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A methodological framework for

Assessing the long-term impact of a nonprofit's work in a geography

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Executive Summary

Nonprofit organisations working on rural poverty alleviation in India have historically rooted their efforts in specific geographies, building deep, long-term engagement with local communities to address complex, interlinked challenges in livelihoods, natural resources, and social development. Over time, they mobilise communities, strengthen livelihoods, support institutions, engage with institutional systems and adapt their strategies in response to ecological and socio-economic shifts. Yet, the dominant evaluative lens in the field of rural development remains project-centric, short-term and attribution-driven. As a result, cumulative and longitudinal changes within a geography are often difficult to establish and remain analytically underexplored.

This report proposes a shift from evaluating isolated projects to assessing the long-term impact of sustained organisational engagement within a geographic area.

Social change processes are painstakingly long, slow, non-linear and path-dependent. Shifts in norms, institutional capacity, agricultural practices and collective agency develop incrementally through repeated engagement rather than through singular interventions. When organisations operate across multiple thematic domains, such as agriculture, women's collectives, natural resource management and governance convergence, the isolation of project-level outcomes obscures how these interventions interact to shape broader development trajectories.

The central evaluative question, therefore, shifts from:

"Did this intervention produce these outcomes?"

to:

"What defines the long-term, longitudinal effect of an organisation's work within a specific geography?"

To address this question, the report develops and applies a Rural Development Impact Framework (RDIF) grounded in realist evaluation. Instead of treating outcomes as direct products of activities, the framework examines how interventions introduce resources into particular structural conditions, activate mechanisms and generate change across interconnected domains.

The framework distinguishes between two dimensions of impact:

Direct impact refers to observable shifts in livelihoods, such as improvements in agricultural productivity, income diversification, reduced distress migration, and increased participation in decision-making.

Generic/Indirect impact which relates to contributions to institutional and systemic strengthening, including sustainable women's collectives, federation (self-help groups, cluster level federations, village organisations, etc.) maturity, strengthened governance engagement and sustained collective action.

The study applies this framework to PRADAN's long-term engagement in two districts: Gumla (Jharkhand) and Dhamtari (Chhattisgarh). While both geographies experienced similar thematic interventions, their trajectories differed.

The comparison highlights three core insights:

- Institutional maturity deepens and stabilises change over time.
- Agricultural, ecological and socio-economic conditions shape the extent to which livelihood gains can expand (there is a ceiling for development).
- Sustained engagement strengthens mechanisms such as confidence and collective agency, but the depth of activation varies across contexts.

In Gumla, decades of sustained engagement in a context of evolving institutional density (both public and private institutions) enabled the creation and consolidation of collective structures, alongside durable shifts in livelihoods. In Dhamtari, where

institutional density and ecological conditions differed, change unfolded through navigation and convergence, producing different outcome patterns.

Across both geographies, the refined programme theory can be summarised as follows:

When sustained and adaptive interventions are introduced into villages with enabling conditions, they activate co-production channels, in which Non-Profit Organisations foster relationships among communities, the state, and markets. Over time, these mechanisms reinforce one another and translate into improvements in the following areas: ecological and economic (yield stability), agency & human (time-use shifts, mobility of women), strategic mobility portfolio (full-family seasonal migration, distress migration), and civic & resource governance (collective action capacity).

The report argues that long-term nonprofit impact cannot be meaningfully understood through project-level attribution alone. It must be analysed as the evolving interaction between organisational engagement and structural conditions within a geography.

By shifting the focus from projects to places and from narrow attribution to organisational contribution, the sector can develop a more grounded understanding of how long-term transformation actually takes shape.

1. Introduction

1.1. Background

Non-Profit Organisations (NPOs) that are working towards social good in India regularly engage in reporting to a variety of funders and carry out third-party evaluations on an annual basis. Yet these assessments typically capture only partial comprehension of an organisation's cumulative effects and societal contributions over time within specific regions (de Goër de Herve, 2024). When NPOs operate multiple programs across distinct thematic areas within a single geography, the isolation of project-level data obscures how these initiatives interact to shape broader trajectories of social change. This fragmentation undermines both the representation of organisational value and the organisation's capacity for adaptive learning (Buckmaster, 1999).

The fundamental issue lies in the nature of social change itself. Social change processes are cumulative, non-linear, and path-dependent. Shifts in norms, relationships, and institutional capacity develop incrementally through repeated engagement rather than from singular projects (Mayne, 2020). Many NPO objectives - such as empowerment, resilience, and organisational capacity - manifest gradually and demonstrate sustainability only when evaluated over extended periods, beyond financing cycles. Consequently, short-term, compliance-oriented evaluations risk systematically underestimating organisational impact, presenting an incomplete picture of what organisations actually achieve over time. A structural obstacle compounds these measurement challenges: evaluations within the Indian NPO sector are predominantly structured to satisfy upward accountability demands, prioritising project-specific attribution (claims of the nature: this intervention yielded these outcomes) over contributions to community or systemic transformation (Ton, 2021). This tension between external accountability and internal learning diminishes the utility of evaluative data in understanding how organisational efforts collectively

influence local development trajectories and whether changes persist, intensify, or reverse over time (Mitchell & Berlan, 2016; Bryan, 2020). Despite numerous project-level assessments, a critical question remains underexplored: *What defines the cumulative, longitudinal effect of an NPO's activities in a specific location?*

Addressing this question requires reconceptualising what impact means. Drawing on Joshi's (2019) framework, organisational impact comprises two intertwined but distinct dimensions. Direct impact refers to specific, attributable changes in the lives of communities - for instance, gender- focused NPOs evaluating empowerment outcomes against defined metrics. Generic impact emerges through contribution to community self-sufficiency and systemic change: strengthening communities to meet their own needs (horizontal scaling), forging partnerships, and advancing policy advocacy (vertical scaling). Neither form can be fully understood in isolation, and examining both longitudinally compounds analytical complexity. The challenge intensifies because these dimensions interact and reinforce each other in ways that traditional evaluation frameworks fail to capture.

The measurement challenge runs deeper still. NPOs struggle with a lack of standardised, comparable effectiveness measures. Scholars have identified several approaches - goal attainment, resource attainment, and multi-dimensional stakeholder criteria - yet the diversity and unique nature of nonprofit work does not present itself as amenable to uniform metrics (Benjamin et al., 2023; Forbes, 1998). This heterogeneity makes reliable performance comparison across the sector difficult (Campbell & Lambright, 2016; Prakash & Gugerty, 2010). The evaluation challenge deepens when considering that effectiveness assessment is inherently value-based and normative. The process reflects competing values and implicit criteria, generating differing views on what constitutes success (Mitchell, 2016; Sowa et al., 2004).

Addressing these challenges requires a fundamental shift in evaluative scope - from individual programs to organisational systems (Garcia & Zazueta, 2015). Rather than applying traditional logic models and theories of change to isolated interventions,

evaluation must encompass organisational mission, strategy, financial sustainability, and relationships with multiple constituencies and communities (Benjamin et al., 2023). This system's perspective acknowledges that outcomes are often emergent and co-created with participants, challenging the assumption of pre-defined, measurable results (Stame, 2022). By considering how program interactions influence overall organisational culture and effectiveness, evaluations can better capture both direct and indirect impacts, as well as their cumulative expression over time (Lemire et al., 2020). Only through this reorientation can NPOs and their funders develop a more accurate understanding of organisational value and the real transformations their work generates within communities.

1.2. Research Objectives

NPOs have been working for decades, but what exactly does that lead to? This question sits at the heart of this study. Like many other rural development organisations, PRADAN has worked in specific geographies for years, engaging with communities through multiple interventions across thematic areas such as agriculture, women's collectives, natural resource management and access to government schemes. Over this sustained engagement, different interventions accumulate, evolve, and interact with one another. However, while the organisation continuously adapts its on-the-ground work, it rarely has the time or resources to systematically document all activities, track outcomes beyond project cycles, or collect long-term data. As a result, the overall impact of this engagement remains difficult to analyse and understanding the overall arc of change becomes challenging.

In this study, we use these two questions (what is impact? & what to evaluate?) articulated above, as starting points to venture into the development of a broader rubric for assessing the work of NPOs in a given geography for a sustained period of time. We focus on the rural development sector, where thematic areas such as income enhancement, climate change mitigation/adaptation, health and nutrition, gender equity, and soil health intersect. This methodological framework allows NPOs to create

context-specific methods for evaluating and quantifying their long-term impacts, while ensuring analytical rigour and comparability across initiatives, rather than dictating a singular evaluative approach. We ground this framework development in PRADAN's long-standing rural development interventions across two geographies: Gumla, Jharkhand and Dhamtari, Chhattisgarh. By examining PRADAN's work over an extended period, we simultaneously demonstrate the framework's application and illuminate the organisation's cumulative impact in these regions.

Our research objectives are:

(a) *Develop a Rural Development Impact Framework* that enables organisations to assess both direct and generic impact across multiple projects operating within the same geography. This framework establishes a shared measurement vocabulary that allows organisations to track tangible changes in stakeholder lives and observe cumulative progress over time - what we term 'the needle shifting'. Direct impact measures specific outcomes within thematic areas (income enhancement, climate change adaptation, health and nutrition, gender equity, soil health); generic impact captures organisational contributions to systemic change, community capacity, and institutional strengthening. Critically, this framework accommodates an organisation's own contextual understanding and values, rather than imposing externally determined metrics.

(b) *Understand Multi-Level, Multi-Actor Change Dynamics* that emerge through sustained intervention(s) over time. This objective recognises that observable changes result not from isolated projects but from complex interactions across multiple initiatives, actors, and scales. We examine how interventions coordinated by PRADAN, government agencies, other NPOs, CSO forums, and local elected bodies collectively influence development trajectories within each geography. By analysing interventions spanning individual, household, panchayats, district administration, and state/national policy levels, we capture how changes cascade and compound across

institutional scales, and how policy support by higher levels creates enabling environments for community-level transformations.

1.3. Structure of the Report

We divide the remaining report into four chapters. The next chapter establishes the study's foundational conceptual architecture by articulating the realist approach. Drawing systematically on secondary literature review, organisational documents, and early stakeholder discussions, this section constructs the hypothesised pathways through which the NPO's interventions are theorised to produce change. Rather than imposing external assumptions about organisational impact, the Initial Program Theory emerges from triangulating multiple sources: documented program logic from organisational records, evidence from comparable interventions in the literature, and tacit knowledge held by program designers, implementers, and community partners. This section explicitly outlines the causal linkages - the mechanisms and contexts - that are theorised to connect program activities to intended outcomes across different thematic areas and geographic locations. By articulating the IPT transparently, the chapter creates the background that subsequent empirical chapters will refine, support, or refute through evidence gathering.

The third chapter brings empirical depth through qualitative fieldwork conducted across both geographic sites. This section examines how interventions have actually manifested in practice, capturing the lived experiences of participants, implementers, and stakeholders embedded within specific contexts. The qualitative analysis explores the extent to which observed patterns align with or diverge from the hypothesised pathways articulated in the IPT. Importantly, it examines not only individual program implementation but also the interactions and convergences between multiple initiatives operating within each geography. By developing context-mechanism-outcome configurations, the qualitative material illuminates the contextual factors that enable or constrain program mechanisms, the unexpected pathways through which change emerges, and how stakeholders perceive and experience organisational

impact over time. By conducting analysis across both geographies, this chapter identifies both context-specific dynamics and broader patterns that reflect the cumulative effects of sustained organisational presence and strategic intervention.

