Indian Public Policy Review 2025, 6(5): 18-45
https://doi.org/10.55763/ippr.2025.06.05.002

IPPR

Bottom-Up Meets Top-Down: How NGO–State Coordination Shapes Energy Access in India

Aritra Chakrabarty*

Abstract

This paper examines how state and non-state actors coordinate to deliver energy services in rural India. Using Bindi International's community solar program in Jharkhand, it asks: to what extent can NGO–state coordination advance equitable access to electricity? Drawing on policy mapping (national and state energy policies), program documents, and interviews with local officials and Self-Help Group members, the study analyses vertical coordination between the central government and state government and horizontal coordination between the state nodal agency for renewable energy and other state agencies responsible for rural development, tribal welfare. Findings show partial alignment at the state level around off-grid and last-mile electricity connectivity objectives but lack of institutionalized roles of NGOs in policy documents, and fragmentation of governance as one of the main causes of coordination failure. The paper argues that formalizing NGO roles, resourcing cross-departmental collaboration, and embedding Panchayats in program design can turn NGOs from "implementers" into co-producers of policy feedback and more just outcomes.

Keywords: energy equity, policy coordination, multi-level governance, energy access non-governmental organizations, coordination failure

Publication Date: 12 December 2025

* Aritra Chakrabarty is a postdoctoral research associate at the European Center for Environment and Human Health (ECEHH), University of Exeter.

1. Introduction

This study looks at the extent of policy coordination between state and non-state actors in India's policy landscape. The study undertakes a coordination analysis of India's national energy policy landscape and brings out the role of non-state actors in implementing the government policy objectives.

The research question guiding this study is, "to what extent can state and non-state actors coordinate effectively to meet the energy services needs of the rural communities?". The assessment is based on the study of coordination between Bindi International (an NGO) and the state, reflected in the central government, state government, and local administration. The objective of this study is to show how lack of coordination (misalignment) can impede equitable access to energy services in rural communities.

The concept of off-grid energy systems to fulfil the energy access needs of rural consumers originated in the 1990s (Palit, D., & Chaurey, A. 2013 ; Palit, D., & Sarangi, G. K. 2014). One of the first solar programs was implemented in the Sunderbans delta region of West Bengal, where remote rural villages which were not linked to the grid were supported through a solar mini-grid, funded and implemented by the renewable energy nodal agency of the state (Palit, D., & Sarangi, G. K. 2014). Since then, renewable energy projects based on off-grid technology have proliferated in the states of Chattisgarh, Madhya Pradesh, Odisha, Jharkhand, and Uttar Pradesh. The remote location of some villages in these states creates opportunities for NGOs to participate in meeting energy access objectives, given technical, administrative, and resource capacity constraints of the government (Palit, D., & Chaurey, A. 2013).

NGOs in India work in the capacity of mediator, facilitator, and implementor to bridge the gap in government service delivery for marginalized communties. However, NGOs also face challenges regarding the accountability of their resources, their perceived interference with government service delivery mechanisms, excessive reliance on external funds to meet program objectives, etc. (Sinyosi, M. (2024; Stauffer, N. W. 2021).

Such debates around the role of non-state actors in state policy implementation can be analyzed through the scholarship on policy coordination. This body of scholarship has application in analysis of public-private coordination in various development programs. In India, studies have focussed on public health, education, and agriculture; the proliferation of NGOs as providers of energy services through off-grid technology has not been examined through the lens of policy coordination. Examination of Bindi International's community solar program, implemented in the government policy landscape, shows how lack of coordination affects the intended outcome of access to clean fuel for lighting in rural communities.

This study contributes to the under-researched area of the role of non-state actors in policy design and agenda development regarding public service delivery. In particular, the study contributes to overlooked policy problems in the Global South, by showing the scope of effective coordination

between state and non-state actors in meeting the objective of access to clean energy. The empirical evidence of this analysis is based on subnational coordination between Bindi International, national and state level policy objectives, as well as the rural local administration.

The study challenges the narrative of "NGO as implementer" by showing the opportunities available to Bindi International to utilize its institutional capacity to influence policy feedback in multi-level governance ecosystem.

I chose Bindi International for this study because of its unique position as a non-state actor. Its objectives of education, livelihoods, solar, women empowerment, and community development involves both the government and the community as stakeholders, making it a classic case for policy coordination analysis. The existing scholarship on policy coordination largely focuses on public administration problems of Western democracies, emphasizing government efforts in service delivery, and inter-agency collaboration (Sager. F., 2006; Trein. P., 2017). There is a growing need to understand how private actors, such as NGOs, can effectively coordinate with public institutions in developing countries (Dhiman, S., & Dyal, S. 2018; Gautam. A., 2020; Patnaik, S., & Shambu Prasad, C., 2021).

In the following sections, I first provide a theoretical review of the policy coordination scholarship, its sub-section on the study of coordination among public and private actors, and an overview of to what extent the scholarship has focused on India. I then provide an overview of equity in energy services and describe how community solar programs are positioned to deliver that outcome and why non-government organizations (NGOs) provide the resources to meet the energy needs of remote rural communities. This is followed by a discussion on methodology, wherein I discuss the policy ecosystem using a summative evaluation framework and use of equity as a metric of evaluation of the cost of policy implementation. This is followed by a discussion of results, and finally, a rationale of how this study informs the limited knowledge in the current scholarship using concepts of interdependence of actors and institutional capacity.

2. Literature review

Coordination in public policy is vital, and its analysis has been an important aspect of study for public policy scholarship. According to Charles Lindblom (Lindblom, C.E., 1965), policy coordination is a process by which different actors work together to achieve a shared policy goal by aligning their respective strategies or by avoiding conflicts of interest. According to this definition, policy coordination can be observed and analyzed in two ways: by observing how actors avoid conflict while maintaining their respective interests, or by observing how actors shift from their respective original interests to align strategies to arrive at mutually agreed policy goals.

Fritz Scharpf (Scharpf, F.W., 1994) in his work on analysis of factors of coordination showed that alignment is facilitated by cooperation networks among actors, while conflicts can arise if there's unequal distribution of power among the actors negotiating the terms of coordination. Antonio

Buainain and Arruda Leite (de Arruda Leite, J.P., & Buainain, A.M., 2013) in their work on identifying dimensions of coordination developed a conceptual framework for analyzing coordination. The authors develop two concepts - q. These two concepts encapsulate a wide range of factors that can vary given the geopolitical context. Interdependence arises when actors such as government agencies, organizations, or sectors depend on each other's resources, expertise, or actions to achieve shared goals. Institutional capacity refers to the rules (formal and informal) structure, norms, and resources that enable organizations to coordinate effectively (de Arruda Leite, J.P., & Buainain, A.M., 2013).

For example, in the study of international coordination regarding integration of climate change policies, G.R. Biesbroek and other authors (Beisbroek, G.R., et, al., 2010) show that policy coordination across nations requires monitoring, reporting, and distribution of responsibilities among national actors. Unclear division of power and responsibilities leads to conflict between the national governments. In a study of the public health sector of Australia, the United States, and Germany, Philipp Trein 9 Trein. P., 2017) reveals that coordination works when institutions share their resource capacity to mobilize resources to deliver public services such as healthcare. On the other hand, lack of coherence among institutions on goals and strategies can undermine effectiveness of a public policy due to misalignment (Champion, C., & Bonoli, G., 2011; Chinseu E, et, al., 2018). In another study of international coordination, Andrew Jordan and Andrea Lenschow (Jordan, A., & Lenschow, A., 2010) analyzed environmental policies across European Union member states to show that conflicts can arise due to lack of established procedures on how coordination should work, and inertia of organizations The authors also note that even though the literature provides many conceptual frameworks, there's not much work to show how coordination can be measured.

