

The Role of Public Interest Litigation (PIL) in Shaping Public Policy in India

Boikuntha Das

Assistant Professor, Department of Political Science, Tinsukia College, Tinsukia, Assam, India

ABSTRACT

This systematic review paper examines the role of the Public Interest Litigation (PIL) in framing the Indian public policy using the literature published from 2013-2019. The paper investigates the impacts of judicial interventions through PIL on the process of reforming major sectors, namely those on health, education and the environment. It also examines the changing role of the judiciary in creating social justice and accountability to the government. The research follows the philosophy of interpretivist, an inductive method, and descriptive design, and themes and axial coding will be used as the design of qualitative data analysis. The results indicate that PIL has played an important role in policy setting and the achievement of social justice on the one hand, and entails the threat of judicial activism, elitism and flaws in translations to be carried out, on the other hand. Future research and policy recommendations are included as well.

KEYWORDS: *Public Interest Litigation, judicial activism, policy reform, accountability, environment*

How to cite this paper: Boikuntha Das

"The Role of Public Interest Litigation (PIL) in Shaping Public Policy in India"

Published in

International Journal of Trend in Scientific Research and Development

(ijtsrd), ISSN: 2456-

6470, Volume-4 |

Issue-4, June 2020,

pp.1898-1904,

URL:

www.ijtsrd.com/papers/ijtsrd31622.pdf



IJTSRD31622

Copyright © 2020 by author(s) and International Journal of Trend in Scientific Research and Development Journal. This

is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (<http://creativecommons.org/licenses/by/4.0/>)



1. Introduction and Background

Introduction

In India, Public Interest Litigation (PIL) has been a very powerful tool of the law under which citizens and representatives of the civil society could conduct judicial activism to pursue a public interest. It has greatly influenced policy making as it has contributed immensely to the domain of environmental protection, human rights, and social justice. The paper constitutes a methodical study of the impact of PIL on public policy development, performance, and problems. The paper will review the role of PIL on democratic government and shifts in policy in contemporary India.

Background

PIL emerged as a legal experiment in the late 1970s in India to increase access to justice by marginalised and disadvantaged members of society. Historically, the law courts used to restrict themselves to cases involving a problem personally. PIL, however, relaxed the bar in the locus standi and allowed other interested individuals or organisations to petition in favour of the offended communities (Bhuwania, 2013). This change became an innovation, as a result of which the Indian judiciary became a participant in the promotion of justice in society. Since then, PIL has been very instrumental in solving some of the systematic social and governmental problems, such as environmental degradation, corruption, human rights abuse, and lack of adequate public health infrastructure in society.

PIL and the cross-section of the same with public policy are considered important (Bhuwania, 2013). By making use of

PILs, courts usually prompt legislative and executive arms to either make or restructure a policy. This has resulted in judicial activism whereby the courts have been filling policy gaps in governance, especially in times when the state has not taken action (Sato, 2019). Although it has the ability to cause a groundbreaking change, the application of PIL is at times condemned due to crossing the boundary of a judge.

2. Research Aim and Objectives

The aim of the research is to analyse the impact of PIL on public policy formulation and implementation in India. **The research has the objective** to examine the influence of PIL on the formulation and implementation of public policy in India across key sectors such as environment, health, and education. The research focusses on analysing the role of the judiciary in using PIL as a tool to promote social justice and governmental accountability. **The research has the purpose** to identify patterns and trends in landmark PIL cases that have led to significant policy changes or legal reforms and to evaluate the limitations, criticisms, and unintended consequences of PIL in the context of public policy-making and judicial overreach.

3. Research questions

- How has Public Interest Litigation influenced the formulation and implementation of public policies in key sectors such as environment, health, and education in India?
- In what ways has the judiciary used PIL as a mechanism to promote social justice and ensure governmental accountability?

- What patterns and trends can be identified in landmark PIL cases that have resulted in significant policy reforms or legal changes?
- What are the major limitations, criticisms, and potential risks of judicial overreach associated with the use of PIL in public policy-making in India?

4. Previous Literature

In India, there is much scholarly interest in Public Interest Litigation (PIL), and the discussion of its efficacy, the democratic meanings and possible overreach. According to Jadon and Roy (2019), PIL has been a welcome intervention against the unresponsiveness of the legislature and executive in many spheres where their interventions are likely to benefit society, such as in areas of environmental protection, education, and health. Conversely, Bhuwania (2013) gives a negative picture based on the idea that the hyper activism of the judiciary through PIL has compromised democratic practices and institutional accountability. He argues that the emergence of PIL poses a trend to judicial populism, whereby the courts and the law tend to avoid the process of affected and deliberative policy-making. Accordingly, it can be said that although PIL has made the process of justice more democratic, it threatens inherent institutional checks and balances.