The fourth chapter provides empirical breadth through findings from household surveys conducted within each geography. This section analyses patterns, trends, and measurable outcomes related to the thematic areas of organisational work - income, agricultural productivity, gender equity, and social cohesion, among others. The quantitative analysis establishes the scale of change and identifies which populations experience what types of outcomes. Critically, this chapter triangulates survey findings with qualitative insights and geospatial data to develop a more complete understanding of impact. Rather than treating quantitative findings in isolation, the analysis examines how numerical patterns reflect and are shaped by the mechanisms and contexts explored qualitatively, and how geographic variation in outcomes correlates with differences in intervention intensity, contextual conditions, and stakeholder engagement.

The concluding chapter synthesises findings across all methodological approaches - theoretical, qualitative, and quantitative - to construct a coherent narrative of organisational impact. This section presents the refined framework that emerges from empirical testing and refinement of the initial program theory. The refined methodological framework articulates how an NPO's multiple initiatives, operating across thematic areas and scale levels within geographic contexts, cumulatively generate both direct outcomes in stakeholder lives and generic contributions to systemic change and organisational capacity. More importantly, it posits ways of analytically studying these. The chapter concludes by highlighting broader learnings for how NPOs can develop context-sensitive approaches to understanding their long-term impact.

2. Theoretical Background and Methodology

Understanding how long-term interventions create impact requires a conceptual approach that can take account of complexity and evolution over decades. PRADAN's work is not a single intervention but a sequence of layered, interacting strategies. Therefore, evaluating its long-term impact demands a framework that explains how these diverse interventions trigger change, why they work differently across settings and under which contextual conditions transformations are sustained. Realist evaluation provides such an approach. It is grounded in the premise that programs do not produce outcomes directly but rather through mechanisms specific to their contexts (Mukumbang et al., 2023). As Smeets et al. (2022) posit, realist evaluation is based on the understanding that programs are theories incarnate and they embody assumptions about how particular activities will bring about change. This means that, to evaluate a programme, one must surface its underlying assumptions and make explicit the causal processes linking interventions to outcomes.

An essential component of assessing an NPO's impact is the contentious notion of 'causality'. Schmitt (2020) contends that the concept of causal mechanisms has been widely debated across multiple disciplines, including sociology, psychology, and political science. Scholars such as Gerring (2008), Hedström & Swedberg (1998), and Mahoney (2001) have contributed to the definition of causal mechanisms, but the term remains subject to varied interpretations (Gerring, 2010; Mayntz, 2004). Early references to causal mechanism analysis in evaluation can be traced back to Suchman (1967) and the later contributions of Chen and Rossi (1989) in the late 1980s. These scholars introduced the concept of theory-driven evaluation, which emphasises the need for a program theory to explain why and how an intervention leads to outcomes. Overall, in the field of evaluation, there is no consensus on the definition or analysis of causal mechanisms, and the term has evolved over time. As a consequence, scholars have adopted multiple approaches over the years to assess 'impact'.

Of late, Randomised Controlled Trials (RCTs) have been viewed as the 'gold standard' for demonstrating impact, but they are often resource-intensive and not suitable for all nonprofits. They may fail to capture the complexity of social change (Gugerty & Karlan, 2014). As a result, there is increasing recognition that no single method is universally applicable. A pluralistic approach embraces a variety of evaluation methods, recognising that different methods are better suited to different tasks and contexts (Goertz, 2017). For example, contribution analysis (Mayne, 2011), process tracing (Bouyousfi & Sabar, 2022), and outcome harvesting (Beardmore et al., 2023) are emerging as alternatives to causal attribution, allowing for a more nuanced understanding of how nonprofits contribute to social change. A shift toward a more nuanced understanding has emerged, suggesting that evaluations should consider the specific conditions under which certain programs work rather than assuming a one-size-fits-all approach (Pawson & Tilley, 1997). This led to the adoption of a more pragmatic, use-led approach, emphasising the practical utility of evaluations in policy making rather than focusing solely on technical accuracy (Mayne, 2017). The focus of evaluation, according to these new perspectives, shifted toward ensuring that programs are feasible, ethical, and relevant to real-world political and organisational contexts, rather than seeking definitive, universally applicable conclusions.

Befani & Mayne (2014) classify the approaches used in causal analysis for impact evaluation into four broad categories:

(i) Counterfactual Approaches: Focus on associating a cause with an effect, often through comparison with a counterfactual scenario. While useful for attribution, they don't explain how the effect occurs, leaving the inner workings of causality unexplained (Befani, 2012).

(ii) Regularity Approaches: Focus on the frequency of cause-effect associations, but they often fail to establish temporal precedence and struggle with complex, multifactorial interventions (Brady, 2002).

(iii) Configurational Approaches: Identify combinations of conditions that are associated with outcomes, often using logical intersections and unions. While they provide a parsimonious description of the causal 'ingredients', they don't delve deeply into the mechanisms themselves (Rihoux & Ragin, 2009).

(iv) Generative Approaches: The most detailed approach aims to describe the actual workings of causal mechanisms. Realist Evaluation (RE) is a prominent example that uses the Context-Mechanism-Outcome (CMO) configuration to explain how contextual resources influence individual or group behaviour and lead to outcomes (Pawson & Tilley, 1997). These approaches have helped shape the understanding of causal mechanisms in evaluation. Theories of change explain how interventions lead to outcomes, and a detailed program theory often includes two key components: (1) implementation theory (how the program is implemented) and (2) the program's causal mechanisms (how successful implementation leads to outcomes) (Caló et al., 2019).

2.1. Realist Evaluation Approach

Mayne (2020) articulates that long-term evaluations face several significant challenges. First, defining clear, feasible questions about causality over extended periods is difficult, especially when determining what is reasonable to evaluate in the long term (Koleros et al., 2016). Additionally, these evaluations often involve multiple linked interventions, making it challenging to describe their interaction and contribution to outcomes. Another complication is the complexity of causality: many factors beyond the intervention may influence change, and over time, these factors can evolve, making it harder to establish clear causal relationships. Furthermore, records on past interventions may be lost or incomplete, complicating the reconstruction of a robust theory of change or understanding of the original context. The changing context in which interventions occur also poses a challenge, as it may shift significantly, affecting the interpretation of results and the relevance of past interventions. Data limitations, such as unreliable interviews due to memory lapses or

individuals moving on, can also hinder long-term evaluation efforts. Moreover, comparing data across different times can be difficult. These challenges underscore the complexity of long-term evaluations and the need for careful data collection, planning, and analysis.

Unlike conventional evaluation designs that often focus solely on measuring outcomes, realist evaluation seeks to understand how and why specific interventions produce particular outcomes, highlighting the influence of context, mechanisms, and outcomes. This approach is especially relevant when studying interventions that are multifaceted, occur over extended periods, and interact with various social, economic, and environmental factors. Realist evaluation is suitable for mixed methods in complex settings where causation is contingent (Pawson & Tilley, 1997). Long-term programmes (such as PRADAN's interventions) do not follow a fixed structure and must adapt to evolving contexts, experiences, lessons, opportunities, crises, and strategies. Shearn et al. note that such programmes are large-scale, complex, and messy interventions (Shearn et al., 2017), in which components evolve over time and interact with multiple domains of social life, making it difficult to isolate them. They warn that without a structured framework, evaluators risk producing an overabundance of small theories that fail to account for system-level change (Shearn et al., 2017).

Another important factor determining the use of the realist approach is the absence of regularly collected survey data. NPOs often face dilemmas regarding the allocation of resources between implementation and internal learning (Holma & Kontinen, 2011). Owing to pragmatic concerns, the latter invariably take a backseat in most situations. In the absence of these datasets, qualitative, theory-heavy and mixed-methods approaches become more suitable for understanding how change unfolds across time and place. In realist approaches, rather than asking whether an intervention worked, evaluations should examine what worked, for whom, in what contexts, how and why (Shearn et al., 2017). It begins by developing a theoretical understanding of an

organisation's interventions. It focuses on the assumptions, sequences, patterns and causal processes through which change is expected to occur. This coherent articulation of how a programme generates impact is referred to as the Initial Program Theory (IPT)[1].

2.2. Development of IPTs

Developing the IPT is the first and essential step of any realist evaluation. It provides a structured explanation of how an NPO's multi-layered interventions may have contributed to long-term changes across diverse rural geographies. Instead of treating outcomes as isolated endpoints, the IPT helps map the processes, conditions (context) and mechanisms through which change emerges. It helps us understand how interventions interact with social, ecological, political, cultural, and institutional contexts, how community behaviours and capacities shift over time, and how early changes lay the foundations for genuine transformation (Feeny et al., 2023). The IPT guides the next stages of the study, such as quantitative analysis, geospatial analysis and further qualitative narratives. It ultimately helps shift the focus from what changed to how, why and for whom long-term change has occurred. In the absence of baselines (or any longitudinal data for that matter) and in the presence of constantly evolving contexts, IPT development must rely on ever-evolving, iterative and abductive reasoning. Kabongo et al. (2020) show how IPTs can be credibly generated for large programmes even when historical monitoring data is limited, by combining document analysis, practitioner knowledge and qualitative insights. Finally, the need for an IPT becomes even greater when one considers that similar interventions can yield divergent outcomes across regions, particularly in long-term interventions such as

[1] In the literature, IPT and Theory of Change (ToC) are used almost interchangeably to understand rationales for programmatic interventions (Koleros et al., 2016; Shearn et al., 2017; Smeets et al., 2022). A more formal definition of ToC: "A theory of change (or causal logic) explicitly articulates how an organisation's interventions will address a social problem. Put another way, it specifies the cause–effect relationships or pathways through which actions are expected to generate results." (Benjamin et al., 2023; p. 338S).

PRADAN's work, where biophysical conditions, institutional engagement/capacities, social cohesion, migration patterns, and governance capacity vary widely across geographies. Therefore, developing an IPT is not only theoretically important but analytically necessary.

Smeets et al. (2021) present a detailed account of how to elicit an IPT for complex integrated care interventions using a realist evaluation approach. They argue that Realist Evaluation works best when evaluating complex programmes because it focuses on understanding "what works, how, for whom, and in what circumstances" (p. 151). The authors emphasise that eliciting the IPT is the first and essential step in any realist evaluation, as it helps us bring forth implicit causal assumptions embedded in program design. Their methodological contribution is a three-phase IPT elicitation strategy. In Phase 1, they identify an abstract theoretical framework. In Phase 2, they construct a preliminary IPT by combining insights from the abstract theory with prior empirical studies. These studies offer tacit theoretical assumptions about users, contextual conditions and intended outcomes. Phase 3 refines the IPT through expert interviews, applying judgmental rationality and retroductive reasoning. The authors use the ICAMO framework, which comprises intervention, context, actors, mechanisms, and outcomes, and argue that outcomes depend on the extent to which the intervention is successfully delivered and adopted by the various actors involved. They ultimately formulate IPT configurations as "if-then-because" hypotheses. Thus, Shearn et al. (2017) address a central challenge in realist evaluation- how to build programme theory for large, long-running and messy interventions. They begin by defining programme theory as "the specific idea about how a program causes the intended or observed outcomes" (p. 2). Therefore, realist evaluations go beyond simple linear chains and should account for multiple layers of causality. Their main contribution is the argument that large, complex interventions require a multi-level causal structure. For analytical clarity, we break down the approach into analytical steps below:

Step 1: Concept Development.