The review of the selected studies provides two insights. First, effective policy coordination is a result of multiple factors, which can be grouped under two broad concepts: interdependence of actors, and institutional capacity. Interdependence of actors is visible in social networks, knowledge diffusion, and bargaining power. It can range from low to high coordination, depending on the level of autonomy of actors in the policymaking process. Actors across different organizations who are at the same level of administration and functional capacity in a multi-level governance framework can coordinate easier due to ease of interdependence based on diffusion of knowledge, social capital compared to a situation where one actor has power to enforce their objectives over other actors (Gregorio, Di. et, al., 2019).

The second concept, institutional capacity, depends on availability of resources to implement the goals and strategies. Effective coordination results from sharing resources across institutions. Scholarship is predominantly focused on the public administration problems of western democracies (Sager. F., 2006; Trein. P., 2017; Champion, C., & Bonoli, G., 2011; Bolleyer, N., & Borzel, T.A., 2010). Authors have studied overlaps or total separation of government departments/entities that leads to misutilization and/or underutilization of institutional capacities, resulting in negative coordination. This is also understood as policy fragmentation, which is the condition of disjointed

and overlapping public policies leading to conflict, inefficiency across different government levels and sectors (Kissinger, G., et, al., 2021).

Fragmentation is one of the causes of incoordination and is a common feature of a top-heavy bureaucratic framework characterized by diversity of objectives, with resources spread across actors who are disconnected from each other in the policy cycle. Fragmentation is a prominent feature of the government administration of developing countries which have adopted the frameworks and planning process of Western democracies while ignoring the diversity of voices on the ground. The presence of fragmentation and resulting negative coordination is also observed in public private coordination scenarios.

The policy coordination scholarship is not confined to study of governmental actors. Trein and Tosun (Trein, P., & Tosun, P., 2019) investigate the different varieties of public-private policy coordination in EU member states regarding implementation of a youth employment guarantee program. Their findings show that private actors can support the delivery of public goods, if public institutions design the policy strategy to include the scope of involvement of private actors. Their other finding is that countries with higher share of government spending on public goods limits the scope of mobilization of resources from private sector actors, since the role of private finance is limited.

Similarly, Aurisch Beerheide and other authors (Aurich-Beerhide, P., et. al., 2015) in their study of public-private policy coordination in the labour market show that coordination of private sector actors can occur at the policy implementation stage. The scope of this coordination is a factor of the extent of centralization of policy planning. A decentralized planning process provides private sector actors with a higher degree of autonomy. Nigel Caldwell and other authors (Caldwell, N.D., et, al., 2017) have contributed to the findings by showing that coordination can occur through relationship building among actors, despite differences in the economic capacity and scale of operations of public and private institutions. The authors show that parameters like leadership and networking capabilities of individuals in the organizations contribute to alignment of organization's interests.

Coordination studies on public-private actors also encompasses factors like scope of privatization of public services (Moschetti, M., et, al., 2020); involvement of private actors at the local level of governance (Asland, A., et, al., 2020); and citizen involvement in community-led organizations (Hardina, D., 2006). The review of public-private coordination in policy scholarship shows that coordination of a private actor with a public sector actor is a function of capacity constraints. If the national government has a high expenditure on public services, there's lesser resource constraints for delivery of services as it is undertaken in a planned resource allocation manner. Hence there's low incentive for private sector actors to get involved in policy/program implementation stage as providers of government services.

Secondly, fragmentation within the public sector creates conditions for private sector actors to act as implementors of public services, as they are able to utilize the government resources that are locked in the fragmented policy loops. This study contributes to policy coordination scholarship by bringing

out the important role of NGOs as non-state actors for effective agenda setting at the local level. NGOs should be viewed not only as implementors, but also as actors who can set the policy agenda prior to implementation if coordination can be achieved at the subnational levels of government.

2.1. Policy coordination scholarship in India

Policy coordination scholarship in India is built on empirical evidence of how public services to citizens are delivered, particularly employment, rural development, and social wellbeing (Dhiman, S., & Dyal, S. 2018; Gautam. A., 2020; Patnaik, S., & Shambu Prasad, C., 2021). I utilize the concepts of interdependence of actors and institutional capacity given by Buainain and Leite (2013) to review the scholarship pertaining to India.

Coordination problems are visible in the study of the national government's efforts on poverty eradication, which have been tackled through different social welfare programs and schemes. In early work on policy coordination in India, Chanchal Sharma (Sharma, C.K., 2011) looked at internal government relations (interdependence of actors). The author's findings show that higher centre-state coordination through higher participation of states in planning and policy diffusion leads to efficient use of resources to achieve the collective goals of development.

Patnaik and Shambu Prasad (2021) explore the various factors that influence coordination among state governments and non-state actors like NGOs. Their work showed that the institutional capacity of NGOs and traits of the NGO leadership help in positive coordination with state governments in implementing poverty alleviation programs. Ajay Gautam (2020) analyzed coordination from the perspective of inefficiency in public administration. His work looks at the negative factors – excessive bureaucracy, lack of transparency, absence of monitoring in government departments in current process of public service delivery – which create conditions for policy coordination. According to the author, institutional capacity of government departments and the fragmentation necessitates coordination. Even though the focus of scholarship is on analysis of institutional capacity, Bhalotra et al (2023) have analyzed coordination using actor characteristics as well. Their study examines policy coordination because of leadership identity in both government and NGOs. Their work shows how social identities of leadership influences citizens' reactions and responsiveness to social welfare programs.

A review of the scholarship on India shows that NGO-government coordination in India has focused on service delivery in the health and education sectors (Bali, A.S., & Ramesh, M., 2021; Upadhyaya, P., et, al., 2020). Studies highlight how NGOs operate as a "filler" in delivery of public services in a resource-constrained environment (Jörgensen, K., et, al., 2015). There is limited empirical study of energy access as a public service.

2.2 Research Contribution

The review of the literature, and findings from the examination of existing empirical studies reveals three gaps in scholarship. The first gap is lack of empirical evidence on public-private sector

coordination in developing countries, which limits our understanding of how non-state actors use their institutional capacity to work in resource-constrained environments. The majority of the work is concentrated on coordination problems in the United States or Europe (Sager. F., 2006; Trein. P., 2017; Bolleyer, N., & Borzel, T.A., 2010; Trein, P., & Tosun, P., 2019; Aurich-Beerhide, P., et. al., 2015). However, given the increasing role of NGOs in developing countries, there is a need for research exploring how these actors navigate coordination with the public sector institutions in resource-constrained environments (Dhiman, S., & Dyal, S. 2018; Gautam. A., 2020; Patnaik, S., & Shambu Prasad, C., 2021). This study fills the gap through examination of how a top-down approach to policymaking conflicts with the bottom-up approach of NGOs when implementing public welfare programs.

Second, policy coordination scholarship has analyzed the cost of coordination (or the lack of it) using administrative, technical, logistical, jurisdictional parameters that hinder or incentivize coordination but there is no discussion on the social cost of achieving coordination. This normative element in measurement of coordination can be identified and analyzed using equity as a metric of measurement, by identifying whether an equitable outcome was achieved through the coordination between the state and non-state actor.

Finally, the study challenges the narrative in policy coordination scholarship regarding NGOs solely as implementors of public services, by showing how Bindi's institutional capacity is poised to influence policy feedback at local level through coordination with the local level administration.

3. Access to Energy Services in Rural India

People don't desire energy, they demand access to energy services such as access to electricity, fuel for cooking, uninterrupted lighting, heating, cooling, etc. that in turn creates a choice of activities for attaining a decent standard of living for a user (Alkire, S., & Deneulin. , S., 2009; Fell, M.J., 2017; Stewart, F., 2017). These 'choices' are to consume nourishing food, ability to read, access to clean water, harmonious relations with members of the household, and community relations (bartiauz, F., et, al., 2021; Day, R., et, al., 2016; Middlemiss, L., et, al., 2019).

Access to energy services is another way of looking at energy poverty. Since energy poverty is multidimensional and reduction of energy poverty creates choices for individuals, equity is invariably a part of this process (Sadath, A.C., & Acharya, R.H.,2017). Deprivation of access to essential energy services is the cause of, and is caused by energy poverty, which also includes income poverty, social inequality, and gender inequality, which show up in the extent of inequitable access to affordable, reliable and essential energy services (Manasi, B., & Mukhopadhay, J.P. 2024).