Sato (2017) presents a more general view, where Indian PIL should be interpreted as universal in its moral values but peculiar in the context of the post-colonial, developing state. Conversely, Sen (2019) points out issues of dilemmas that the courts have to deal with as they attempt to play both sides between judicial restraint as well as activism. She criticises the imprecision of PIL parameters and the procedural safety lacking, which in some cases results in frivolous or politically motivated petitions. It can therefore be said that, as much as PIL has increased access to justice, its lack of laid-down procedural order is a matter of concern.

Chandrachud (2018) continues to explain how PIL has played its role in fighting against corruption, especially by structural injunctions granted by the Supreme Court. He refers to PIL as a means of judicial governance, particularly where failure has occurred on the part of the executive agencies. Quite the contrary, Gill (2015) addresses the field of environmental jurisprudence and admits to progressive judicial successes with the help of PIL but notices peculiarities of uneven enforcement and judicial arrogance. It can therefore be said that PIL may enhance the enforcement of policy as well as complicate policy enforcement depending on the implementation of mandates by the judiciary.

Lokaneeta (2017) and Singh (2018) discuss the philosophical and compensatory aspects of PIL, respectively, and Singh points out the requirement of PIL in forming

justice-oriented solutions to the grievances of the disadvantaged. Nonetheless, Lokaneeta is also adamant that the role of the Supreme Court in democracy is too highly idealised. In that way, one can say that the normative appeal of PIL should be balanced with its consequences and institutional implications.

5. Research gap

Although there is a wide body of literature on Public Interest Litigation (PIL), there is a large gap as to whether it has a direct influence on the formulation and implementation of public policy. Whereas Jadon and Roy (2019) and Chandrachud (2018) confirm the transformative power of PIL, long-term policy impacts across sectors are scarce to measure. Bhuwania (2013) evaluates and criticises judicial overreach; however, it does not provide an empirical evaluation of the policy implications. Also, according to Sen (2019), the clarity of surrounding PIL processes is not evident, and thematic reviews are still scarce. Such a gap emphasises the importance of a systematic review to evaluate the role of PIL in shaping policy, striking governance balances, and maintaining democratic accountability in the current Indian context.

6. Methodology

Research design

This study has adopted an interpretivist philosophy to make sense of the subjective and contextual nature of the influence of the concept of PIL on public policy in India (Chowdhury, 2014). It has taken the inductive method, where themes and patterns can be drawn out of the literature instead of testing a hypothesis. A descriptive research design has also been presented to appropriately document and analyse the impact, outcome and limitation of PIL.

Data collection method

The information has been collected through conducting a secondary qualitative systematic literature review of peer-reviewed journal articles, legal commentaries, and case studies published from 2013 to 2019 (Ruggiano & Perry, 2019).

Databases

Scholarly articles, law case reviews, and policy studies that are identified during the research are located on academic databases, such as JSTOR, SSRN, ScienceDirect, and ProQuest (Ruggiano & Perry, 2019).

Search terms

- Public Interest Litigation in India
- Impact of PIL on public policy
- Judicial activism in India
- PIL and socio-economic reforms
- Policy-making India
- Challenges of PIL in India
- Judicial overreach in Indian PIL