Before theorising, the intervention must be conceptually clarified. This involves identifying how it is described in existing documents or literature, extracting its core aims, principles and intended outcomes, then recognising competing interpretations. The goal is to produce a provisional/temporary definition that outlines the intervention, its target and its intended outcomes.

Step 2: Proposition Development

Because messy interventions generate many unstructured tacit theories, Shearn et al. (2017) recommend constructing a conceptual framework using selected abstract or middle-range theories at the macro, meso, and micro levels.

Macro-level: Change is shaped by broader structural factors, including state policies, market conditions, ecological factors, funding architectures, and the institutional ecosystem in which programs operate. These conditions set the broad opportunities and constraints within which any organisation works.

Meso-level: This refers to organisational and community-level practices, such as routines, norms, relationships, decision-making structures, and coordination mechanisms, through which interventions are implemented. This is where collective behaviour, institutional culture and day-to-day programme processes take shape.

Micro-level: This level focuses on individuals, their reasoning, motivations, capacities, emotions and the mechanisms activated when they encounter program resources.

Overall, the break-up allows outcomes to emerge from interactions across all three layers: macro conditions enable or constrain meso-level practices, meso-level structures shape what individuals experience, and micro-level reasoning determines whether mechanisms actually work.

Step 3: Theory Building

Finally, these propositions are connected into a coherent causal framework. Relationships across different levels are mapped and refined to explain how the intervention may operate. The resulting Initial Rough Program Theory (IRPT) is provisional and ready for empirical testing. This framework guides abductive and retroductive reasoning to generate causal propositions (Wong et al., 2016). Retroduction is defined as "the process of devising a theory, which requires moving from an observation of concrete phenomena to reconstruct the basic conditions for these phenomena" (Mukumbang et al., 2021: p.4). Essentially, Shearn et al. (2017) recommend starting by constructing a multi-level conceptual framework of abstract theories to make sense of messy systems, then deriving propositions and weaving them into an IRPT.

Additionally, Kabongo et al. (2020) show how an IPT can be constructed even when a programme lacks detailed baseline or longitudinal data. Their method combines Theory of Change (ToC) and Realist Evaluation (RE). ToC helps identify programme modalities, intended outcomes and tentative causal pathways, providing what they call "three critical features toward developing an initial program theory" (p. 5). Realist Evaluation then strengthens the causal logic by "identifying relevant programmatic contexts and linking the postulated mechanisms of action to program outcomes" (p. 1). Using document analysis, coding, abductive reasoning and stakeholder insights, they reconstruct the implicit and explicit assumptions behind the intervention. Further, Hebbar et al. (2025) offer an empirical example of why realist evaluation is essential for long-term, multi-site interventions. They emphasise that programme theories help explain "why interventions work or not in specific settings" (p. 143), reinforcing realist evaluation's focus on context–mechanism interactions. The authors refine their IPT using literature, policy frameworks, and stakeholder interviews.

2.3. Relationship between IPTs and C-M-O Configurations

In realist evaluation, IPTs are broken down into more tangible analytical statements that are articulated as Context-Mechanism-Outcome (CMO) configurations. IPTs and CMO configurations are closely related but serve different analytical purposes. Together, they form an iterative system for developing, testing, and refining causal explanations of how an intervention works, for whom, and under what conditions (Pawson, 2013). The IPT functions as the starting point of a realist evaluation. It represents a working hypothesis about how a programme is expected to bring about change. As described by Hounsou et al. (2025), an IPT articulates assumptions about how, for whom, why and in which contexts an intervention is expected to be effective and is explicitly treated as provisional/rough rather than definitive. At this stage, the IPT captures the broad logic of the intervention, drawing on programme documents, existing literature, stakeholder perspectives, and the research team's knowledge. Its purpose is to bring forth and organise underlying assumptions, rather than to provide a final explanation (Marchal et al., 2018).

CMO configurations play a complementary role by operationalising the IPT. IPTs are configured into CMO hypotheses/configurations, which specify how particular mechanisms are triggered in particular contexts to generate specific outcomes. In this sense, CMO configurations break down the IPT's broader causal propositions into more specific, testable explanations. Multiple CMO configurations often arise from a single IPT, as complex programmes may operate through different mechanisms across different interventions and contexts. This relationship guides empirical data collection and analysis. The IPT shapes the study's overall focus, whereas CMO configurations provide the analytical framework for data analysis.

During analysis, researchers use CMO configurations to structure the data while assessing whether the hypothesised mechanisms were observed, how different contextual conditions shaped them, and why outcomes differed across places (Greenhalgh & Manzano, 2022). Hounsou et al. (2025) describe the use of CMO

configurations during analysis, with findings from these configurations compared with those from the IPT. This comparison helps with iterative refinement. Insights generated through CMO analysis are used to confirm, revise, challenge and change elements of the initial programme theory. Over time, the IPT evolves from a broad, theory-heavy hypothesis into a more empirically grounded programme theory that better explains what works, how it works and under what conditions. Hounsou et al. (2025) emphasise that this refinement is a central feature of realist evaluation, with the IPT being adapted as empirical evidence is gathered.

The key distinction, therefore, lies in their function and level of abstraction. The IPT represents the overall theoretical plan of a programme's logic. CMO configurations are the analytical units through which that logic is examined, asking in what circumstances, through which mechanisms and for whom outcomes are produced. Their relationship is cyclical rather than linear- IPTs influence CMO analysis, and CMO findings reshape the IPT. This iterative relationship enables realist evaluation to move beyond simple outcome assessment toward a context-sensitive and mechanism-focused understanding of programme effectiveness.

2.4. Developing C-M-O Configurations

Realist approaches offer the deepest insight, explaining how a given resource or intervention brings about change (Manzano & Williams, 2024). The primary objective is not to develop abstract theory for theory's sake but to enhance the theories of practitioners, participants, and policymakers. The ultimate aim is to influence programming and policymaking by understanding the mechanisms that drive social change. The CMO approach provides a structured framework to study NPO interventions by analysing how specific contexts interact with mechanisms to produce outcomes (De Souza, 2013).

(i) *Context* refers to the circumstances and settings in which the NPO intervention operates, including socio-economic, cultural, political, and environmental factors

(Nielson et al., 2022). Researchers identify both broad (omnibus) and specific (discrete) contextual factors influencing the intervention. Examples include community characteristics (e.g., poverty levels, governance structures) and historical relationships between the NPO and the community. Moreover, context is not static; it evolves over time as interventions shape and are shaped by local conditions.

(ii) *Mechanisms* are the processes or strategies triggered by the intervention that lead to change. These include both observable actions (e.g., capacity building, training) and underlying causal factors (e.g., empowerment, trust-building) (Westhorp, 2018). Here, researchers analyse how mechanisms work for different groups within the community. They investigate whether mechanisms such as participatory planning or skill development are effectively addressing local needs (Handley et al., 2020). Moreover, it is essential to study unintended mechanisms that may arise during long-term implementation.

(iii) *Outcomes* are the measurable results of the intervention, categorised as proximate (short-term), intermediate (medium-term), and distal (long-term). Researchers track changes in social indicators such as education levels, healthcare access, and economic empowerment over time. They also assess the sustainability of outcomes by examining whether mechanisms continue to function effectively after NPO involvement diminishes.

Each C-M-O configuration "is a proposition stating what it is about a program which works for whom and in what circumstances. The conjectured CMO configuration is the starting point for an evaluation, and the refined CMO configuration is the finding of an evaluation." (Pawson & Tilley, 1997: p. 217). A necessary component of developing a CMO configuration is identifying the pathways of impact. Impact pathways map the causal steps linking program activities to eventual outcomes, outlining the sequence of events and actions. A theory of change builds upon the impact pathway by providing the causal assumptions behind the links in the pathway - what needs to happen and under what conditions for the program's activities to lead to the intended outcomes.

However, this process becomes rather obscure in the context of evaluations of long-term NPO work. For instance, while it is easy to develop an impact pathway and a CMO configuration for one set of interlinked interventions undertaken by an NPO in a region over a short period of time (<3 years), the identification of both of these becomes a herculean task when assessing the impact of a bunch of interventions over a sustained period of time (referred to as long term perspective in the evaluation literature) (de Goër de Herve, 2024).

Mayne (2020) articulates that long-term evaluations face several significant challenges. First, defining clear and feasible causal questions over extended periods is difficult, especially when determining what is reasonable to evaluate over the long term (Koleros et al., 2016). Additionally, these evaluations often involve multiple linked interventions, making it challenging to describe their interaction and contribution to outcomes. Another complication is the complexity of causality: many factors beyond the intervention may influence change, and over time, these factors can evolve, making it harder to establish clear causal relationships. Furthermore, records on past interventions may be lost or incomplete, complicating the reconstruction of a robust theory of change or understanding of the original context. The changing context in which interventions occur also poses a challenge, as it may shift significantly, affecting the interpretation of results and the relevance of past interventions. Data limitations, such as unreliable interviews due to memory lapses or individuals moving on, can also hinder long-term evaluation efforts. Moreover, comparing data across different times can be difficult. These challenges underscore the complexity of long-term evaluations and the need for careful data collection, planning, and analysis.

2.5. Methods

As we discussed in the introduction, in the report, we intend to develop a methodological framework for studying the long-term impact of an NPO's work in a geography. To do so, we study PRADAN's longstanding interventions in Gumla and Dhamtari. We summarise our specific research approach in Figure 2.1. As we adopt a

realist approach, building the IPT for PRADAN's long-term, continually evolving work requires us to draw on a range of sources and multiple analytical methods. We reviewed PRADAN's documents and reports to understand how the work had changed over time, conducted fieldwork through FGDs and interviews and held repeated discussions with PRADAN's staff who had seen these changes firsthand. All of this was analysed using realist evaluation methods, focusing on how context, people's reasoning and program inputs interact to produce outcomes.

2.5.1. Data Sources

While developing the IPT, it was necessary to bring together two types of evidence- a historical picture/story/account of PRADAN's evolving approach over the past two decades and field-based insights from FGDs, interviews, quantitative survey data and interactions with PRADAN professionals.

Secondary Material Analysis for the development of IPT and its evolution

PRADAN's organisational repertoire, captured in annual reports, project documents, surveys, and the extensive Intro*Scape* (formerly known as News*Reach*) article archive, served as a crucial source for understanding the intervention's history. These sources provided insight into the timing of interventions, major strategic shifts and the organisational learning processes that led to program evolution.

IntroScape Articles

Intro*Scape* articles functioned as an important data source in the initial stages of IPT development. As PRADAN's in-house magazine, it provides narratives authored by practitioners, reflective essays and case studies that reveal how field professionals interpret interventions, frame challenges, and articulate causal explanations for observed changes.