The incidence and extent of energy poverty is different in rural areas compared to urban areas because of the difference in forms of inequality across gendered division of labour in a household. For example, in rural areas women have the responsibility to collect fuel for the household and manage energy supply of the household (Kaygusuz, K., 2011).

Rural energy access in India emerged as a policy agenda during the 2000s as prime factor to improve rural development (Palit, D., & Bandopadhyay, K.R., 2017). The Electricity Act (2003) built the national architecture of electricity access including choice of access to consumers, involvement of states, and separate objectives and targets for rural electrification (Palit, D., & Bandopadhyay, K.R., 2017). The Act created obligations for the national and state governments to supply electricity to rural areas. The National Electricity Policy (NEP) 2005 in turn obligated the states to create their respective state-level electricity policy document for universal household electrification including rural electrification.

The policy landscape focuses on utility-scale grid-based solar power plants, competitive electricity markets, incentives for private companies to participate in solar manufacturing, etc. Financial incentives like tax rebates/exemptions, special financial packages to set up solar manufacturing facilities, relaxation of duties on raw materials, land allocation, ease of regulatory clearances, etc., are oriented towards large-scale power plants.

On the other hand, rural electrification is challenged by lack of financial resources, since it is seen to be inefficient for transmission and distribution companies. The quality of grid electricity supplied is also questionable, and the cost of installing a metered connection remains high. There is a lack of rural finance to operate and manage grid connections, and absence of coordination with other rural development objectives (Palit, D., & Bandopadhyay, K.R., 2017).

3.1 The context of study

India's energy landscape is dominated by coal. Out of the total installed power capacity of 476 GW in 2025, 50% was accounted for by coal (MNRE., 2024). Similarly, out of the total electricity generated from all sources, coal represented 72.75% (MNRE., 2024). Within the nominal share of renewable energy sources in the total installed capacity, solar energy has experienced the most substantial growth accounting for 24%, followed by wind power at a distant second (10.3 %). Nuclear (2%) and hydro power (4.6%) also play significant roles [40]. Although the share of clean energy sources both in installed capacity (Gigawatt) and electricity generation (Terawatt hour) has increased over the years, coal continues to dominate (EMBER., 2025).

India's transition toward solar energy gained pace as installed capacity reached 105.65 GW in April 2025, which included 81 GW of ground-mounted and 17 GW of rooftop installations (MNRE., 2024). Around 24 GW of capacity was added during FY 2024–25—its largest annual increase to date (MNRE., 2024). Despite this momentum, coal-fired generation still accounts for over half of the total share in electricity generation. The discrepancy between growing solar capacity and persistent generation from coal reflects deeper structural and policy trade-offs.

Jharkhand, located in eastern India, presents a unique context for study of decentralized renewable energy technologies and its policy implications. As one of India's youngest states formed in 2000, Jharkhand is rich in mineral resources yet faces persistent developmental challenges, especially in rural and tribal regions [(Balakrishnan, R., 2003). Over 26% of its population belongs to Scheduled Tribes

(Census of India, 2011[1]). The Scheduled Tribes face chronic poverty characterized by poor access to basic services including housing, food, water, and electricity (Sharma, K., 2012).

Jharkhand's energy landscape has been characterized by low electrification rates, infrastructural bottlenecks, and unreliable grid connectivity in rural areas. As of 2020, while 87% of rural households in Jharkhand had electricity access, 49% did not have a metered connection (Kottadiel, D., 2020). Despite the central government's efforts under national schemes like the Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY[2]), many remote villages remain underserved due to terrain, economic constraints, and logistical limitations (Palit, D., & Chaurey, A. 2013). In this context, decentralized renewable energy systems such as solar microgrids have emerged as viable alternatives to enhance energy access.

We must also recognize that Jharkhand is home to indigenous population of which ninety percent reside in rural areas. The indigenous (tribal) communities have their own cultural practices, traditional knowledge systems, and socio-economic profile which has undergone changes due to the coal-based economy of the state (Shilee, S., & Shailee, S., 2002). Over time, the tribal communities have faced marginalization due to displacement from their traditional habitats due to coal mining, leading them to reside in further remote areas, which exacerbated their challenge to access electricity, education and healthcare services, that are paid for through coal-based revenue (Haldar, T., &Abraham, V., 2015).

This study also points to the exclusionary pattern of renewable energy transition: a focus on utility-scale, grid-connected projects often overshadows the decentralized solutions needed to address regional inequalities. Jharkhand serves as a critical site to interrogate the implications of this exclusionary policy on marginalized communities. The state's unique socio-economic status marked by tribal identity, rural poverty, and dependence on fossil fuel makes it an essential case for understanding policy coordination in the context of access to essential energy services for the energy poor.

3.2 The policy context

At the national level, the Ministry of New and Renewable Energy (MNRE) is the pivotal body driving India's renewable energy agenda. In Jharkhand, Jharkhand Renewable Energy Development Agency (JREDA) operates under the directives of MNRE as the formal nodal agency in the state responsible for implementing both MNRE-backed and state-funded programs.

As of 2022, JREDA was tasked with executing over 280 MW of off-grid solar including solar pumps and mini-/micro-grid systems[3]. However, the state institutional capacity remains constrained by limited staffing, financial bottlenecks, and a focus on profitable large-scale infrastructure to implement and execute this mandate. Implementation of decentralized models lags, even as policy documents set quantitative targets e.g., ambition to install 110 MW of solar mini-grids by 2027 in Jharkhand (Gupta, L.C.D.K., 2022). The solar policy aims to expand solar parks and agricultural pump solutions but offers less guidance on micro-level community solar participation.

At the grassroots, Panchayati Raj Institutions (PRIs) and Self-Help Group (SHG) federations such as Mahila Vikas Mandal (MVM) play frontline roles in mobilizing local energy demand and managing distribution systems. However, their participation in formal planning and decision-making is limited or absent. District bodies such as village energy committees frequently serve as informal implementation partners but lack formal recognition in state level planning (Alsop, R., et, al., 2001). The local energy landscape thus depends heavily on NGO-led programs to fill institutional gaps. Their ability to coordinate vertically with JREDA and horizontally with PRIs and civil society becomes a key determinant of how national decentralization ambitions translate into equitable outcomes.

3.3 Why decentralized energy projects

The total installed capacity of off-grid solar in India is 5.01 GW (2025) out of which less than two percent (88 MW) is in Jharkhand (MNRE., 2024). Off-grid solar installations were spearheaded by NGOs, to improve rural energy access to address energy poverty in remote areas where grid infrastructure is economically and/or technically unfeasible.

In 2019, the central government launched the Prime Minister's Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) program to ensure energy security for farmers through decentralized solar plants and stand-alone solar agriculture pumps dedicated for improving livelihood through agriculture activities [40]. These initiatives have largely been driven in coordination with state renewable energy agencies, grassroots organizations, and local governing bodies such as Gram Panchayats.

Decentralized off-grid electricity programs have been implemented in the states of West Bengal, Bihar, Chhattisgarh, Lakshadweep, Madhya Pradesh, Odisha, Uttar Pradesh, and West Bengal either as stand-alone solar PV systems, biomass, or hydro systems (Palit, D., & Chaurey, A. 2013; Palit, D., & Sarangi, G. K. 2014). Such technologies have proliferated in these states, especially to remote villages where grid connection was neither cost-effective nor technologically feasible mode. As a result, the energy supply was inadequate to meet the demand (Palit, D., & Chaurey, A. 2013; Manasi, B., & Mukhopadhyay, J., 2024; Palit, D., & Bandopadhyay, K.R., 2017).

3.4 About Bindi International

Bindi International Association was established on July 20, 2015, with the aim of empowering rural women across India and contribute to the achievement of the United Nations' sustainable development goals (UNSDGs). The organization is headquartered in Harmara village, Ajmer District in Rajasthan state and operates with the fundamental belief that women should be at the forefront of all initiatives focused on fostering economic and social development.