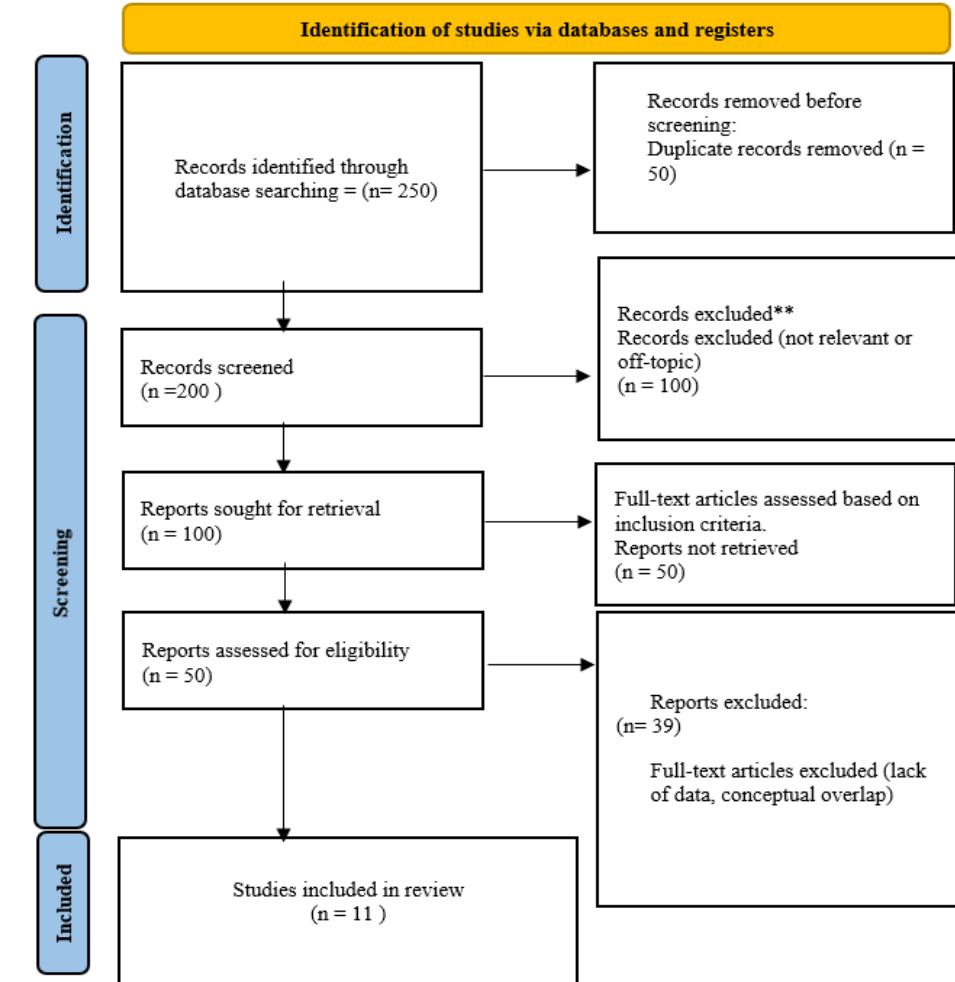
Boolean operators

Table 1: Boolean operators

Keywords	Boolean Operator	Keywords
Public Interest Litigation	AND	Public Policy
Judiciary	AND	Social Justice
Judicial Activism	OR	Judicial Overreach
PIL	AND	Environmental Law
PIL	AND	Education Policy
PIL	AND	Health Policy
Courts	AND	Policy-making
Public Interest Litigation	NOT	United States
Public Interest Litigation	AND	India
PIL	OR	Judicial Intervention

Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed articles published between 2013 and 2019	Articles published before 2013 or after 2019
Studies focused on India and Indian judiciary	Studies based on non-Indian legal systems
Research discussing PIL and its policy implications	Opinion pieces or editorials without academic backing
Articles written in English	Non-English language articles
Legal case studies and empirical/thematic analyses of PIL	Irrelevant topics unrelated to PIL or public policy

Table 2: Criteria**PRISMA****Figure 1: PRISMA**
(Source: Influenced by Selçuk, 2019)**Data analysis method**

Thematic coding and axial coding of qualitative data analysis have been used in the research (Clarke & Braun, 2014). The axial coding was then used in the formation of groupings of related codes into larger thematic groupings that assisted in the identification of patterns and the comparisons of the studies.

7. Result

Authors	Keywords	Sub-Themes	Themes
Behera & Dash (2018)			
Bhuwania (2018)	Health expenditure, public health, PIL	PIL impact on healthcare reforms	Theme 1: Judicial interventions through PIL have influenced policy reforms in health and education
Greenstone & Hanna (2014)			
Niyati (2015)			
Chitalkar & Gauri (2019)			
Jaswal & Singh (2017)	Accountability, judiciary, constitutionalism	Judiciary shaping governance	Theme 2: PIL serves as a judicial tool to promote social justice and accountability mechanisms
Kumar & Narain (2014)			
Zaveri (2014)			
Bhuwania (2014)	Populism, overreach, judicial power	Politicisation of PIL	Theme 3: Patterns in landmark PIL cases reveal transformative impacts and risks of judicial overreach
Bhatty & Dongre (2016)			
Happer & Philo (2013)			