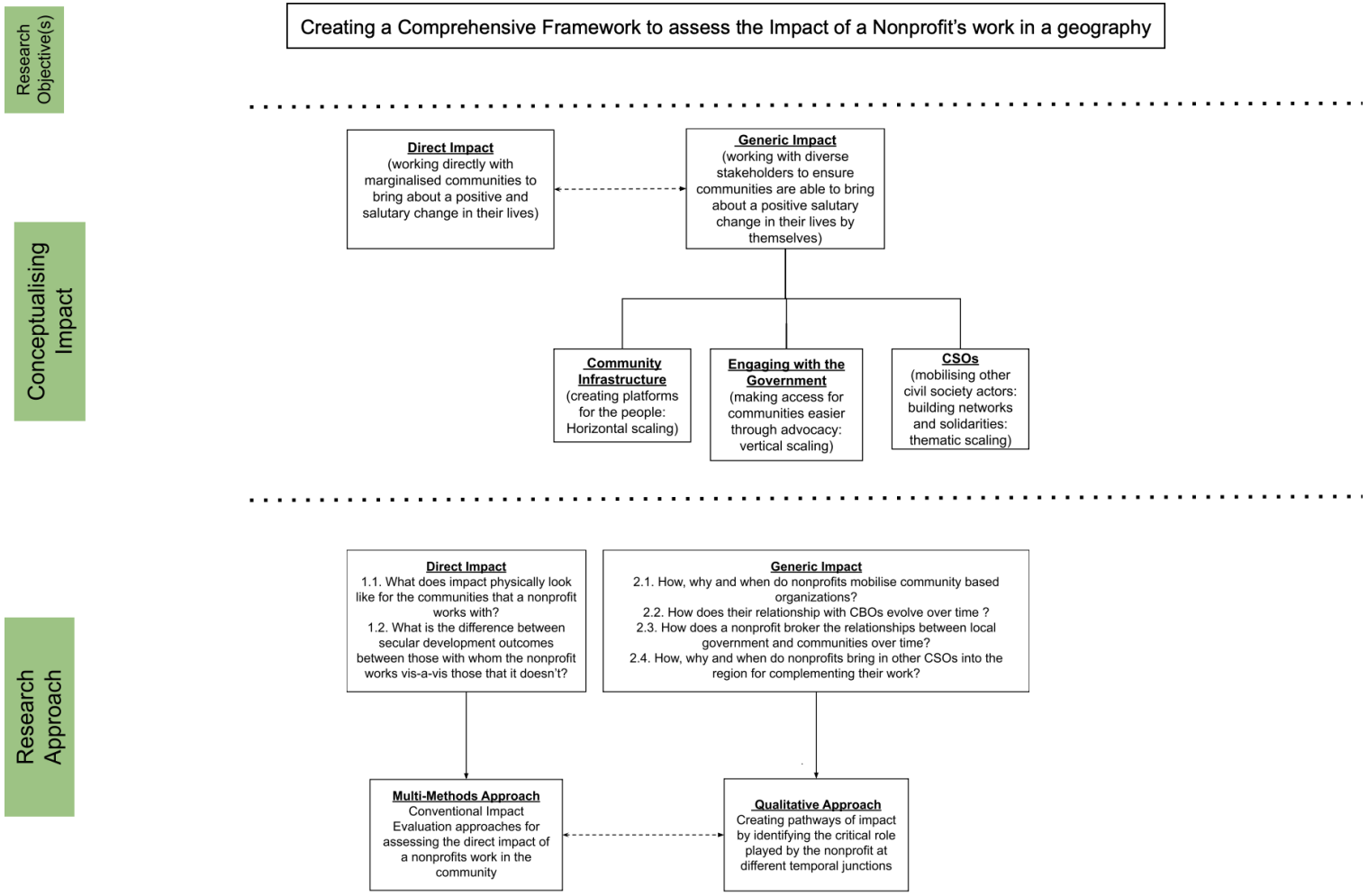


Figure 2.1. Research Approach for Studying PRADAN's Interventions in Gumla and Dhamtari

Unlike formal project documents, Intro*Scape* captures the experiential reasoning, tacit assumptions and interpretations of professionals who work closely with communities. This makes it especially valuable for realist inquiry, which seeks access to the implicit theories held by people embedded in an intervention. The articles offered insights into how practitioners understood shifts in livelihoods, agricultural practices, women's agency and local governance and how they linked these changes to specific contextual conditions. Because Intro*Scape* pieces blend descriptive reporting with reflective analysis, they provided early hypotheses about potential mechanisms, enabling us to map practitioner reasoning before entering the field.

In this way, Intro*Scape* supplemented interview and FGD data by offering a practitioner-side narrative of "what works, for whom and why," helping to surface initial causal propositions that were later refined through empirical coding and cross-village comparison.

Annual Reports

We began by tracing PRADAN's shifting Theory of Change from 2004 to 2024, mapping how its strategies evolved, expanded, deepened and adapted to emerging contexts. We identified six phases in PRADAN's overall organisational strategy in these two decades. In 2004-06, PRADAN focused primarily on grassroots mobilisation through Self-Help Groups (SHGs), emphasising the economic empowerment of women through livelihood programs such as agriculture and microenterprises. The strategy was to empower communities by building financial systems that would later be scaled with government support. By 2007-10, their implementation strategy evolved to incorporate community-led models. PRADAN emphasised reducing dependence on external aid by training local leaders (CSPs) and forming SHG federations to collectively manage livelihoods. Between 2011-15, PRADAN's strategy shifted towards institutionalising community-led models and strategic partnerships. The focus was on scaling integrated interventions that addressed not only livelihoods but also health, sanitation and education. During this period, a shift from direct

intervention to partnership-based scaling was evident. The period 2015-20 marked the emergence of development clusters and a stronger emphasis on systemic change, collective leadership and women's public participation. PRADAN's Theory of Change evolved to focus on scalable, systemic change, with an emphasis on community-led interventions and multi-stakeholder partnerships. During 2020-22, the organisation adapted its approach in response to COVID-19 by prioritising livelihood resilience and digital facilitation. The core idea was that community resilience in rural areas could be built through digital tools, women-led collectives and agriculture diversification. 2022-24 has seen a scale-up of climate-smart agriculture and intensive collaboration across multiple governance levels. PRADAN's Theory of Change is focused on increasing its reach to 50 million community members by 2030, scaling climate-smart agriculture, gender equity and community-driven change. The approach is systemic, involving multi-level collaborations with governments, corporations, and NPOs. We provide a detailed analysis of this for the organisation, as well as for Gumla and Dhamtari in the next chapter.

Across these phases, PRADAN's work shows a clear shift from direct delivery to systemic facilitation. Yet, the mechanisms that drive change, such as trust in the NPO, social cohesion and aspiration, remain consistent, even as the contexts in which they operate continue to evolve. This historical mapping, combined with field narratives, enabled us to reconstruct the causal logic underlying the Initial Programme Theory.

Key Informant Interviews

Discussions with long-serving PRADAN professionals, some of whom were present during the earliest phases of intervention, were essential for filling gaps in the written archive. Such knowledge, which was often absent from formal documentation, provided detailed accounts of early irrigation initiatives, SHG formation, challenges to collective action and changes in village dynamics. These insights kept our analysis grounded in practitioner-focused understanding. We conducted a total of six such

interviews and one FGD with professionals who have worked in Gumla across the last two decades.

Qualitative Fieldwork

We conducted a total of 47 village-level FGDs and 37 interviews with bureaucrats and community leaders. Our empirical base for IPT refinement comes from a set of focused group discussions across different SHG groups in villages, supplemented by semi-structured interviews conducted with farmers, women SHG members and community leaders. These discussions provided rich narratives of how interventions were implemented, how they evolved over time and how participants interpreted changes in livelihoods, migration, agricultural practices, gender empowerment and institutional participation.

All audio recordings from the FGDs and interviews were transcribed verbatim, and the transcripts were then systematically coded in MS Excel. We organised the dataset in a matrix, with columns representing village types- PRADAN-intensive, PRADAN non-intensive and non-PRADAN villages and rows capturing temporal and causal categories- before PRADAN, because of PRADAN, challenges to PRADAN and agnostic to PRADAN. Representative extracts of the coding sheet are provided in Annexure 1.

Following Gioia et al. (2012), we began by extracting first-order codes, phrases used by participants, into this matrix, capturing how people described shifts in livelihoods, migration, agricultural practices, institutional engagement and gender empowerment. These first-order codes were then iteratively clustered into second-order codes and subsequently into overall themes through a repeated process among transcripts, codes and emerging theoretical categories. This structured approach helped us trace patterns across village types and over time. In alignment with the realist tradition, this process allowed us to platform the reasoning used by respondents, which is critical because mechanisms are not directly observable and are

inferred from how individuals explain their choices, constraints, and interpretations of change.

Survey Data[2]

To validate the CMOs constructed from qualitative data, we collected primary data from 2,010 households across 201 villages using a multistage stratified sampling design. In total, 120 villages were covered in Gumla and 81 villages in Dhamtari. Within each sampled village, we surveyed 10 households using a spatially distributed selection approach: two households were randomly selected from each of five reference points - the village centre (typically the location where the pucca road ends and/or where the community hall is located), and the north, south, east, and west directions - yielding a total sample of 2,010 households. We implemented two complementary primary instruments: (i) a household survey (n = 2010) and (ii) a village-level survey (n = 201). The household questionnaire had two parts: a detailed module administered to men, and a shorter module administered to the second-oldest woman in the household to capture gender-relevant outcomes and intra-household dimensions. The village survey was administered to knowledgeable respondents such as elected representatives, SHG/community leaders, or respected village elders. FGDs typically involved 10–15 participants and lasted 60–90 minutes. All participants were informed in advance, and informed consent was obtained prior to data collection.

[2] This study has received ethical approval from the IRB at Goa Institute of Management. (Approval Number: BGMP082505).

Table 2.1. Data Types and their purpose in the study.

Data Type	Data	Description	Purpose
Qualitative	Intro*Scape* Articles	42 articles written by professionals for Gumla and Dhamtari across two decades	IPT development
	Annual Reports, Internal Documents	20 Annual Reports (2004-24) and internal documents (150 pages)	IPT refinement (Evolution of ToCs)
	Key Informant Interviews	6 Interviews and one FGD with 8 professionals who have worked in Gumla across the last three decades	IPT refinement
	Community FGDs and Interviews	47 village-level FGDs and 37 interviews with bureaucrats and community leaders	Developing CMO configurations
Quantitative	Survey Data	Close- Ended Survey with data from 2010 households across 201 villages	Validating CMO configurations
	Geo-Spatial Data	Agricultural Productivity proxy for 800 households from 2017 to 2024	Validating CMO configurations

Spatial Data Analysis

Recognising that agricultural potential and water availability shape the activation of mechanisms, the study incorporated GIS-based classification of PRADAN villages. Using satellite data, land-use maps and agricultural suitability indexes, villages were categorised into agro-ecological types (e.g., high-potential, moderate-potential, low-potential). This allowed for systematic embedding of contextual variation in the CMOs. Because of the nature and timing of the interventions, cross-sectional data provide a limited understanding of causal dynamics; therefore, GIS analysis helps verify these dynamics. Moreover, retrospective evaluations face challenges, including memory recall bias and incomplete documentation. Therefore, to understand PRADAN's

varied long-term outcomes, it was necessary to capture differences across villages; hence, the incorporation of GIS and secondary datasets.