The organization's focus on sustainable development through women's empowerment is evident in their approach to provide financial independence to women in rural areas. Women's entrepreneurship development has been instrumental in achieving women's empowerment and economic independence. Bindi International also trains on digital literacy, marketing skills, banking skills to women in remote areas to enable them to participate and access all the opportunities presented in the rapidly evolving digital world around them.

3.5 Bindi's community solar program

Bindi International's model is a multi-dimensional approach: distributing solar home systems, empowering local women through training as "solar mamas," and fostering village energy enterprises. This strategy intentionally bridges energy provision, livelihood generation, and gender equity, diverging from the dominant policy focus on grid-centric solutions and large-scale renewable infrastructure.

The objectives of the community solar program are 1) to provide access to electricity for the non-electrified and under electrified households, 2) provide skill training of solar technology to rural women, and 3) establish women as key resource of delivering renewable energy solutions in rural, remote communities. The intended outcome for Bindi International is economic development of the community and women empowerment through a secondary livelihood that is created through technical training, providing access to finance, marketing training, and administrative support through the social capital of the local SHG federation MVM.

In the case study region, I found that the existing social capital of Self-Help Groups (SHGs) helped Bindi International to implement the community solar program. SHGs are the network of actors that were designed to support rural income of women through micro finance (Gugerty, M.K., et, al., 2019). An SHG comprises of 10-20 local women who come together to form the organization and create a bank account associated with the organization (Shastry, G.V.R.R.S, 2022). Women members make monthly contributions to the group to build capital and utilize the credit for livelihood and entrepreneurial activities, improving financial health and use the social capital of the group to empower each other through development activities (Gugerty, M.K., et, al., 2019; Shastry, G.V.R.R.S, 2022; Parwez, S., 2013).

Bindi International utilized the social capital of Mahila Vikas Mandala (MVM), a grassroot women's federation that has formed several SHGs in villages of Gumla District of Jharkhand. MVM works on education, health and sanitation, livelihood end employment, create local autonomy in rural communities and improve administration of government programs (Gupta, A.K., 2012).

3.6 Solar technology in rural setting

Bindi International, along with MVM, conducted community meetings with the Gram Panchayat to understand the electrification status of households in the village, the energy needs, and the fund required to install the systems in the identified households in the village. Based on the inputs from

the community meetings prior to implementation, the NGO chose a Solar Home System (SHS) design that includes a 100-Watt capacity, four LED lamps, one direct current (DC) fan, and a mobile charging point. The system provides lighting for a duration of 6 – 12 hours and takes up to 8 hours to fully charge the battery.

4. Methodology of the study

The methodology of this study is the based on policy mapping of India's energy policy landscape, the summative evaluation of Bindi International's community solar program, and evaluation of the outcomes at the site of program intervention. Summative program evaluation is an ex-post evaluation conducted after the implementation of a program and focuses on measuring the outcomes against the program goals/objectives (Janus, M., & Brinkman, S., 2010).

This practice is common and is used by all levels of government, from local municipalities to central government (Kaczmarek, K, & Romaniuk, P., 2020). Usually, summative evaluation is used in evaluating effectiveness of learning process or education programs (Bhat, B.A., & Bhat, G.J., 2019; Bin Mubayrik, H.F., 2020; Murray, H.G., 1984) and public health programs (Kaczmarek, K, & Romaniuk, P., 2020; McGrath. J.C., 1991; Scanlon, D.P., et, al., 2016). However, none of the established evaluation techniques could be directly applied to this study. I've combined policy mapping, qualitative data analysis, and document analysis to create the summative evaluation methodology for this study. I used an inductive approach to ascribe meanings to the data and associate it with the scholarship of this study (Bingham, A.J., 2023).

4.1 Analytical Framework

The objective of this analysis is to determine the extent coordination between state and non-state actors through the study of this community solar program. The framework is informed by scholarship on multi-level governance (Jordan, A., & Lenschow, A., 2010; Jörgensen, K., et, al., 2015), and policy coordination in complex policy systems (Gautam. A., 2020; Patnaik, S., & Shambu Prasad, C., 2021).

The core of this framework is based on two dimensions: policy coordination mechanisms and energy equity. Policy coordination in this study is defined as the extent of alignment between central, state, and non-governmental actors in the design and implementation of energy access policies (Bolleyer, N., & Borzel, T.A., 2010). Coordination is enabled by resource capacity, technical knowledge, and adequate resource flows (Jordan, A., & Lenschow, A., 2010), and is constrained by bureaucratic fragmentation, entrenched power hierarchies, and uneven access to policy networks (van Bueren, E.M., et, al., 2003).

Energy equity is multidimensional. It includes distributional justice in the allocation of benefits from implementation of policy/program and procedural justice which evaluates inclusive participation in decision-making processes (Jenkins, K., McCauley, et, al, 2016). This approach recognizes that energy poverty is not merely a technical deficit but an outcome of structural

inequality, political exclusion, and market-oriented transitions that bypass marginalized groups (Yenneti, K., & Day, R., 2015).

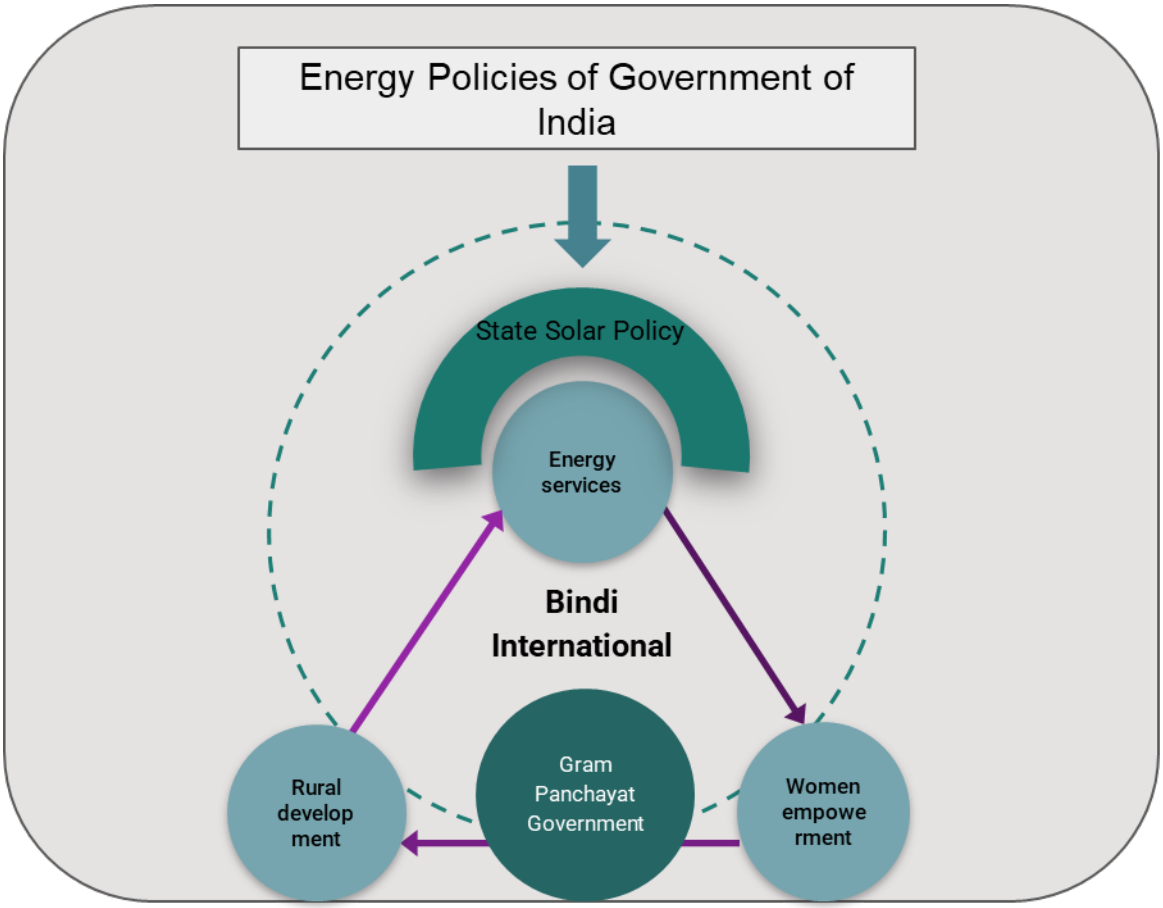
The analytical framework is visualized in Figure 1, which illustrates the policy ecosystem of the state, the non-state actor Bindi International within that ecosystem, and the resulting outcomes as a result of coordination or incoordination. The national-level energy policies determine the boundaries of implementation of state energy policies. Each state creates a state specific solar policy under the statutory requirements of the National Electricity Act (2003). The primary goal of state solar policy is to meet the energy services needs of the state through combination of fiscal, monetary, legal incentives. In the case of Jharkhand, JREDA is responsible for implementation of state specific solar programs, schemes, etc. as described in the State Solar Policy of Jharkhand.

