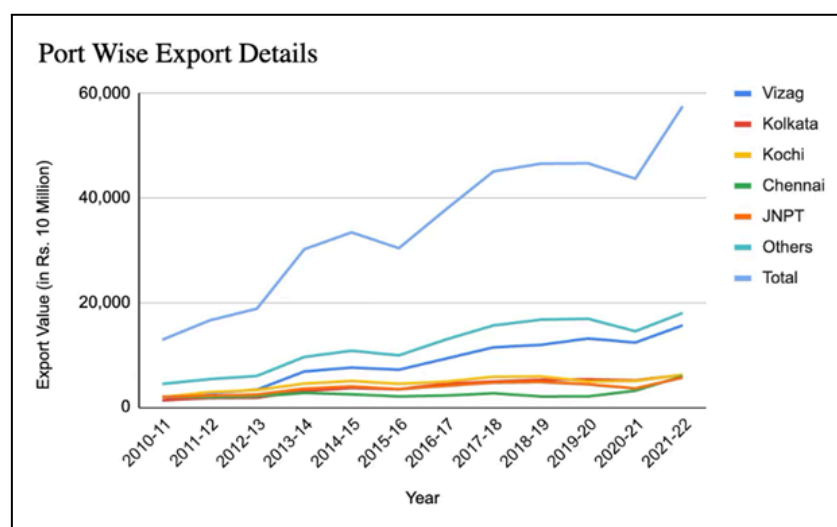


Similarly, if we look at the export of fish and fish products from the major ports in India from 2010-2011 to 2021-2022, except for Vizag and Others (combined data for the ports not included individually), there is no significant increase in the amount of exports from the rest of the ports. For instance, the export in value in 2010-2011 from Chennai (the then largest single contributor) was at Rs. 19,800 million but that of Vizag only at Rs. 13,000 million. Fast forward to 2021-2022, there is a reversal in the trend with Vizag exporting fish and fish products worth Rs. 156,490 million compared to Rs. 59,470 million from Chennai. This astounding growth of Vizag port can be attributed to the Cold-chain logistics and modern processing facilities it has acquired through these years. Chennai now appears like an ‘early leader, later laggard’. While Vizag had 1100% growth over the years, Chennai had only 200% growth. Limited hinterland connectivity might be the reason why Kochi’s contribution has flattened after an initial surge. Meanwhile Kolkata and Jawaharlal Nehru Port Trust (JNPT) show steady but slow growth probably due to infrastructure bottlenecks and port congestion. This shows the need to develop the needed infrastructure and institutional requirements to enable timely export of the fish products from the various ports across the country.

**Table 1: Relative Growth Comparison (2010-11 vs. 2021-22) of various ports in India in relation to fish and fish products (Source: Handbook on Fisheries Statistics, 2023)**

Port	2010-11 (₹ 10 Million)	2021-22 (₹ 10 Million)	Growth (%)
Vizag	1300	15649	1103
Chennai	1980	5947	200
Kochi	1892	6168	226
Kolkata	1314	6169	369
JNPT (Mumbai)	1971	5644	186
Others	4445	18010	305

**Figure 2: Port wise export details about fish and fish products from India (Source: Handbook on Fisheries Statistics, 2023)**



The data above shows how export of fish and fish products is directly linked to the infrastructural facilities of the ports. It is also related to the PHLF as losses incurred can significantly come down with the increased hinterland connectivity, turn-around time in ports etc.

## 5 Conclusion

In short, PHLF brings in a serious setback to India's fisheries sector and thereby slashes the potential of its blue economy. The estimated PHLF at Rs.600,000 million not only offset the export gains but also hinders the wider national objectives of food security, sustainable livelihood, employment generation and income generation. These issues can be addressed through committed investment in infrastructure, cold-chain logistics, and value-chain modernisation. Moreover, ensuring efficient and timely export of fish and fish products from the major ports across India is of utmost importance. The analysis has also shown that while Vizag port is performing better in this regard, the data points from other major ports have painted a pale graph. Better hinterland connectivity and institutional support in the form of infrastructural investment can definitely augment their export performance. These measures must be well complemented by capacity building programmes for farmers to minimise PHLF due to poor handling. There is a dearth of relevant literature on PHLF in India. Therefore, this study eventually opens up the scope for further research to better understand the impact of PHLF on the Indian economy and how it affects different fishing communities along the "happening" coastal lines of India.

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Impact and Policy Research Review (IPRR)  
IPRR Volume 4 Issue 2 (July - December 2025)

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IPRR Volume 4 Issue 2 (July - December 2025)

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Submissions are invited on topics having concrete implications for progressive development, covering a well-grounded policy analysis, that are interdisciplinary or focused on particular disciplines, for example, Economics, Politics, Governance, Geography, Sociology, Gender, and Ethnic Discrimination, Development Studies, Environmental Degradation, Anthropology, and International Relations, with an expectation that all work is accessible to readers across the social sciences. The submissions may be in the form of research papers, commentaries, or book reviews.