2.5.2. Approach to Analysis

As discussed earlier, following the realist approach, we adopted an iterative process that involved constantly moving back and forth between the data and the emerging theory. We began by reconstructing the sequence of PRADAN's interventions over time. Using organisational documents, practitioner insights, and village timelines and narratives from FGDs, we grouped the organisation's work into four broad phases: early efforts focused on irrigation and basic agriculture, followed by a period in which farmers experimented with vegetables and horticulture. Thus, PRADAN's trajectory can be understood as a phased, trust-based process of transformation. It begins with establishing a presence in the village and building credibility with the community, followed by encouraging experimentation to move beyond dominant cropping patterns and adopt improved agricultural practices. Over time, PRADAN deepens community participation by organising women into SHGs and positioning them as central actors in planning and implementing interventions. As the relationship strengthens, the organisation progressively shifts from primarily material and technical interventions to those aimed at fostering behavioural change, collective agency and new ways of thinking within the community.

Once this timeline was clear, we looked for patterns in outcomes across villages. We analysed qualitative data to identify recurring trends in agricultural productivity, migration, women's participation, access to schemes, the functioning of village institutions, and the sustainability of natural resources. From these patterns, we moved to understanding mechanisms. We paid close attention to how people explained their decisions and experiences because mechanisms often surface in their reasoning. This meant that statements like "we tried growing vegetables because we felt confident after seeing others" or "women go to meetings now because we trust each other and have become friends beyond the work" became important clues. These

explanations pointed to mechanisms such as women's confidence, aspirations, solidarity, trust and social cohesion.

Next, we mapped the contextual conditions that shaped these mechanisms. For this, we categorised contexts into biophysical (soil, water, terrain), socio-economic (migration patterns), institutional (SHGs, federations, governance structures), and political (block-level support). Using this understanding of interventions, mechanisms, and contexts, we began constructing provisional CMO configurations for each thematic area: agriculture, migration, women's empowerment, and collective action. This involved linking the resources PRADAN introduced with specific contextual conditions, the patterns that emerged and the outcomes we observed. We then refined these provisional CMOs by triangulating them with additional FGDs, interviews from different villages, secondary datasets, and PRADAN professionals' accounts. Finally, we synthesised the strongest recurring patterns into four core CMO strands: productive agriculture reducing migration; SHG participation increasing women's empowerment; collective action improving resource management; and low-engagement villages limiting impact. We summarise this process in Figure 2.2.

Bringing the IPT together means taking the four CMO patterns we identified and turning them into a single, clear explanation of how PRADAN's work creates change across different kinds of villages. The IPT works as a guiding storyline that helps connect the different pieces of the intervention. In realist evaluation, an IPT doesn't need to be elaborate. It is essentially a well-reasoned guess/guesstimate about how the programme is expected to work. The aim is simply to lay out a clear, testable explanation of how certain contexts might trigger particular mechanisms to produce outcomes, which can then be examined and refined as more evidence is collected.

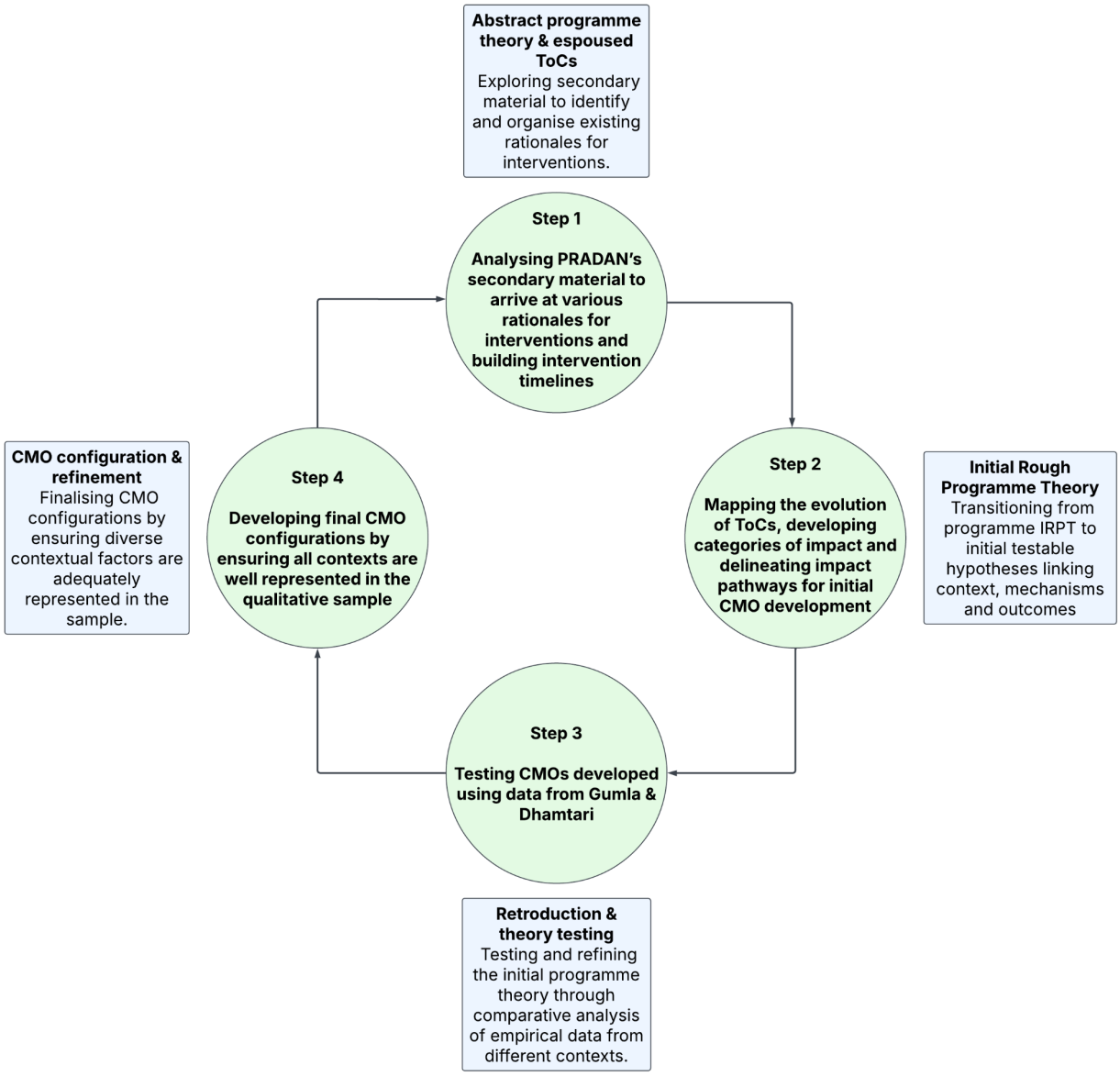


Figure 2.2. Analysis Process for developing and refining IPTs and developing CMOs

Therefore, the core idea that emerges from this process is that when villages have at least some enabling conditions, such as reasonable agricultural potential, social cohesion, and basic institutional functioning, PRADAN's interventions (irrigation, SHGs, farming demonstrations, collective work, etc.) provide people with new resources and opportunities. These resources activate mechanisms such as confidence, aspiration, solidarity, collective agency and the ability to work with institutions. When these mechanisms start working, we see changes such as improved

farming, reduced migration, greater women's participation, and stronger village institutions. But this doesn't happen everywhere. In villages with low resources, low cohesion or fragile institutions, these same interventions don't trigger the mechanisms.

So, the IPT in simple terms is:

If PRADAN brings interventions to villages with at least some enabling conditions,

Then the key mechanisms get activated,

because people see new opportunities, feel more confident, and act collectively, leading to long-term improvements in livelihoods, gender, social cohesion, and governance.

This "**If-Then-Because**" logic is how we test our CMO configurations.

Next, operationalising the IPT means turning the big-picture explanation of "how PRADAN's work creates change" into metrics we can actually measure, test and analyse. We start by breaking down each CMO into a clear, testable statement.

For example:

If a village has strong agricultural potential and reliable irrigation, farmers are more confident to experiment because the risk feels lower.

If SHGs have been active for many years, then women are more likely to participate in local governance because they feel supported and know how to navigate institutions.

These become our hypotheses for quantitative work. Then we design our survey around the mechanisms. We can't directly "measure confidence" or "agency." Still, we can measure indicators of them, such as risk-taking behaviour, participation in meetings, decision-making roles, and the ability to negotiate with institutions. The next step is where the IPT helps us decide where to sample. We know that context

(particularly biophysical) matters a lot, so we stratify villages using GIS-based categories. This lets us systematically compare strong, moderate, and weak villages.

Finally, operationalisation is not a one-time activity. As we collect quantitative data, conduct more FGDs, and integrate GIS findings, we continue refining the IPT, moving from the initial IPT to subsequent versions. This mirrors the iterative nature of realist evaluation. In short, operationalising the IPT is how we move from a theory of how PRADAN's work creates change to a set of measurable, testable questions that guide the rest of the study.

In the next chapter, we detail our findings from the qualitative data that have emerged following the above-mentioned approach.

3. Qualitative Analysis: Developing Initial Program Theory and Context-Mechanism-Outcomes Configurations

While the CMO approach provides a robust way to analyse the impact of NPO programs, many challenges remain, especially when dealing with long-term interventions. This has led scholars to acknowledge the role of adopting an eclectic methodological approach to evaluate impact (Koleros & Mayne, 2019). In long-term evaluations, impact pathways are essential tools for identifying and exploring significant outcomes and key results that need attention (Mayne, 2020). These pathways help pinpoint areas where linkages in the causal chain may be unclear or contested and guide the data collection necessary to evaluate the intervention's effect on the observed changes (Mayne, 2017). Typically, impact pathways are derived from the initial planning documents, which lay out the intended activities and expected impacts. However, there is often a gap between what was originally planned and what was actually implemented, requiring a reality check to assess whether the documented plans align with the field reality. This verification becomes especially challenging in long-term evaluations due to the potential loss of historical records or personnel.

To develop effective contribution pathways, extant scholarship points to the need to focus on different types of activities and groups involved in the intervention, as these often form the foundation for distinct pathways to impact (Koleros et al., 2016). A useful approach is to create timelines that depict how various pathways may unfold over time, clarifying the evolving nature of the intervention (Ton, 2017). Mayne (2020) posits that when data is scarce, consulting stakeholders for insights into possible impact pathways can be a helpful strategy. This approach, which gathers expert opinions on plausible pathways, is particularly valuable in long-term evaluations where records and direct evidence may be limited.

After creating such timelines, long-term evaluations often involve developing a theory of change (ToC) in a more modest way, grounded in the contribution pathways identified throughout the process (Koleros & Mayne, 2019). These pathways form the foundation for creating a ToC by specifying the assumptions needed for each step in the pathway to be realised (McGillivray et al., 2016). Due to the limited background and data often available in long-term evaluations, many of these ToCs may be quite basic. Nonetheless, even a simplified ToC captures key stages along the pathway, such as outputs, changes in practices, direct benefits, and impacts. Confirming these pathways helps establish evidence that the intervention could have made a meaningful contribution.