At the other end of the circle is the lowest unit of government administration, the Gram Panchayat. The Gram Panchayat is the lowest level of government in the Indian administration, constituted of members who are elected by the village population (Alsop, R., et, al., 2001). Gram Panchayat oversees the administration of one to more than one village. It is responsible for implementing rural development programs which include central and state government schemes such as PM-KUSUM, DDUGJY, etc.

Bindi International is a nonstate actor external to this policy ecosystem. It has its own set of objectives – provide rural last mile electricity solutions (energy services); provide training and capacity building to rural women (women empowerment); improve village economy through solar entrepreneurship among women (rural development) that determines the boundary of operation, represented as the triangle.

I visualize the operational boundaries of Bindi International defined by the objectives as a triangle overlayed on the policy ecosystem of central, state policies. This framework represents the extent to which the state and Bindi International can coordinate as well as the possible extent of misalignment. The energy services objectives fit well within the state level solar policy directives. On the other hand, rural development, women empowerment are at the periphery of the ecosystem, representing areas of conflict between the state and Bindi International. The framework centers the coordination between state, nonstate actors, using equity in energy access as the theme, and speaks to the growing literature on policy coordination in the Global South (Zhang, P., & Gu, H., 2023).

Figure 1 Framework of coordination



4.2 Data and Analysis

The data for this study consists of policy documents (four national level and one document of Jharkhand) regarding electricity access (The Electricity Act and National Electricity Policy), energy efficiency (The Energy Conservation Act), solar policy (National Solar Mission and Jharkhand State Solar Policy). The policy mapping forms the first part of coordination analysis.

The second part of summative evaluation is based on document analysis of data obtained from Bindi International's program documents and analysis of qualitative data from interviews conducted with Bindi International's management team, Chairman of the Gram Panchayat, and group discussion with the SHG women members who are beneficiaries of the community solar program. The objective of each type of data analysis and key findings have been summarized in Table 1 below.

Table 1 Summary of data analysis

Data Source	Count	Objective	Key Findings
Policy documents of government of India and Jharkhand state	Five documents (four national documents, one state document)	The presence/absence of energy equity in India's energy policy landscape	Vertical alignment between national and state solar policies asymmetric; administrative bottlenecks. Limited horizontal coordination between energy and rural development departments; implementation silos.
Program documents of Bindi International	Two documents	Whether program outcomes align with the intended objectives	Coordination between Bindi and Gram Panchayat is not operationalized, which is a missed opportunity to utilize the Gram Panchayat's administration to create equitable distribution of benefits.
Interview with Chairman of Dumardih Gram Panchayat	One interviewee, recruited in coordination with MVM	Determine the participation of the local government in implementation of the program	Village electrification is not equal to household electrification. Benefits of government schemes and/or NGO programs are influenced by income poverty, social hierarchy, ethnicity.
Group discussion with household beneficiaries	One discussion with ten SHG members who are beneficiaries of the program	Determine the distributive and procedural justice in the implementation of off-grid solar programs	Local voices are largely excluded from planning and monitoring; engagement is top-down and one dimensional.
Group discussion with Bindi International's management team	One discussion with five persons. The team was recruited through email communication.	Determine the challenges and opportunities for Bindi to operate in the policy environment	Subsidies primarily benefit large-scale developers; limited support for community-led solar.

The group discussion was conducted online with the management team of Bindi International comprising of five persons. The discussion lasted two hours, and the recording of the discussion was later used to transcribe the data. The transcription was then converted to codes and themes. The

interview with the Chairman of the Gram Panchayat was conducted on site for a duration of two hours. The group discussion with the SHG members was also conducted on site where the community solar program was implemented. Recordings of the interview and discussion were converted and formatted into textual data after removing participant identifiers.

Top-level coordination is analysed using policy mapping of the National and State policies, document analysis of the program document, and analysis of discussion with Bindi International's management team. Analysis of bottom-level coordination is based on document analysis of Bindi International's program documents, in-person interview with the Chairman of the Gram Panchayat, and group discussion with household beneficiaries.

4.3 Vertical and Horizontal Coordination Challenges

Analysis of national and state policy documents revealed asymmetrical relationship between MNRE at the centre and JREDA. While national renewable energy policies promote both grid connected and off-grid solar applications through large-scale programs such as the National Solar Mission (NSM)[4], state-level implementation is constrained by lack of fiscal autonomy and technical capacity [63]. As stated earlier, the energy needs at the state level are specific to the socio-economic conditions, which in the case of Jharkhand are linked to a coal-based economy.

Transition to a renewable-energy-based economy requires human resources trained in renewable energy technology, fiscal independence, ease of access, and an energy culture that is currently missing at the state level. Secondly, at the state level, horizontal integration across departments such as JREDA, Department of Rural Development, and Jharkhand State Tribal Cooperative Development Corporation is missing from the State Solar Policy document. Interviews with Bindi Management team show that solar technology deployment is implemented in silos, without coordinated planning with other actors to align strategies. This adds another layer of challenge in policy coordination between the state and the NGO.

4.4 Assessing Energy Equity Outcomes

Analysis of the state solar policy document shows that while grid-based solar plants expanded the state's installed capacity from 36.4 MW in 2017 to 73.6 MW in 2022, the benefits accrued primarily to urban consumers and businesses. Interview data revealed that subsidies and incentives disproportionately supported large-scale developers, with minimal attention to decentralized community-led models. Participants from the group discussion with Bindi team noted that "there isn't too much focus on rural electrification in energy policy, neither are guidelines present in the policy document on how NGOs can operate to implement off-grid technology applications."

Community group discussions revealed how rural households – especially indigenous community households – continue to experience energy poverty despite being counted as electrified. In the hamlet of Dumardih Gram Panchayat, women respondents from households who were beneficiaries of the community solar program shared that although the SHS is useful, they consider grid electricity

connection as the beneficial outcome. However, grid electricity connection is limited to street lighting, and household connection requires metering, which is cost prohibitive. The absence of women in decision making regarding the scale of the technology has made them indifferent to the benefits derived from the program.

The differences between how a household is considered electrified and the lived experience of the beneficiaries highlight the procedural and distributive inequities. The heavy focus on solar applications in agriculture (PM KUSUM) has limited access to only certain section of rural households, who have the capacity to buy these higher-scale systems. Households with income vulnerability, limited land holding, and low purchasing power are left out of the transition process.

5. Results and Discussion

The key findings from the analysis are that the goals of Bindi International are more coordinated with state energy policies as compared to national energy policies. Secondly, within the given scope of coordination at subnational level, Jharkhand's policy on rural community energy access is best aligned with Bindi's energy services objective, and less with women empowerment and rural development objective (Figure 1).

The cause of misalignment between the state and Bindi International results from fragmented interdependence of government departments, which fail to coordinate with the NGO. Finally, Bindi International can be an actor in agenda setting of public policy at the local level, given its institutional capacity, if it could coordinate with the Gram Panchayat's capacity and resources to implement the program with more equitable outcomes.