Table 3: Axial coding

Authors	Summary
Behera & Dash (2018)	PIL judgments have compelled state-level reforms, increased public health investment and improved healthcare delivery, especially in underfunded regions.
Bhuwania (2018)	A single PIL judgment caused mass displacement, highlighting unintended socio-political consequences of unchecked judicial activism.
Greenstone & Hanna (2014)	PIL cases addressing pollution have led to stronger environmental regulations and reduced infant mortality, showing direct health and environmental policy gains.
Niyati (2015)	PILs filed for ecological concerns have guided legislative change and stricter enforcement of environmental laws, reflecting judiciary-led policy advancement.
Chitalkar & Gauri (2019)	The Supreme Court has used PIL to hold governments accountable and address rights-based claims, reinforcing democratic responsiveness.
Jaswal & Singh (2017)	PILs have empowered citizens to demand state action on social justice issues, redefining the judiciary as a key policy actor.
Kumar & Narain (2014)	Judicial interpretation through PIL has influenced policy reform, especially where administrative inertia delayed legislative responses.
Zaveri (2014)	Corporate law firms have increasingly shaped regulatory frameworks via PILs, raising questions about elite capture and accountability.
Bhuwania (2014)	PIL has shifted toward elite-driven agendas, blurring lines between justice and governance, and challenging democratic boundaries.
Bhatty & Dongre (2016)	Judicial mandates through PIL have promoted inclusive education policy by challenging structural barriers and expanding access to marginalised communities.
Happer & Philo (2013)	Media often amplify the impact of PIL, shaping public belief and judicial legitimacy, but also risk misrepresenting legal outcomes and motivations.

Table 4: Summary

8. Thematic analysis

Theme 1: Judicial Interventions through PIL have significantly influenced policy reforms in health and education

Judicial interventions through PIL have become known to bring a lot of the shaping of the public policy in India, especially in areas of environment, health and education. With respect to health, the Behera & Dash (2018) study showcased that PIL-initiated mandates resulted in fiscal reforms that ensured improved revenue collection through states' devolution of tax and central transfers, which, in turn, supplemented expenditure on public health in states. As an example, PIL-enforce court orders increased the funds devoted to healthcare by states, decreased out-of-pocket expenses, and increased access.