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- Special Articles (4000-6000 words)
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Abstract (100 words)

Policy Perspectives (3000-4000 words)

Abstract (100 words)

Special Articles (6000 words)

Abstract (150-200 words)

Young Voices (1000-1500 words)

Abstract (100 words)

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- The manuscript should contain a clear title and an abstract of 200-300 words, with 3-5 Keywords.

- Word count should be inclusive of references, footnotes, and endnotes, following the section-wise word counts as given above.
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Literature Review

Data & Methodology

Results and Discussion

Conclusion

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The Style Guide is given below:

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### **Spelling and Language**

Use American English spellings. For example, ‘organization’, instead of Organisation.

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Do not use full stops in abbreviations such as MP, MPP, NDP, PQ, USA, and OECD. In the first mention, the name should be spelt out in full, followed by the abbreviation in brackets used in subsequent references.

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Spell out one to nine. From 10 up, use numerals. Use % rather than per cent or cent (for example, 10%). Do not use figures in excessive decimal places. At most two decimal places should be reported, with occasional exceptions to this rule, e.g., a regression coefficient of less than 0.005. Millions and thousands should be used instead of crores and lakhs.

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Write out a series of years in full, for example, 1980-1993 (not 1980-93); refer to a decade without an apostrophe, for example, the 1990s (not the 1990's); for specific dates, cite the day month and year in that, for example, 25 May 2004. References to centuries are written in full, e.g., twentieth century (not 20th century).

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When citing sources, it is essential to adhere to the established APA conventions. Specifically, the author's last name and year of publication must be included in the text, as exemplified by (Chakrabarty, 1998). Additionally, a comprehensive reference for each source must be provided at the end of the paper.

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- Always capitalise proper nouns, including author names and initials: M. Chakrabarty.
- One can initiate a quotation by using a signal phrase that comprises the author's last name, followed by the date of publication enclosed in parentheses. Example: According to Banerjee (2012), "Poverty is not just lack of money; it is not having the capability to realise one's full potential as a human being" (p. 139).
- If the author's name is not mentioned in the sentence, then the last name of the author, along with the year of publication and page number, must be enclosed in parentheses after the quotation. For example: He stated, "Poverty is not just lack of money; it is not having the capability to realize one's full potential as a human being" (Banerjee, 2012, p. 139).
- When citing direct quotations from sources without page numbers, a logical identifying element such as a paragraph, chapter number, section number, or table number should be used instead.

Author(s): In the in-text citation provide the surname of the author but do not include suffixes such as "Jr."

- Single Author: As Banerjee (2016) mentions... or (Banerjee, 2016).
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- If you are citing multiple works by the same author in the same parenthetical citation, you should only give the author’s name once and follow it with dates. Sequence: No date citations go first, then years, then in-press (forthcoming articles accepted for publication) citations. Example: (Banerjee, n.d., 2008, 2012, in press).
- For Authors with the same last name, use first the initials of the names followed by last name.
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- Authors' first and middle names should be written as initials. Separate each author's initials from the next author in the list with a comma. Use an ampersand (&) before the last author's name. If there are 21 or more authors, use an ellipsis (but no ampersand) after the 19th author, and then add the final author's name.
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Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. Title of Periodical, volume number(issue number), pages. <https://doi.org/xx.xxx/yyyy>

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### For Books:

Author, A. A. (Year of publication). Title of work: Capital letter also for subtitle. Publisher Name. DOI (if available)

Editor, E. E. (Ed.). (Year of publication). Title of work: Capital letter also for subtitle. Publisher. DOI (if available)

### For Edited Book with Author(s):

Author, A. A. (Year of publication). Title of work: Capital letter also for subtitle (E. Editor, Ed.). Publisher. DOI (if available)

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Author, A. A. (Year of publication). Title of work: Capital letter also for subtitle (T. Translator, Trans.). Publisher. (Original work published YEAR) DOI (if available)

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Author, A. A. (Year of publication). Title of work: Capital letter also for subtitle (# edition). Publisher. DOI (if available)

Example: Mueller, R. 1990. *Ethics and Dilemmas in Politics* (2nd ed.). Oxford University Press, pp 20-22.

#### **For Book Chapter:**

Author, A. A., & Author, B. B. (Year of publication). Title of chapter. In E. E. Editor & F. F. Editor (Eds.), Title of work: Capital letter also for subtitle (pp. pages of chapter). Publisher. DOI (if available)

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Patel, V. (2022). *An Intersectional Gendered Discourse on Empowerment During Pre and Post COVID-19 Pandemic*. IMPRI Books.

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List authors by last name and initials, separated by commas and using the ampersand instead of “and”.

Sharma, S & Tripathi, S (2022). *Indo-Pacific economic framework: Old Wine in New Bottle?* *Impact and Policy Research Review*, 2(1), 70-74.

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Use ampersand (&) instead of “and” before the last author’s name.

Patel, V., Mehta, S., & Tripathi, S. (2023). *Advocating a Feminist Foreign Policy for India*. IMPRI Books.

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Ministry of New and Renewable Energy. (2024). *World Energy Congress 2024: IREDA CMD highlights the need for Innovative Financing Solutions for New and Emerging Renewable Energy Technologies*. Press Information

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**IPRR VOL. 4 ISSUE 2**  
**July – December 2025**

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