Table 2 summarizes the findings from the evaluation of the goals of Bindi International with the policy objectives of government (both National and State level). The coordination is analyzed on a scale ranging from nil (no alignment) to high (maximum alignment). The state policies have been summarized into eight policy goals and have been examined for alignment with Bindi's four program goals.

The alignment matrix shows that goals focused on access to energy services along with women empowerment are more aligned with state policies that are specific on community solar, training in solar, employment in solar, last-mile connectivity, and promotion of off-grid solar. The alignment matrix shows that a policy which speaks to the community's energy needs will be best aligned with the NGO's objectives. In the following sub section, I discuss how policy coordination differs at the top and at the bottom using the findings from this alignment matrix.

Table 2 Policy alignment matrix

		Program goals			
		Fulfil energy needs of rural communities	Gendered training in solar	Community ownership	Creating rural livelihood
Policy Goals	Electricity generation	Nil	Nil	Nil	Nil
	Universal Access	Low	Nil	Low	Medium
	Increased participation of private sector	Nil	Nil	Low	Medium
	Energy efficiency	Nil	Nil	Nil	Nil
	Increase in % of grid solar in electricity generation	Nil	Low	Nil	Medium
	Promote the solar manufacturing industry	Low	Nil	Nil	Nil
	Last-mile connectivity	Medium	Nil	Nil	Low
	Promote off-grid solar	Medium	Medium	High	Low
	Skill training in solar	Nil	High	Low	Medium
	Employment in solar	Medium	Medium	Nil	Medium
	Community solar	High	Medium	High	High

5.1 Policy coordination at the top

The policy landscape for rural electrification in India presents significant challenges for NGOs like Bindi International, whose operational boundaries are defined by the small scale of technology and financial resources. Government policies prioritize large-scale grid expansion, requiring substantial public and private investment, while offering little institutional or financial support for small-scale,

community-based initiatives. As a result, there is a misalignment between the state and the nonstate actors working in rural electrification.

The primary challenge is the absence of specific guidelines in the policy documents on how NGOs can improve access to energy services using decentralized technologies. Unlike large-scale grid projects that receive government subsidies and investment incentives, small-scale solar home systems lack recognition in policy documents. Without targeted financial incentives, NGOs must independently raise funds through donors or develop monetized models where beneficiaries contribute financially to sustain program operations. This lack of institutional support limits the scalability and sustainability of decentralized energy initiatives in rural communities.

The second challenge is the lack of acknowledgment by the state government of the role of NGOs as key stakeholders in addressing rural electrification. Although state-level policies are more specific, they treat rural electrification, skill training, and women's empowerment as independent, mutually exclusive policies. Each policy in turn depends on separate government departments to be coordinated. This creates additional barriers for NGOs who synergize access to energy services with women empowerment, limiting their scope of coordination with any government department. Thus, NGOs and their contributions remain unacknowledged from policy objectives, because they can't coordinate with any particular department, which in turn is a result of the disjointed polices.

For example, JREDA has the potential to coordinate with other state departments, such as the Department of Scheduled Tribe, Minority, and Backward Class Welfare, and the Rural Development Department, to design skill training programs and livelihoods programs centered around community solar. However, such coordination needs to happen at two levels – first across government departments through inter-governmental collaboration, and then engagement with the NGO, a process that is not established in the existing policy. Bindi International could benefit from sharing its institutional resources with JREDA, while JREDA could assist with financing the implementation of the program.

5.2 Policy coordination at the bottom

"Our Panchayat was not involved with the program design or selection of beneficiary households. I'm supportive of the solar program but it would benefit the community to have a bigger scale technology such as a micro grid with a recharge system that connects a group of households on a pay-as-you-go basis model. If there's government support or if the company can help subsidize the cost of installation, that would ease the financial burden on the households."

The above quote is from the Sarpanch of the Gram Panchayat during the interview at Dumardih. This quote reveals the missed opportunity of Bindi International to influence policy making at the local level with the Sarpanch.

While coordination with the centre or the state is fraught with challenges of financial unviability, conflict of objectives, coordination at the bottom is also currently missing. In a multi-level governance

system, coordination is easier at the grassroots level where the two actors are horizontally at the same resource capacity to influence each other (Bolleyer, N., & Börzel, T. A., 2010) . In this case, the level of interdependence could have been much higher, leading to better outcomes for the beneficiary households if both the actors had utilized their respective capacities in a coordinated manner.

The village level government has sufficient resources to conduct community meetings regarding demand assessment, widen the reach of the technology to more beneficiary households, and provide financial support for the project success. It can map the demography of the village(s), identify specific energy needs of tribal and non-tribal groups across income disparities, and provide manpower support to operate and maintain the program. On the other hand, Bindi International has the capacity to use its knowledge and expertise to impart skill training to create 'choice' of new livelihoods for rural women and 'capability' of users to determine how they access energy services, and to raise capital to scale up the program. In this way, the NGO could coordinate with the local administration to create a policy that is context specific, coherent with the socio-economic inequalities, and hence produces more equitable outcomes for larger number of beneficiaries. The bottom-level coordination would be better if Bindi shared resources with the administration and utilized the Sarpanch's authority and his experience of working with the village to design the program, such that it was embedded in the socio-economic diversity of the community.

Bindi as an actor has a higher degree of autonomy at the local level, and it can leverage its knowledge capacity, resources, and infrastructure to influence the policy implementation of rural electrification. Higher degree of interdependency among these two actors will lead to effective coordination and ultimately higher success in program outcomes compared to the limited success. The current skills obtained are too limited to create any employment opportunity for women. Thus, there's a missed opportunity to align the program goals with the goals of the Gram Panchayat to address equity in access to energy services within the community.

6. Conclusion

This study approaches policy coordination between public and private actors from two ends – coordination at the top, and coordination at the bottom. The findings of this study emphasize the importance of policy coordination in addressing equity in energy services in rural India, particularly through the collaboration between NGOs and state level government. Based on the findings, the study has identified three contributions.

First, national and state-level energy policies should institutionalize the role of NGOs as key stakeholders in policy agenda setting. In the case of energy access, the government can integrate NGOs into the policy framework, leverage their institutional capacity, grassroots networks, and expertise in implementing small-scale renewable energy projects. This should be accompanied by incentives and enablers on how NGOs can implement decentralized energy programs.

Such an approach addresses the gap in public-private sector coordination in developing countries, as highlighted by Dhiman and Dyal (2018) and Ajay Gautam (2020). This study contributes to this scholarship by demonstrating how NGOs can influence policy feedback and improve program delivery when given the space to coordinate with government institutions. Furthermore, this study challenges the traditional narrative of NGOs as mere implementers and instead positions them as active participants in shaping policy outcomes (Kissinger, G., et, al., 2021; Trein, P., & Tosun, J., 2019).

The study reveals that coordination at the bottom, between NGOs and village government administration, is currently underutilized. The Gram Panchayats possess significant institutional capacity and social capital that can be utilized to enhance the reach and legitimacy of community-based energy programs. NGOs like Bindi International should actively engage with the Panchayat to design and implement programs that are attuned to the specific socio-economic and gender roles in such communities. By promoting coordination between NGOs and local governments, the study builds on the conceptual framework developed by Buainain and Leite (2013), which emphasizes the importance of interdependence among actors and institutional capacity in achieving effective policy coordination.

This study also brings out fragmentation as one of the major causes of negative coordination. The current policy landscape in India is characterized by overlap of policy objectives; each has a respective target outcome, and governmental actors respond uniquely to policy objectives that align with their exclusive capacity. Interdependence and capacity utilization is absent. This fragmentation creates barriers for NGOs to identify a state actor to coordinate.

To address this at the state level, government agencies and NGOs should be able to speak with each other in a manner that is institutionalized in the state-level policy document. Through these efforts, NGOs can move beyond their traditional role as implementers and become active participants in shaping policy feedback and decision-making processes. This shift will not only improve the effectiveness of rural energy programs but also contribute to the broader goals of sustainable development and gender equity.