In situations where multiple interventions are implemented over time with a common goal - such as reducing poverty - each intervention will likely follow a unique pathway to impact. These interventions can be visualised through a timeline, illustrating the start and progression of each intervention and the corresponding impact pathway (see Figure 3.1). For instance, an NPO might implement a series of interventions in sequence, with each intervention having its own distinct timeline and pathway. Once these timelines are established, it is important to develop individual ToCs for each pathway. These ToCs don't have to be overly detailed but should cover key elements such as the outputs produced, changes in practices, and the direct benefits and impacts achieved.

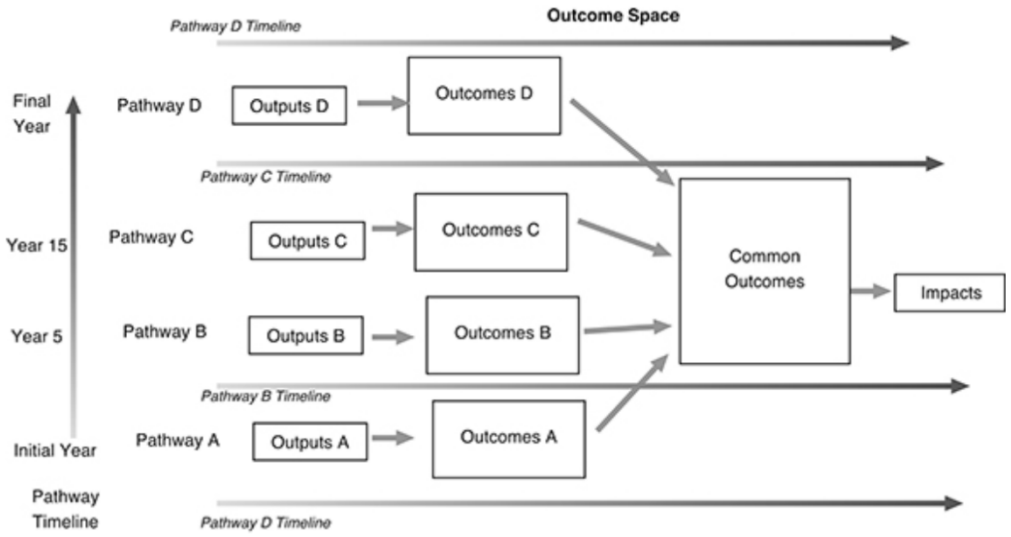


Figure 3.1: A Series of Related Interventions over Time—source: Mayne (2020)

3.1. Qualitative Data and Methods

We summarise our discussion of impact and the methodological approach we are following, using the realist evaluation tradition, in Figure 3.1. Drawing on this methodological approach, we have adopted the following steps to develop timelines, contribution pathways, and conjectural CMO configurations, to arrive at initial program theory[3] and also to work through modifying the same:

(a) Conducting a review of all secondary material available in the public domain (Intro*Scape* articles) as well as internal documents shared by PRADAN (annual reports and development apprentice reports).

(b) Conducting a total of 6 personal interviews with professionals of PRADAN who have worked in Gumla over the last three decades.

(c) Conducting an FGD with all the professionals who have led the Gumla & Dhamtari team at one point or another.

[3] Initial Program Theory (IPT) and Theory of Change (ToC) have been used interchangeably as collective representation of contribution pathways of different interventions or programs.

(d) Conducting two exploratory field visits to Gumla & Dhamtari:

(i) Dec 2024: Conducted 3 village-level FGDs and 9 interviews with community members and leaders.

(ii) Jan 2025: Conducted 5 village-level FGDs; 8 interviews with community members and leaders, and 1 interview with a bureaucrat.

(iii) May, 2025: Conducted 7 village-level FGDs, 4 interviews with the community members and 1 with the bureaucrat.

(iv) October, 2025: Conducted 30 village-level FGDs, 16 interviews with bureaucrats.

These steps in analysis and their purpose are summarised in Table 3.1.

Table 3.1. Phases of Qualitative Data Collection and Analysis

	Phase 1	Phase 2	Phase 3	Phase 4
Time Frame	Sep, 24 - Nov, 24	Dec, 24 - Mar, 25	Apr, 25 - Jun,25	Jul, 25 - Nov, 25
Rationale	Analysing PRADAN's secondary material to arrive at various rationales (ToCs) for interventions and building intervention timelines	Refining initial ToCs, developing categories of impact and delineating impact pathways for initial CMO development	Testing ToCs developed using data from Gumla in Dhamtari	Developing Final CMO configurations by ensuring all contexts are well represented in the qualitative sample
Data Type	Annual Reports, Intro*Scape* Articles, Interviews with Professionals, FGD with professionals	Interviews with Professionals, community members and village-level FGDs in Gumla	Interviews with Bureaucrats, Professionals and village-level FGDs in Dhamtari	Interviews with Bureaucrats, Professionals and village-level FGDs in Gumla and Dhamtari
Participants	1 FGD with PRADAN professionals, 6 Personal Interviews	10 village-level FGDs, 17 interviews with the community members, and 1 with a bureaucrat	7 village-level FGDs and 4 interviews with the community, and 1 with a bureaucrat	30 village-level FGDs and 16 interviews with bureaucrats

3.2. Evolution of PRADAN's overall ToC and Moving to CMOs

We began our analysis by thoroughly reviewing a selection of articles authored by professionals from the Gumla team, published in Intro*Scape* - a magazine produced by PRADAN, and the team's annual report from Gumla, as well as the reports prepared by development apprentices. Intro*Scape* is a vital communication tool for PRADAN, serving not only as a means of disseminating information but also as a platform for professionals to engage with a broad community of development workers, policymakers, and local stakeholders. The articles included in the magazine cover a wide range of topics, from detailed accounts of specific interventions to personal stories of individuals or communities and reflective notes designed to provoke thoughtful debate on issues that have often been overlooked or inadequately addressed through PRADAN's interventions.

The majority of the articles and reports we reviewed focused on the outcomes and impacts of various interventions, many of which aim to improve the lives of underserved communities. These interventions include efforts to enhance agricultural practices, such as promoting alternative farming techniques, and initiatives to empower women and promote economic independence through SHGs. One key theme across these articles is the emphasis on promoting practices that are not only sustainable but also adaptable to the unique socio-economic conditions of the communities in which PRADAN works. Over the years, we have demarcated PRADAN's interventions across all its regions into six broad phases (Table 3.2). Following our approach, we developed ToC articulations for each phase and then analysed their evolution (Benjamin et al., 2023). An important point to note here is that these ToCs have been developed by us through analysis and are not explicitly articulated in this way in either document.

Phase 1: Foundational Scaling and Livelihood-Centred Empowerment (2004- 2006)

In the beginning, PRADAN's Theory of Change was based on a fairly straightforward idea: giving people economic power through livelihoods would lead to substantial social changes. The main way to get involved was through the creation of women's Self-Help Groups (SHGs), which were considered both a means of generating income and a way to connect with other women. Interventions in agriculture, poultry, livestock, and microenterprises were mostly limited to a single area and were intended to raise household incomes directly. The basic idea put PRADAN in charge of making changes. The agency mostly stayed with the organisation, although communities were organised and supported. There was participation, but it was more about helping than changing things. Gender was important, but empowerment was mostly seen as access to savings, credit, and productive assets rather than the authority to make decisions. Institutionally, SHGs were not yet governance bodies; they functioned as delivery channels for economic interventions. Partnerships were pragmatic and transactional, aimed at accessing government schemes and donor funds to scale proven livelihood models. The implicit ToC assumed that once financial stability was achieved at the household level, communities would gradually gain confidence and capacity. Structural issues - governance, social norms, ecosystem constraints - were acknowledged but not yet systematically addressed. This phase laid the foundation: building trust, demonstrating viability, and establishing SHGs as the core institutional architecture upon which later, more complex theories of change would be constructed.

Phase 2: Visioning and the Shift to Community-Led Pathways (2007–10)

With the initiation of Vision 2015, PRADAN's Theory of Change (ToC) began to directly interrogate its own function. The organisation transitioned from a service-delivery approach to a capacity-building and community-driven development framework. Livelihoods remained vital; however, they were no longer regarded as discrete technical interventions. Rather, they were integrated into a comprehensive framework of gender equity, institutional advancement, and intersectoral

convergence. Livelihood planning transitioned from activity-centric interventions to family-oriented, integrated livelihood solutions that view households as economic entities managing various risks. Integrated Natural Resource Management (INRM) was incorporated into the ToC in response to ecological constraints, particularly water and land degradation. This indicated a significant conceptual transformation: livelihoods were no longer perceived as separate from environmental systems.

The ToC evolved to acknowledge that sustainable impact required local leadership and community governance, rather than merely increased incomes. SHGs began federating, signifying a preliminary institutional transition from beneficiaries to entities with decision-making authority. Community Support Persons (CSPs) received training, indicating a strategic effort to internalise knowledge and diminish reliance on PRADAN personnel. The concept of gender empowerment has become stronger. Women transitioned from mere participants in savings and credit activities to being recognised as prospective leaders within SHGs and local governance frameworks. The power dynamics commenced a gradual, if unequal, transformation. The relationships with donors also evolved. PRADAN transitioned to establishing long-term relationships, especially with government entities, with a focus on common objectives rather than isolated programs.

The ToC increasingly recognised interdependencies among agriculture, water, forests, and labour, asserting that communities can effectively manage these relationships if provided with appropriate institutional support. PRADAN's function evolved to encompass the design of processes, standards, and learning systems instead of merely providing outputs. Gender dynamics continued to progress, with women asserting increased influence within federations, although leadership development remained ongoing. Collaborations between donors and the government facilitated this transformation, enabling experimentation with multisectoral frameworks. The ToC transitioned from ‘facilitating access’ to ‘establishing stewardship’, in which communities were expected to assume responsibility for both

resources and decision-making. The revised ToC now hinged on the conviction that empowered community institutions can independently organise, manage, and sustain development processes, with PRADAN serving as a facilitator rather than an executor. This phase signified a more assured expression of community agency within PRADAN's Theory of Change. The primary assumption was that self-sufficient communities, supported by robust local institutions, could effectively manage increasingly intricate livelihood systems. SHG federations evolved into governance platforms rather than mere collections of groups, while Community Service Providers became essential agents of change.

Throughout this period, PRADAN's Theory of Change evolved into a consciously integrated model. The organisation came to perceive livelihoods, gender, governance, and natural resources not as separate entities but as interdependent mechanisms that reinforce one another. Interventions progressively integrated agriculture, water, health, and social empowerment, with SHG federations serving as the institutional cohesive force. A fundamental breakthrough in the Theory of Change was the acknowledgement that achieving scale necessitated partnerships rather than mere repetition. PRADAN established itself as a knowledge and implementation partner for government initiatives, non-governmental organisations, and other entities. Policy engagement and leadership development emerged as explicit strategies, signifying a transition from village-level transformation to systemic support. Gender had become an integral consideration rather than an isolated goal. Women's leadership was integrated into governance frameworks, and participation began to convert into power. Power dynamics increasingly favoured communities, although PRADAN maintained a significant directing role. The Theory of Change posited that sustainable transformation would occur when community institutions were synchronised with state structures and markets. This phase demonstrated PRADAN's increasing assurance that institutional design, rather than discrete interventions, was the principal catalyst for enduring transformation.