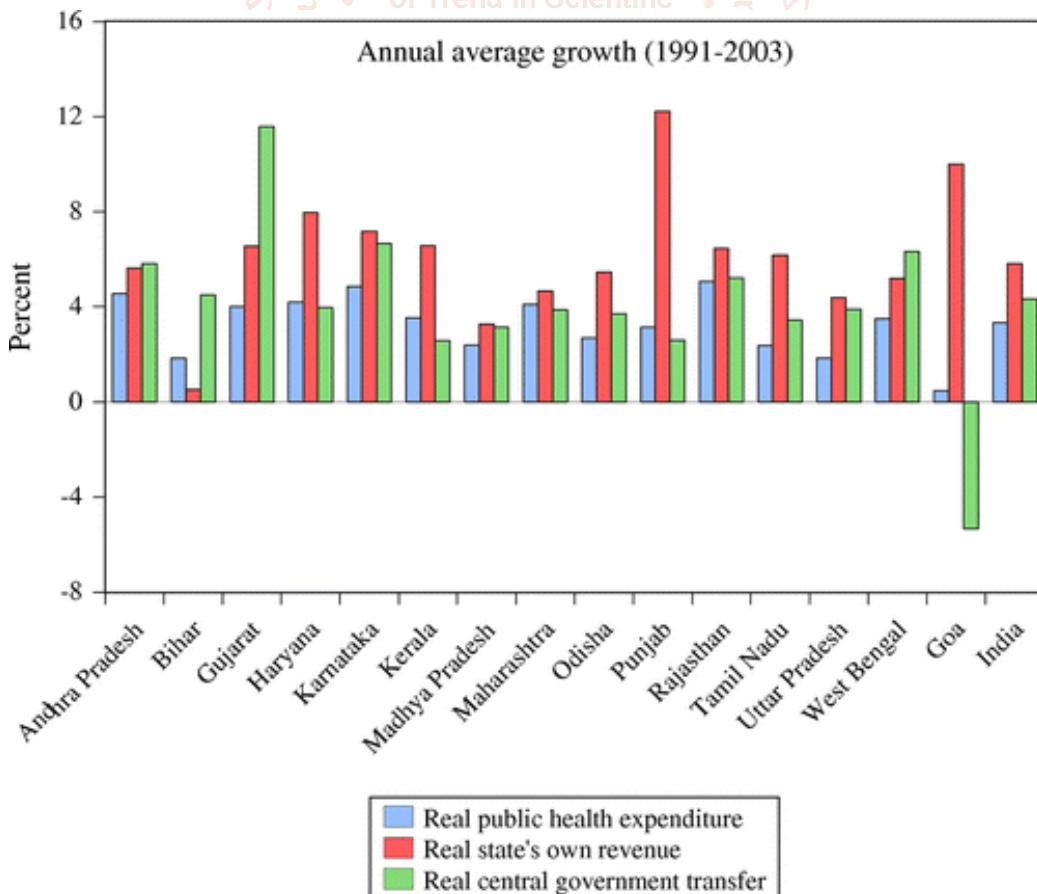


Figure 2: Trends in public health expenditure
(Source: Behera & Dash, 2018)

In the environmental sphere, Greenstone & Hanna (2014) establish that court-imposed pollution controls through PILs, including emission limits on industries, have been associated with enhanced atmosphere and water quality and with a quantifiable reduction in mortality related to infancy. To supplement this, Niyati (2015) highlights the progress that judicial activism via PILs has been providing to the sphere of environmental protection, spurring the austere implementation and changes in policies throughout India.

Nevertheless, Bhuwania (2018) emphasises the dangers of judicial activism: a high-profile PIL resulted in displacement and socioeconomic disruption in the metropolis, where the case, which left one city destroyed, exemplifies the unpredictable outcome of judicial activism without coordinated policy change. Therefore, the PILs have been effective in reformulating policies in the areas of health, environment, and education through imposing tangible state intervention.

Theme 2: PIL serves as a judicial tool to promote social justice and accountability mechanisms

Indian PIL has emerged as an eminent judicial instrument to further the cause of social justice and government accountability. Chitalkar & Gauri (2019) note that social injustices that suggest manual scavenging as well as service delivery, to name a few, have increasingly been entertained as PILs in the Supreme Court, increasing the accountability role of the judiciary. As an example, PILs directing at issuing the practice of manual scavenging forced the state authorities to implement the rehabilitation plan, exemplifying the role of PIL as a systemic change instrument.

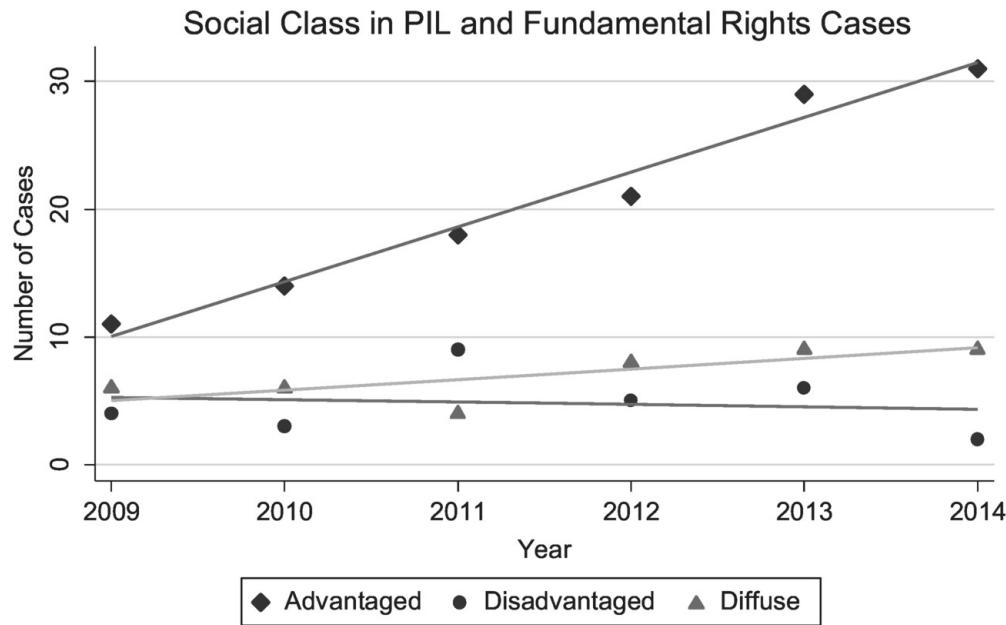


Figure 3: Social class in PIL

(Source: Chitalkar & Gauri, 2019)

In furtherance of this, Jaswal and Singh (2017) point out that judicial activism through PIL, expansion of locus standi and provision of structural directions have strengthened constitutional obligations by curbing executive apathy on the fundamental rights. In this case, judicial-inspired reformation of governance is well illustrated in the landmark Vishaka guidelines on sexual harassment in the workplace.