The study contributes to the existing literature on policy coordination by demonstrating the importance of interdependence among actors and institutional capacity in achieving effective policy implementation, particularly in resource-constrained environments. It also highlights the need for future research to explore the long-term impact of policy coordination on rural energy access and community development, using methodologies such as summative evaluation to assess program outcomes.

6.1 Limitations of the study

This study has several limitations that should be acknowledged. First, while the policy mapping framework enabled a systematic analysis of national and state-level energy policies, it does not include

a systematic analysis of budgetary flows or state-wise energy access demand and supply, which could strengthen the analysis. Secondly, some potentially relevant documents particularly those implemented at sub-state (district) levels were not available publicly in digital format, and moreover, there was no access to physical documents.

Second, the empirical data collected through interviews and focus group discussions was limited in scope due to logistical and time constraints. Many JREDA officials declined telephonic or in-person interviews which would have made the qualitative data more robust. Since this study is based in Jharkhand, it does not capture policy variations in implementation or outcomes across other states in India. While the study integrates key concepts such as multi-level governance and fragmentation, it does not utilize a comparative framework for policy types. A cross-state comparative analysis could have offered broader generalizability and insights into diverse coordination dynamics and equity outcomes.

Finally, the study largely adopts a qualitative and post evaluation methodology. While this approach is useful for understanding program outcomes through lived experiences and institutional processes, using quantitative metrics of energy access and socio-economic indicators could complement the analysis and strengthen its analytical rigour. Future research could build on these limitations by incorporating mixed-methods and longitudinal tracking of policy impacts.

References

Palit, D., & Chaurey, A. (2013). Off-Grid Rural Electrification Experiences from South Asia. In (Vol. 116, pp. 75-104). https://doi.org/10.1007/978-1-4471-4673-5_4

Palit, D., & Sarangi, G. K. (2014). Renewable energy based mini grids for enhancing electricity access: Experiences and lessons from India.

Sinyosi, M. (2024). Renewable Energy in Rural Areas: Challenges, Opportunities, and Successful Rural Projects. Climate Change Writers. Retrieved March 15 from https://climatechangewriters.com/stories/renewable-energy-in-rural-areas-challenges-opportunities-and-successful-rural-projects

Stauffer, N. W. (2021). Encouraging solar energy adoption in rural India. MIT News. Retrieved March 15 from https://news.mit.edu/2021/encouraging-solar-energy-adoption-rural-india-0401

Sager, F. (2006). Policy coordination in the European metropolis: A meta-analysis. West European Politics, 29(3), 433-460.

Trein, P. (2017). Coevolution of policy sectors: A comparative analysis of healthcare and public health. Public Administration, 95(3), 744-758.

Bhalotra, S., Clots-Figueras, I., Iyer, L., & Vecci, J. (2023). Leader Identity and Coordination. The Review of Economics and Statistics, 105(1), 175-189. https://doi.org/10.1162/rest_a_01040

Di Gregorio, M, Fatorelli, L., Paavola, J., Locatelli, B., Pramova, E., Ridho Nurrochmat, D., May Peter, H., Brockhaus, M., Sari, I.M., & Kusumadewi. S.D. 2019. Multi-Level Governance and Power in Climate Change Policy Networks. Global Environmental Change 54 (1): 64–77. https://doi.org/10.1016/j.gloenvcha.2018.10.003.

Dhiman, S., & Dyal, S. (2018). The challenge of Governmental policy coordination in India. challenge, 3(1), 113-117.

Gautam, A. (2020). Role of Coordination in Effective Public Service Delivery System. Journal of Public Administration and Governance, 10(3), 158-201.

Patnaik, S., & Shambu Prasad, C. (2021). Coordination in multi-actor policy implementation: case study of a livelihood enhancement programme in India. Development in Practice, 31(4), 523-532. https://doi.org/10.1080/09614524.2020.1861220

Lindblom, C. E. (1965). The intelligence of democracy: Decision making through mutual adjustment. Free pr.

Scharpf, F. W. (1994). Games real actors could play: Positive and negative coordination in embedded negotiations. Journal of theoretical politics, 6(1), 27-53.

de Arruda Leite, J. P., & Buainain, A. M. (2013). Organizational coordination in public policy implementation: Practical dimensions and conceptual elements. Central European Journal of Public Policy, 7(2), 136-159.

Biesbroek, G. R., Swart, R. J., Carter, T. R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M. D., & Rey, D. (2010). Europe adapts to climate change: comparing national adaptation strategies. Global Environmental Change, 20(3), 440-450.

Jordan, A., & Lenschow, A. (2010). Environmental policy integration: a state of the art review. Environmental Policy and Governance, 20(3), 147-158.

Champion, C., & Bonoli, G. (2011). Institutional fragmentation and coordination initiatives in western European welfare states. Journal of European Social Policy, 21(4), 323-334.

Chinseu, E., Stringer, L., & Dougill, A. (2018). Policy integration and coherence for conservation agriculture initiatives in Malawi. Sustainable Agriculture Research, 7(4), 51-62.

Bolleyer, N., & Börzel, T. A. (2010). Non-hierarchical policy coordination in multilevel systems. European political science review, 2(2), 157-185.

Kissinger, G., Brockhaus, M., & Bush, S. R. (2021). Policy integration as a means to address policy fragmentation: Assessing the role of Vietnam's national REDD+ action plan in the central highlands. Environmental Science & Policy, 119, 85-92.

Trein, P., & Tosun, J. (2019). Varieties of public–private policy coordination: How the political economy affects multi-actor implementation. Public Policy and Administration, 36(3), 379-400. https://doi.org/10.1177/0952076719889099

Aurich-Beerheide, P., Catalano, S. L., Graziano, P. R., & Zimmermann, K. (2015). Stakeholder participation and policy integration in local social and employment policies: Germany and Italy compared. Journal of European Social Policy, 25(4), 379-392.

Caldwell, N. D., Roehrich, J. K., & George, G. (2017). Social Value Creation and Relational Coordination in Public-Private Collaborations. Journal of Management Studies, 54(6), 906-928. https://doi.org/https://doi.org/10.1111/joms.12268

Moschetti, M., Martínez Pons, M., Bordoli, E., & Martinis, P. (2020). The increasing role of non-State actors in education policy making. Evidence from Uruguay. Journal of Education Policy, 35(3), 367-393. https://doi.org/10.1080/02680939.2018.1562569

Aasland, A., Kropp, S., & Meylakhs, A. Y. (2020). Between Collaboration and Subordination: State and Non-state Actors in Russian Anti-drug Policy. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 31(2), 422-436. https://doi.org/10.1007/s11266-019-00158-9

Hardina, D. (2006). Strategies for citizen participation and empowerment in non-profit, community-based organizations. Community Development, 37(4), 4-17.

Sharma, C. K. (2011). Intergovernmental Coordination Mechanisms in India.

Bali, A. S., & Ramesh, M. (2021). Governing healthcare in India: a policy capacity perspective. International Review of Administrative Sciences, 87(2), 275-293. https://doi.org/10.1177/00208523211001499

Upadhyaya, P., Shrivastava, M. K., Gorti, G., & Fakir, S. (2020). Capacity building for proportionate climate policy: Lessons from India and South Africa. International Political Science Review, 42(1), 130-145. https://doi.org/10.1177/0192512120963883

Jörgensen, K., Mishra, A., & Sarangi, G. K. (2015). Multi-level climate governance in India: the role of the states in climate action planning and renewable energies. Journal of Integrative Environmental Sciences, 12(4), 267-283. https://doi.org/10.1080/1943815X.2015.1093507

Alkire, S., & Deneulin, S. (2009). The human development and capability approach. In An introduction to the human development and capability approach (pp. 22-48). Routledge.

Fell, M. J. (2017). Energy services: A conceptual review. Energy Research & Social Science, 27, 129-140. https://doi.org/https://doi.org/10.1016/j.erss.2017.02.010

Stewart, F. (2013). Capabilities and Human Development: Beyond the individual-the critical role of social institutions and social competencies. UNDP-HDRO occasional papers(2013/03).