Phase 3: Institutionalisation and Holistic Community Development (2011–2015)

This phase signified the consolidation of PRADAN's institutional Theory of Change. The fundamental premise was that robust community institutions could manage not only livelihoods but also health, education, nutrition, and governance outcomes. SHG federations assumed responsibility for several development domains, signifying a pivotal transition from sector-specific programming to comprehensive community development. PRADAN's function evolved to encompass system design, capacity enhancement, and partnership management. Interventions were distinctly participatory, involving communities in design, execution, and monitoring. Gender empowerment significantly intensified: women-led decision-making became standard in livelihoods and local governance, while concerns like socioeconomic inequity and gender-based violence were incorporated into the programmatic framework. Extensive collaborations, especially with Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM) and state governments, redefined the Theory of Change concerning institutional durability and scalability. Donor connections evolved into multi-year; strategic partnerships focused on systemic change rather than short-term results. The rationale was evident: if women-led institutions could be integrated into governmental processes and markets, they could maintain and amplify their influence well beyond PRADAN's direct involvement. This time, PRADAN's Theory of Change was definitively defined as institutional rather than project-oriented.

Phase 4: Scale, Markets, and Eco-Social Transformation (2015 - 2020)

From 2015 to 2020, PRADAN's Theory of Change clearly integrated markets, climate resilience, and scalability. Livelihoods were restructured to focus on regenerative agriculture, value chains, and the integration of smallholders into markets. The premise evolved from the notion that communities could manage resources to the belief that they could compete, negotiate, and adapt within broader economic frameworks. Women's collectives - SHGs, federations, and Farmer-Producer

Organisations (FPOs) - emerged as crucial economic agents. Women's governance and leadership were regarded as essential for sustainable livelihoods. The ToC now directly ties gender equity with ecological sustainability and economic resilience, eliminating previous thematic distinctions. Development Clusters were developed as a geographical strategy for the large-scale implementation of multi-sectoral projects. Digital instruments were implemented for oversight and decision-making, indicating a transition to data-driven governance. Donor collaborations became thoroughly institutionalised, with philanthropic organisations endorsing long-term initiatives focused on climate adaptation and women's economic development. The Theory of Change was predicated on a systemic assumption: the large-scale transformation of rural livelihoods necessitates coordinated action across people, markets, ecosystems, and governmental entities.

Phase 5: Crisis, Resilience, and Adaptive Capacity (2020–22)

The COVID-19 pandemic rigorously tested PRADAN's Theory of Change, thereby refining it. The primary conclusion was that resilience, rather than progress alone, constituted the authentic measure of empowerment. Women-led institutions were essential in coordinating relief efforts, managing resources, and facilitating livelihood recovery. The ToC underscored swift adaptation via community leadership, digital resources, and varied livelihoods. SHG federations and FPOs served as initial responders, affirming PRADAN's longstanding conviction in the robustness of institutions. Digital engagement - IVRS, online training, digital finance - has transitioned from a peripheral role to a fundamental component essential for maintaining involvement and learning. The advancement of climate-smart agriculture and agroecology demonstrates the recognition of the interconnection between ecological shocks and health issues. During this period, donor relationships emphasised adaptability, trust, and sustained commitment. The ToC was developed to acknowledge ambiguity openly. PRADAN conceptualised change as an adaptive

process rather than a predetermined road, wherein empowered institutions facilitate communities' responses to shocks while safeguarding livelihoods and dignity.

Phase 6: Perspective Plan 2030 and Systems-Scale Change (2022–2024)

In the latest phase, PRADAN's Theory of Change is distinctly systems-oriented and aspiration-driven. The Perspective Plan 2030 aims to influence 50 million individuals, necessitating cooperation among government, markets, civil society, and philanthropy. The ToC posits that sustainable livelihoods, climate resilience, and gender equity are interdependent and must be concurrently advanced through regenerative agriculture, water management, and women's leadership. SHG federations are no longer intermediary entities; they are acknowledged as principal agents of change within local and regional frameworks. PRADAN identifies itself as a catalyst and systems partner - formulating frameworks, facilitating alliances, and shaping policy - rather than as an executor. Development clusters, FPO resource centres, and value-chain partnerships provide mechanisms for scalability. Donor partnerships are entirely institutionalised, focused on impact, and aligned with the Sustainable Development Goals and long-term transformation. *The Theory of Change today relies on a well-established premise: enduring transformation occurs when empowered community institutions are integrated into, and capable of influencing, broader socio-economic and ecological system.*

Table 3.2: Evolution of PRADAN's ToC

Period	Strategic Focus	Tentative Theory of Change
Phase 1: 2004- 2006	Foundational Scaling & Consolidation	Focused on grassroots mobilisation through SHGs, emphasising economic empowerment of women through livelihood programs like agriculture and microenterprises (PRADAN, 2005, pp. 2-4). The strategy was to empower communities by building financial systems, which would later be scaled through government support
Phase 2: 2007-2010	Visioning Future Growth "Community Taking Charge" Era Innovative Models & Strategic Partnerships	The implementation strategy evolved to incorporate community-led models. PRADAN emphasised reducing dependency on external aid by training local leaders (CSPs) and forming SHG federations to manage livelihoods collectively (PRADAN, 2009, p. 5). At this stage, PRADAN's approach was diversified to include water resources management and integrated natural resource management (INRM) to strengthen agricultural resilience.
Phase 3: 2011-2015	Institution Building & Systematisation	The strategy shifted towards institutionalising community-led models and strategic partnerships. The focus was on scaling integrated interventions that addressed not only livelihoods but also health, sanitation, and education (PRADAN, 2013-14, p. 6). During this period, a shift from direct intervention to partnership-based scaling was evident.
Phase 4: 2015-2020	Large-Scale Outreach & Governance	PRADAN's Theory of Change evolved to focus on scalable, systemic change, with an emphasis on community-led interventions and multi-stakeholder partnerships. The theory was built on the assumption that marginalised communities, particularly women, can be empowered through economic, social, and environmental interventions, leading to long-term transformation (PRADAN, 2019-20, p. 10). During this period, PRADAN implemented its strategy through Development Clusters (DCs), which served as geographical units for implementing multi-sectoral programs. The emphasis was on sustainability and women's empowerment through SHGs, FPOs, and climate-resilient farming practices. By targeting local governance structures like Panchayats, PRADAN aimed to shift decision-making to community-driven models (PRADAN, 2020, p. 12)
Phase5: 2020-2022	COVID-19 Response & Adaptation	PRADAN's Theory of Change in response to COVID-19 was focused on rapid adaptation and livelihood recovery. The core idea was that community resilience in rural areas could be built through digital tools, women-led collectives, and agriculture diversification (PRADAN, 2020, p. 13). Digital transformation became central to PRADAN's strategy, using online training, digital financial literacy, and remote livelihood support. The strategy also emphasised resilience in smallholder livelihoods and market linkages (PRADAN, 2020, p. 13)
Phase 6: 2022-2024	Perspective Plan 2030 & Scaling Impact	PRADAN's Theory of Change is focused on reaching 50 million individuals by 2030, scaling climate-smart agriculture, gender equity, and community-driven change. The approach is systemic, involving multi-level collaborations with state governments and NPOs (PRADAN, 2023-24, p. 19). Scaling through Development Clusters is the focus, with agriculture, livelihoods, and climate resilience as key priorities. PRADAN plans to expand the FPO Resource Centre and value chain development through partnerships with donors and state agencies (PRADAN, 2023-24, p. 19)

Over the past two decades, PRADAN's Theory of Change has transitioned from a linear approach to livelihood enhancement to a more adaptive, systems-level transformation (for a comprehensive analysis of the evolution of Theories of Change, refer to Appendix 1). The locus of agency transitions progressively - from PRADAN to communities, from SHGs to federations, and from villages to ecosystems and markets. Gender transitions from access to authority; livelihoods evolve from activities to systems; partnerships shift from transactional to strategic. The Theory of Change evolves into the conviction that women-led institutions, integrated within supporting frameworks, provide the most sustainable avenue for achieving equitable and resilient rural development. These articulations illustrate the intricacy of the tasks undertaken by PRADAN personnel as they address the challenges of operating in varied rural environments characterised by complicated socio-economic dynamics.

Without a common framework for understanding the causal relationships between interventions and outcomes, it is challenging to evaluate the actual efficacy of PRADAN's efforts. The diverse viewpoints among professionals lead to differing interpretations of the same activities, complicating the assessment of whether the benefits stem from PRADAN's initiatives or external influences. This is particularly applicable when interventions are executed at a local level, when external variables - such as fluctuations in market conditions, local political dynamics, or environmental factors - can significantly influence the consequences. To address this difficulty, we analysed the case studies to uncover the fundamental patterns and causal links in the data. These articulations illustrate the intricacy of the tasks undertaken by PRADAN experts as they navigate the challenges of operating in varied rural environments characterised by complex socio-economic dynamics. We have used CMOs to capture these articulations, as illustrated below using a sample case study.

3.2.1 Illustrating the Development of C-M-O Configurations (From IPT to CMOs)

The construction of CMOs is an iterative process that requires ongoing interaction among multiple data types, making it difficult to capture in a single snapshot. To clarify the disaggregation of single quotation or qualitative data extracts, we provide a case study of a female member of an SHG who implemented the System of Rice Intensification (SRI) technique under the guidance of PRADAN (Table 3.3). This case is particularly intriguing, as it underscores the obstacles and triumphs faced by individuals who adopt new agricultural techniques in their farming. The case study of the SHG member who implemented the SRI technique exemplifies the impact that PRADAN seeks to accomplish. By implementing SRI, this woman substantially enhanced her rice yields, thereby augmenting her household income and benefiting her family's overall well-being. This instance illustrates the efficacy of the intervention and offers insights into the wider context of PRADAN's initiatives in rural regions. It elucidates how the organisation collaborates with local people to implement sustainable agriculture methods that enhance food security and strengthen financial resilience.

Table 3.3: Assessing what impact physically looks like for PRADAN interventions

"Puspa Kujur is a member of the Sant Monica Mahila Mandal. Her family includes herself, her husband Abraham Kujur, four sons and a daughter. She has 2.5 acres of land used for paddy cultivation and 1.25 acres of uplands. She had hardly been able to feed her family till 2002 because the paddy yields were low, and life was quite challenging for her. She is the pioneer of the SRI demonstration in the village. In the very first year, she covered all her lands with the SRI paddy. She was able to harvest three times higher yields that year. Her family now has food sufficiency for the whole year and surplus food grain stored for another year from the same piece of land. She has also started growing mangoes and vegetables in her uplands since 2007. She has irrigation support from a well, constructed by Sant Monica Mahila Mandal. In 2012, she sold mangoes worth Rs 40,000 and, in 2011–12, vegetables worth Rs 50,000. Her annual income has grown from Rs 5,000 per annum to Rs 80,000–1,00,000 per annum. Her daughter is studying to be a nurse in a private institute in Patna, Bihar; all five children are now literate. Her husband, Abraham, has supported her in all the changes that she has made so far. Abraham also works as a Community Service Provider. He has developed a strong understanding of agriculture-based technologies and is a valuable resource in the village. The family is now planning to start a seed and fertiliser shop. This family is an inspiration to all the families of Sipringa." news_reach_july_aug2012: 40 - 40 (0)

From the passage in Table 3.3, we can clearly delineate the context mechanisms and potential outcomes for the individual- and household-level impact of PRADAN's work over a long period of time. This can be summarised as a CMO configuration:

"Puspa Kujur, supported by the Sant Monica Mahila Mandal and her spouse's active participation, adopted the System of Rice Intensification (SRI) method and diversified into growing mangoes and vegetables (context), which triggered feelings of protection and confidence due to the training support and financial resources available to her through interventions by PRADAN (mechanism), leading to increased food sufficiency, a significant rise in income, improved education for her children, and plans for future entrepreneurial ventures (outcomes)."