Kumar & Narain (2014) hold that PIL has served to bring judicial supervision into the process of public administration, thereby triggering the state towards increased openness and accountability in policy making. This weakness was evident in the way the Supreme Court stepped into the issue born out of the 2G spectrum case (Centre for PIL v Union of India); it was judicial interference that led to policy clarity and parliamentary intervention. In the meantime, Zaveri (2014) exposes the emergence of corporate law firm presence as the shaping force behind PIL patterns, which raises more concerns on the issue of capture by elites and where they evade their own corruption accountability. In this way, PIL has served as a courtly tool of social justice and accountability, but the emerging players raise the question of fair representation and the possibility of a change of policy power.

Theme 3: Patterns in landmark PIL cases reveal both transformative impacts and risks of judicial overreach

India Landmark PIL cases in India illustrate a large-scale change in public policy, as well as the threat of judicial activism. Courts post-Emergency Bhuwania (2014) depicts that the post-Emergency upward spurt of PIL has facilitated courts to effect social change, as in the Bandhua Mukti Morcha case, but warns that this flexibility in procedure occasionally allows courts to avoid normal procedures of evidence or the interlocutory regime of protections. This informality in court has broadened opportunities, although it has at times come at the expense of due process.

This is enhanced on a larger scale by media amplification. As demonstrated by Happer & Philo (2013), the media can influence how people see PIL intercessions; for instance, they may perceive judicial rulings as populist victories and shunt away complicated policy discussions. On certain occasions, too much media coverage has coerced courts to make decisions or immediate decisions.

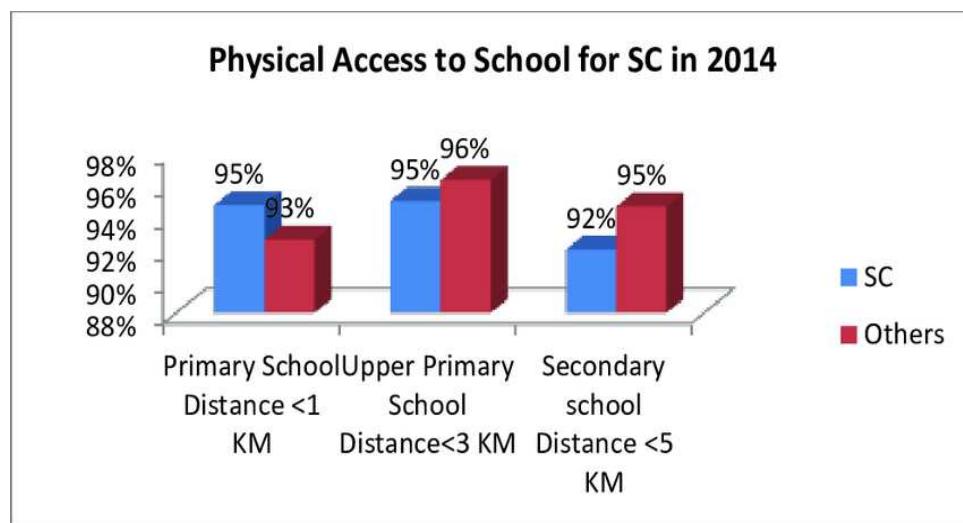


Figure 4: Access to school
(Source: Bhatty & Dongre, 2016)

PILs in the educational sector have echoed the same dualities. According to Bhatty & Dongre (2016), PILs have motivated change in educational access, especially among the marginalised communities, though the potential danger of such policies is overruled by courts, going beyond the scope of legislative requirements. In one example, PIL-based directives in the form of the RTE Act increased school quotas and created challenges in implementation as courts ordered routine executive implementation without a corresponding policy context. The patterns have necessitated an act of balance to maintain the social advantages achieved by PIL but strengthen the procedural protection and joint policymaking.