Bartiaux, F., Day, R., & Lahaye, W. (2021). Energy Poverty as a Restriction of Multiple Capabilities: A Systemic Approach for Belgium. Journal of Human Development and Capabilities, 22(2), 270-291. https://doi.org/10.1080/19452829.2021.1887107

Day, R., Walker, G., & Simcock, N. (2016). Conceptualising energy use and energy poverty using a capabilities framework. Energy Policy, 93, 255-264.

Middlemiss, L., Ambrosio-Albalá, P., Emmel, N., Gillard, R., Gilbertson, J., Hargreaves, T., Mullen, C., Ryan, T., Snell, C., & Tod, A. (2019). Energy poverty and social relations: A capabilities approach. Energy Research & Social Science, 55, 227-235. https://doi.org/https://doi.org/10.1016/j.erss.2019.05.002

Sadath, A. C., & Acharya, R. H. (2017). Assessing the extent and intensity of energy poverty using Multidimensional Energy Poverty Index: Empirical evidence from households in India. Energy Policy, 102, 540-550.

Manasi, B., & Mukhopadhyay, J. P. (2024). Definition, measurement and determinants of energy poverty: Empirical evidence from Indian households. Energy for Sustainable Development, 79, 101383. https://doi.org/https://doi.org/10.1016/j.esd.2024.101383

Kaygusuz, K. (2011). Energy services and energy poverty for sustainable rural development. Renewable and Sustainable Energy Reviews, 15(2), 936-947. https://doi.org/https://doi.org/10.1016/j.rser.2010.11.003

Palit, D., & Bandyopadhyay, K. R. (2017). Rural electricity access in India in retrospect: A critical rumination. Energy Policy, 109, 109-120. https://doi.org/https://doi.org/10.1016/j.enpol.2017.06.025

Ministry of New and Renewable Energy, I. (2024). Renewable Energy Statistics 2023-24 [Annual Report]. I. Ministry of New and Renewable Energy.

https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2024/10/20241029512325464.pdf

EMBER. (2025). India electricity generation highlights. EMBER. Retrieved 07/01/2025 from https://ember-energy.org/countries-and-regions/india/

Balakrishnan, R. (2003). Jharkhand - Past, Present & Future (CSD Working Paper Series, Issue. I. Council for Social Development. https://csdindia.org/wp-content/uploads/2017/04/Jharkhand-Past-Present-and-Future.pdf

Sharma, K. (2012). Poverty and Tribal Development in Jharkhand: Issues and Challenges. The Tribal Issues, 5(1). https://www.etribaltribune.com/index.php/volume-5/mv5i1/poverty-and-tribal-development-in-jharkhand-issues-and-challenges

Kottadiel, D. (2020). Energy in Rural Jharkhand. Power For All. Retrieved 07/01/2025 from https://www.powerforall.org/insights/asia/more-one-third-households-rural-jharkhand-dissatisfied-grid-supply-report

Shilee, S., & Shailee, S. (2002). Indigenous Identity of Tribals in Jharkhand. Indian Anthropologist, 32(1/2), 75-86. http://www.jstor.org/stable/41919910

Haldar, T., & Abraham, V. (2015). Development, Displacement and Labour Market Marginalisation: The Case of Jharkhand Tribal Population. Social Change, 45(1), 45-66. https://doi.org/10.1177/0049085714561839

Mishra, A., Sarangi, G. K., & Wadehra, S. (2016). Off-grid energy development in India: an approach towards sustainability. Economic and Political Weekly, 105-114.

Gugerty, M. K., Biscaye, P., & Leigh Anderson, C. (2019). Delivering development? Evidence on self-help groups as development intermediaries in South Asia and Africa. Development Policy Review, 37(1), 129-151.

Shastry, G. V. R. R. S. (2022). Financial inclusion challenges faced by self-help groups in Jharkhand: a case study of east Singhbhum district. International Journal of Advanced Research in Commerce, Management & Social Science, 5(1), 148-153.

Parwez, S. (2013). Impact assessment of self-help group towards rural development: a case study of Jharkhand, India.

Gupta, A. K. (2012). Women's group promises to help develop Gumla villages. Times News Network (TNN). Retrieved 03/01/2024 from https://timesofindia.indiatimes.com/city/ranchi/womens-group-promises-to-help-develop-gumla-villages/articleshow/16199985.cms

Janus, M., & Brinkman, S. (2010). Evaluating Early Childhood Education and Care Programs. International Encyclopedia of Education, 25-31. https://doi.org/10.1016/B978-0-08-044894-7.01197-0

Bhat, B. A., & Bhat, G. J. (2019). Formative and summative evaluation techniques for improvement of learning process. European Journal of Business & Social Sciences, 7(5), 776-785.

Bin Mubayrik, H. F. (2020). New trends in formative-summative evaluations for adult education. Sage Open, 10(3), 2158244020941006.

Murray, H. G. (1984). The impact of formative and summative evaluation of teaching in North American universities. Assessment and evaluation in Higher Education, 9(2), 117-132.

Kaczmarek, K., & Romaniuk, P. (2020). The use of evaluation methods for the overall assessment of health policy: potential and limitations. Cost Effectiveness and Resource Allocation, 18(1), 43. https://doi.org/10.1186/s12962-020-00238-4

McGrath, J. C. (1991). Evaluating national health communication campaigns: Formative and summative research issues. American Behavioral Scientist, 34(6), 652-665.

Scanlon, D. P., Wolf, L. J., Alexander, J. A., Christianson, J. B., Greene, J., Jean-Jacques, M., McHugh, M., Shi, Y., Leitzell, B., & Vanderbrink, J. M. (2016). Evaluating a complex, multi-site, community-based program to improve healthcare quality: the summative research design for the Aligning Forces for Quality initiative. Am J Manag Care, 22.

van Bueren, E. M., Klijn, E. H., & Koppenjan, J. F. M. (2003). Dealing with Wicked Problems in Networks: Analyzing an Environmental Debate from a Network Perspective. Journal of Public Administration Research and Theory, 13(2), 193-212. https://doi.org/10.1093/jpart/mug017

Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. Energy Research & Social Science, 11, 174-182.

Yenneti, K., & Day, R. (2015). Procedural (in) justice in the implementation of solar energy: The case of Charanaka solar park, Gujarat, India. Energy Policy, 86, 664-673.

Zhang, P., & Gu, H. (2023). Potential policy coordination: Can energy intensity targets affect energy poverty? Energy Economics, 126, 106932. https://doi.org/https://doi.org/10.1016/j.eneco.2023.106932

Dubash, N. K., & Rao, D. N. (2008). Regulatory practice and politics: Lessons from independent regulation in Indian electricity. Utilities Policy, 16(4), 321-331.

Alsop, R., Anirudh K., & Sjoblom, D. (2001). Inclusion and local elected governments: The Panchayat Raj system in India. Social Development Paper 37, World Bank.

Gupta, L. C. D. K. (2022). The Status of Mini grids in Rural India. Transform Rural India,

(BEE), B. o. E. E. (2025). State Energy Efficiency Action Plan - Jharkhand (State Energy Efficiency Plans (SEEP), Issue. I. Bureau of Energy Efficiency (BEE), MNRE. https://beeindia.gov.in/sites/default/files/SEEAP_Jharkhand-Final.pdf

Bingham, A. J. (2023). From Data Management to Actionable Findings: A Five-Phase Process of Qualitative Data Analysis. International Journal of Qualitative Methods, 22. https://doi.org/10.1177/16094069231183620

Notes

[1] https://censusindia.gov.in/census.website/data/population-finder
[2] DDUGJY overview: https://www.india.gov.in/spotlight/deen-dayal-upadhyaya-gram-jyoti-yojana
[3] State Solar Policy 2022 (https://api.jreda.com/all-uploaded-img/img/6360e972de5e0.pdf)
[4] NSM overview: https://mnre.gov.in/en/solar-overview/