9. Discussion

This study has been able to answer the research questions as it has delved into the intertwined role of the PIL with regard to defining the public policy in India. In terms of its effects on major areas, such as Behera & Dash (2018) demonstrate how PIL-inspired judicial instructions improved healthcare expenditure and accessibility issues, whereas Greenstone & Hanna (2014) associate environmental regulations as enforced by PIL with air quality and mortality rates improvement. These conclusions emphasise the ability of PIL to change the systemic problem and make the state act. Similarly, Bhatty & Dongre (2016) also represent that the educational reforms guided by PIL enhanced access to education for disadvantaged people, but implementation issues remain a puzzle.

As it is stated by Jaswal & Singh (2017), the state of Rajasthan had structural recommendations to address workplace harassment. The other indication that was established by Chitalkar & Gauri (2019) is that the judiciary actively participated in eradicating social injustices through the implementation of the PIL; this provides reinforcement to the responsibility of the government. However, the patterns of landmark cases, such as those mentioned by Bhuwania (2014), illustrate the change in outcomes and the risk of judicial activism without procedural safeguards and desired socio-economic outcomes. These findings further confirm the apprehensions provided by Happer & Philo (2013) concerning the power of media in the resolution of a case and how the people consider PIL.

10. Conclusion

This study establishes that PIL has been transformational in influencing policy-making in the country and especially in the fields of health, education, and environment in India. PIL has forced the state to come clean and has ensured that the system has been fair, and has strengthened constitutional rights through judicial interventions. It has become an effective instrument to provide the advantage of justice to marginalised groups, as well as a tool with which the judicial

system has become strong enough to effect governance when the legislature or the executive has failed. There are, nevertheless, serious issues of judicial excess and elite impact and implementation that the study also points out. The landmark cases demonstrate that PILs have the potential to cause gradual policy change, but can also present unforeseen outcomes, unless supported through procedural protection or integrated policy models. Institutional checks as well as making judicial activism correspond to inclusive policymaking, should be strengthened.

11. Future scope and recommendations

Future scope

Subsequent research can involve analysis of the contrasting performance of PIL across Indian states so as to understand regional variations of judicial power. The longitudinal studies could be used to measure the sustainability of policy reforms initiated in the context of PIL. Moreover, there are interdisciplinary researchers who could combine legal studies with political science and public administration and might talk more about the phenomena of institutions. It can alternatively be applied to examine the evolution of non-state actors such as NGOs or corporate law firms as actors in shaping PIL trajectories and affecting the policy outcome.

Recommendations

- Make provisions on admissibility and jurisdiction of PILs more detailed to prevent abuse, and pay more attention to substantive aspects of a commonly proclaimed definition of a broad concept of public interest (Jadon & Roy, 2019).
- Encourage consenting relationships among the judiciary, legislature and executive to make judicial orders realistic, practical and term-consistent in terms of long-term policy planning (Lokaneeta, 2017).
- Formulate open systems to monitor the power of such corporate law firms and NGOs within the PILS to mitigate against elite capture and entrench equity (Sato, 2017).

References

[1] Behera, D. K., & Dash, U. (2018). The impact of macroeconomic policies on the growth of public health expenditure: An empirical assessment from the Indian states. *Cogent Economics & Finance*, 6(1), 1435443. <https://doi.org/10.1080/23322039.2018.1435443>

[2] Bhatty, K., & Dongre, A. (2016). India's education policy and its development over time: How has social inequality been addressed. *the background paper for the report The Learning Generation: Investigating in Education for a Changing World. International Commission on Financing Global Education Opportunity*. DOI - 10.13140/RG.2.2.19076.94082

[3] Bhuvanai, A. (2013). *Competing Populisms: Public Interest Litigation and Political Society in Post-Emergency India*. Columbia University. <https://search.proquest.com/openview/cc1e20a9c08425bf5eb00a1cfdfaa0/1?pq-origsite=gscholar&cbl=18750>

[4] Bhuvanai, A. (2014). Courting the people: the rise of public interest litigation in post-emergency India. *Comparative Studies of South Asia, Africa and the Middle East*, 34(2), 314-335. doi 10.1215/1089201x-2773875

[5] Bhuvanai, A. (2018). The case that felled a city: examining the politics of Indian public interest litigation through one case. *South Asia Multidisciplinary Academic Journal*, (17). DOI: 10.4000/samaj.4469

[6] Chandrachud, C. (2018). Anticorruption by Fiat: Structural Injunctions and Public Interest Litigation in the Supreme Court of India. *Socio-Legal Rev*, 14, 170. <https://doi.org/10.55496/ARBC3995>

[7] Chitalkar, P., & Gauri, V. (2019). The recent evolution of public interest litigation in the Indian Supreme Court. In *A Qualified Hope: The Indian Supreme Court and Progressive Social Change* (pp. 77-91). Cambridge University Press. <https://collaborate.princeton.edu/en/publications/the-recent-evolution-of-public-interest-litigation-in-the-indian->

[8] Chowdhury, M. F. (2014). Interpretivism in aiding our understanding of the contemporary social world. *Open Journal of Philosophy*, 2014. DOI:10.4236/ojpp.2014.43047

[9] Clarke, V., & Braun, V. (2014). Thematic analysis. In *Encyclopedia of critical psychology* (pp. 1947-1952). Springer, New York, NY. https://link.springer.com/rwe/10.1007/978-1-4614-5583-7_311

[10] Gill, G. N. (2015). Human rights and environment protection in India: The judicial journey from public interest litigation to the national green tribunal. In *Thought, Law, Rights and Action in the Age of Environmental Crisis* (pp. 123-154). Edward Elgar Publishing. <https://doi.org/10.4337/9781784711337.00013>

[11] Greenstone, M., & Hanna, R. (2014). Environmental regulations, air and water pollution, and infant mortality in India. *American Economic Review*, 104(10), 3038-3072. <https://www.aeaweb.org/articles?id=10.1257/aer.104.103038>

[12] Happer, C., & Philo, G. (2013). The role of the media in the construction of public belief and social change. *Journal of social and political psychology*, 1(1), 321-336. doi:10.5964/jspp.v1i1.96

[13] Jadon, M. S., & Roy, S. (2019). The Role of Public Interest Litigation in Shaping Up the Public Policy Regime in India: Over-Reaching or Justified and the Way Ahead. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3484794

[14] Jaswal, N., & Singh, L. (2017). Judicial activism in India. *Bharati Law Review*, 3, 1-11. <https://docs.manupatra.in/newsline/articles/Upload/0BD8AAF5-4031-484F-AB92-2B84EFE0ABC.pdf>

[15] Kumar, A., & Narain, V. (2014). Public policy and governance in India. *Vision*, 18(4), 257-260. DOI: 10.1177/0972262914555815

[16] Lokaneeta, J. (2017). Debating the Indian Supreme Court: equality, liberty, and the rule of law. *Law, Culture and the Humanities*, 13(3), 353-368. <https://doi.org/10.1177/1743872115596158>

[17] Niyati, M. (2015). Judicial activism for environment protection in India. *International Research Journal of social sciences*, 4(4), 7-14. <https://www.isca.me/IJSS/Archive/v4/i4/2.ISCA-IJSS-2014-327.pdf>

[18] Ruggiano, N., & Perry, T. E. (2019). Conducting secondary analysis of qualitative data: Should we, can we, and how?. *Qualitative social work*, 18(1), 81-97. <https://doi.org/10.1177/1473325017700701>

[19] Sato, H. (2017). The universality, peculiarity, and sustainability of Indian public interest litigation reconsidered. *World Development*, 100, 59-68. <https://doi.org/10.1016/j.worlddev.2017.07.032>

[20] Sato, H. (2019). Commonalities in the Law and Development Movement and the Indian Public Interest Litigation: Reconsidering the Roots of Their Current Difficulties. *The Indian Yearbook of Comparative Law 2018*, 175-189. https://doi.org/10.1007/978-981-13-7052-6_7

[21] Selçuk, A. A. (2019). A guide for systematic reviews: PRISMA. *Turkish archives of otorhinolaryngology*, 57(1), 57. <https://doi.org/10.5152/tao.2019.4058>

[22] Sen, M. (2019). Limitations and Dilemmas of Public Interest Litigation. *International Journal of Legal Research*, 5(3). https://www.researchgate.net/profile/Moumita-Sen/publication/349706007_Limitation_and_Dilemmas_of_PIL/links/603cdcb74585154e8c6e13ab/Limitation-and-Dilemmas-of-PIL.pdf

[23] Singh, V. K. (2018). Compensatory justice jurisprudence in INDIAN Public Law-An Analysis. *NLUA Law and Policy Review*, 3. https://papers.ssrn.com/Sol3/Papers.Cfm?Abstract_Id=3507604

[24] Zaveri, B. (2014). Notes from the Field: How India's Corporate Law Firms are Influencing Her Legal, Policy and Regulatory Frameworks. *HLS Program on the Legal Profession Research Paper*, (2014-19). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2448269