- Context:
    - Local community infrastructure (Sant Monica Mahila Mandal), providing irrigation support and creating a platform for agricultural innovation.
    - Family's agricultural background: Limited resources and low yields before intervention, with supportive family dynamics.
- Mechanism:
    - Introduction of SRI farming by PRADAN: The adoption of SRI techniques to improve paddy yield.
    - Diversification of crops by PRADAN: Growing mangoes and vegetables with the support of irrigation.
    - Community engagement: Active participation of Puspa's spouse, Abraham, as a community service provider in PRADAN's interventions, learning and sharing agricultural technologies.
- Outcomes:
    - Increased food sufficiency: Meeting the family's year-round food needs with surplus food storage.
    - Increased income: Significant rise in annual income due to higher agricultural yields and the sale of mangoes and vegetables.

- Improved literacy and education: Children's literacy and advancement in education.
- Entrepreneurship and future development: The family plans to start a seed and fertiliser shop as a future venture.

This configuration highlights the crucial role of a series of interventions by PRADAN: (i) creation of SHGs and (ii) agricultural innovation (SRI & commercial crops) in transforming Puspa's family's livelihood, education, and economic opportunities.

Similarly, our analysis traces the logical steps connecting PRADAN's interventions to specific outcomes while also considering the broader context in which these interventions occur. This method allows us to not only assess the immediate impact of individual interventions but also to understand the longer-term effects on the communities and individuals involved. In doing so, we hope to offer a more nuanced and comprehensive answer to the question: What constitutes PRADAN's impact? This process involves examining both the direct and indirect effects of PRADAN's work and considering factors that may influence the sustainability of these impacts over time. By taking this approach, we provide a clearer picture of PRADAN's role in promoting development in rural communities. Through a more systematic and rigorous analysis of the evidence, we can better understand the pathways through which PRADAN's interventions lead to lasting change and how these interventions contribute to the broader goals of economic and social empowerment and sustainable development in the region. Following the approach mentioned above, we triangulate from different sources: personal interviews, focus-group discussions, articles and reports to arrive at coherent CMO configurations discussed in 3.4. We now move to discussing initial program theories and CMO configurations for both Gumla and Dhamtari. The program theories of each location draw from the overall PRADAN ToC but are adapted to cater to the specific contextual needs of each location, and hence warrant separate discussion.

3.3. Initial Program Theories: Gumla and Dhamtari

To begin with, our analysis revealed that the impacts of PRADAN's interventions varied significantly across different time periods. The timing and sequencing of these impacts were crucial in understanding how the interventions played out and led to tangible outcomes. For example, the case discussed earlier in Table 3.3. demonstrates a clear, logical sequence in articulating impact: the creation of an agricultural surplus, followed by a shift to commercial cropping, ultimately leading to increased incomes, improved family health and education, and a boost in entrepreneurship. This sequence illustrates the interconnected nature of the outcomes, all of which resulted from a constellation of carefully designed and executed interventions by PRADAN. Each step in this chain of impact is not isolated but is part of a larger narrative of change, illustrating how small, cumulative changes in one area - such as agricultural practices - can ripple outward and influence broader aspects of life, including economic, social, and even personal aspects of well-being.

However, to fully comprehend this sequence and its underlying logic, it was essential to understand when and why these interventions were introduced, and when they were withdrawn or phased out. Understanding the timing of these interventions is particularly important because the effects of development work, especially in rural settings, often unfold over extended periods. It is not always clear how a particular intervention will lead to a desired outcome, and the impacts may vary depending on local conditions, community capacity, and the sequence of activities undertaken. In light of this, we took a methodical approach to mapping the types of PRADAN interventions that were implemented over the years in Gumla and Dhamtari. This mapping process involved collecting data on the specific interventions introduced by PRADAN in different phases and understanding their objectives, scope, and target groups. By examining the chronology of these interventions, we could gain insight into the evolution of PRADAN's approach and how different interventions were designed to build upon one another to create a more comprehensive and lasting impact.

Once we had mapped the interventions, we grouped them into categories, or 'buckets', to identify plausible intervention phases. These phases represent distinct periods in the evolution of PRADAN's work in Gumla, each characterised by different sets of activities aimed at addressing specific challenges faced by the community. For instance, in the early phases, PRADAN may have focused more on agricultural interventions, such as introducing improved farming techniques and crop diversification. Over time, as the community became more adept at these new practices, PRADAN may have shifted its focus toward livelihood diversification, entrepreneurial ventures, and health and education programs, recognising that the broader socio-economic context needed to be addressed in tandem with agricultural improvements. By organising the interventions into distinct phases, we gained a clearer understanding of how each intervention contributed to the overall impact and how the timing and sequence of these interventions mattered for achieving the desired outcomes. It also became apparent that some interventions, such as those aimed at improving agricultural productivity or promoting commercial cropping, had both immediate and long-term impacts. These interventions not only increased income levels and food security but also laid the foundation for broader social changes, such as improved family health and educational outcomes, as people were able to invest more in their children's education and healthcare.

The process of mapping and categorising these interventions also helped us identify patterns in the way PRADAN's work evolved over time. For instance, in the initial phases, PRADAN's interventions focused on building trust and fostering relationships with local communities, which is essential to laying the foundation for any long-term development work. Over time, as these relationships strengthened and the community gained greater confidence in the interventions, PRADAN's focus shifted toward more complex, multidimensional strategies aimed at enhancing livelihoods and promoting social empowerment. By mapping the types of interventions over time and categorising them into distinct phases, we were able to create a more nuanced and comprehensive picture of PRADAN's impact. This approach allowed us to understand

not only the direct effects of individual interventions but also the cumulative and long-term outcomes that resulted from a series of well-timed and strategically implemented actions. Through this process, we gained valuable insights into the way PRADAN's interventions interact and build upon one another, ultimately contributing to a more holistic and sustainable model of development in the region.

3.3.1. The Gumla Chapter

From an analysis of the secondary sources (Intro*Scape* & Team Annual Reports) and interviews with professionals in the field teams, we discerned two broad categories of interventions undertaken by PRADAN in Gumla over the years. The first set pertains to working directly with communities on various aspects of farm and non-farm-based activities. PRADAN entered Gumla roughly in the mid-1990s, expanding its work from the neighbouring district of Lohardaga. This was a period when the emphasis was placed on improving kharif agriculture, with active support from what was then known as the Bihar Plateau Development Project (funded by the World Bank) and the Bihar Hill Area Lift Irrigation Corporation Limited. The initial interventions were centred on creating lift irrigation systems in villages with access to surface water sources. These villages typically had a small seasonal stream nearby, allowing for bunding and the construction of water-harvesting structures to develop irrigation facilities for community members. PRADAN professionals set up Water User Associations (WUAs) with male farmers to maintain accounts and establish mechanisms to determine collective use of the lift and allocate water to farms.

Phase 1: Finding Feet

The initial lift irrigation systems enabled farmers to adopt scientific agriculture, improve yields, and use precision irrigation techniques rather than flooding their farms. Additionally, they offered scope to expand agriculture into the uplands, which otherwise remained fallow owing to low water retention (due to steep gradients) and uneven terrain. This phase of interventions has been characterised by the professionals of that period as 'setting up' or 'finding feet' with the community (see

Figure 3.2). However, while working with men as a part of the WUAs, PRADAN professionals realised the need to shift their gaze to women. Two rationales emerge from the interviews. Firstly, professionals realised that women are among the most underserved in this region, with the prevalence of social ostracisation practices such as 'witch-hunting'. Secondly, working with men to promote collectives or community-based organisations was challenging due to a very little social bond despite heavy investment in building solidarity by PRADAN professionals. Thus, the shift to working with women implied that agricultural interventions were now being conducted on a one-on-one basis with men in the community, and that SHGs were being set up in parallel with women.

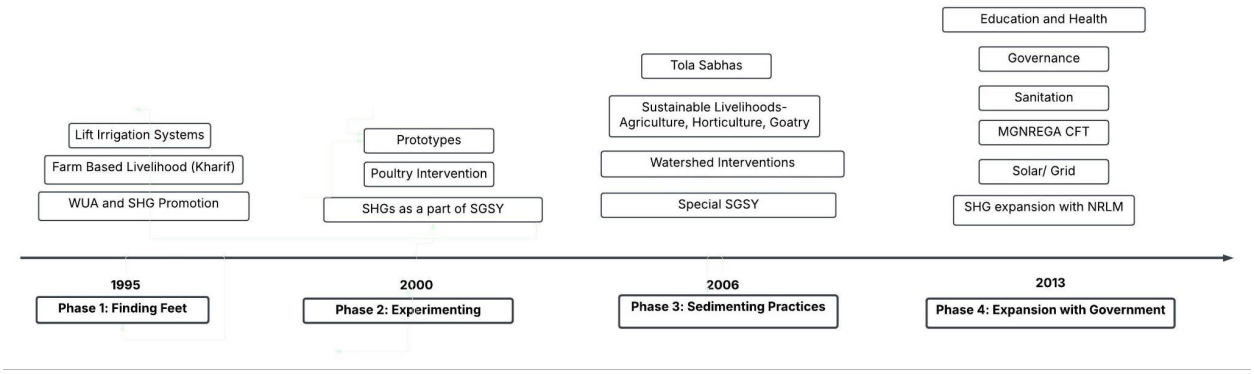


Figure 3.2.: Timeline of PRADAN's Key Interventions in Gumla. Author's Analysis

Phase 2: Experimenting

In the second phase of interventions, PRADAN implemented multiple approaches to increase household incomes in communities. The first strand of interventions, built on earlier work on lifts and the creation of water harvesting structures, was to introduce commercial cropping during the rabi season. The shift from Kharif to Rabi was aimed at creating two possible outcomes: first, to discourage women from migrating with men to cities for the entire period post-monsoon. This had a bearing on the functioning of the newly promoted SHGs, as women migrating out reduced the possibility of their remaining active in the SHGs. Secondly, this was intended to allow

men to spend more time in agriculture, in the hope that this would yield better returns than the remittances they send home after migrating to cities. Once crops started coming in, the professionals also shifted their attention to developing market access and input aggregation mechanisms. However, these market-linkage activities were undertaken systematically during this phase. Additionally, in this phase, PRADAN's professionals relied heavily on entrepreneurial efforts to secure government grants from the Bihar Department of Welfare to develop prototypes for poultry and goat-rearing interventions with communities. These were viewed as opportunities to create additional sources of income for households without access to water for agriculture.

Phase 3: Sedimenting Practices

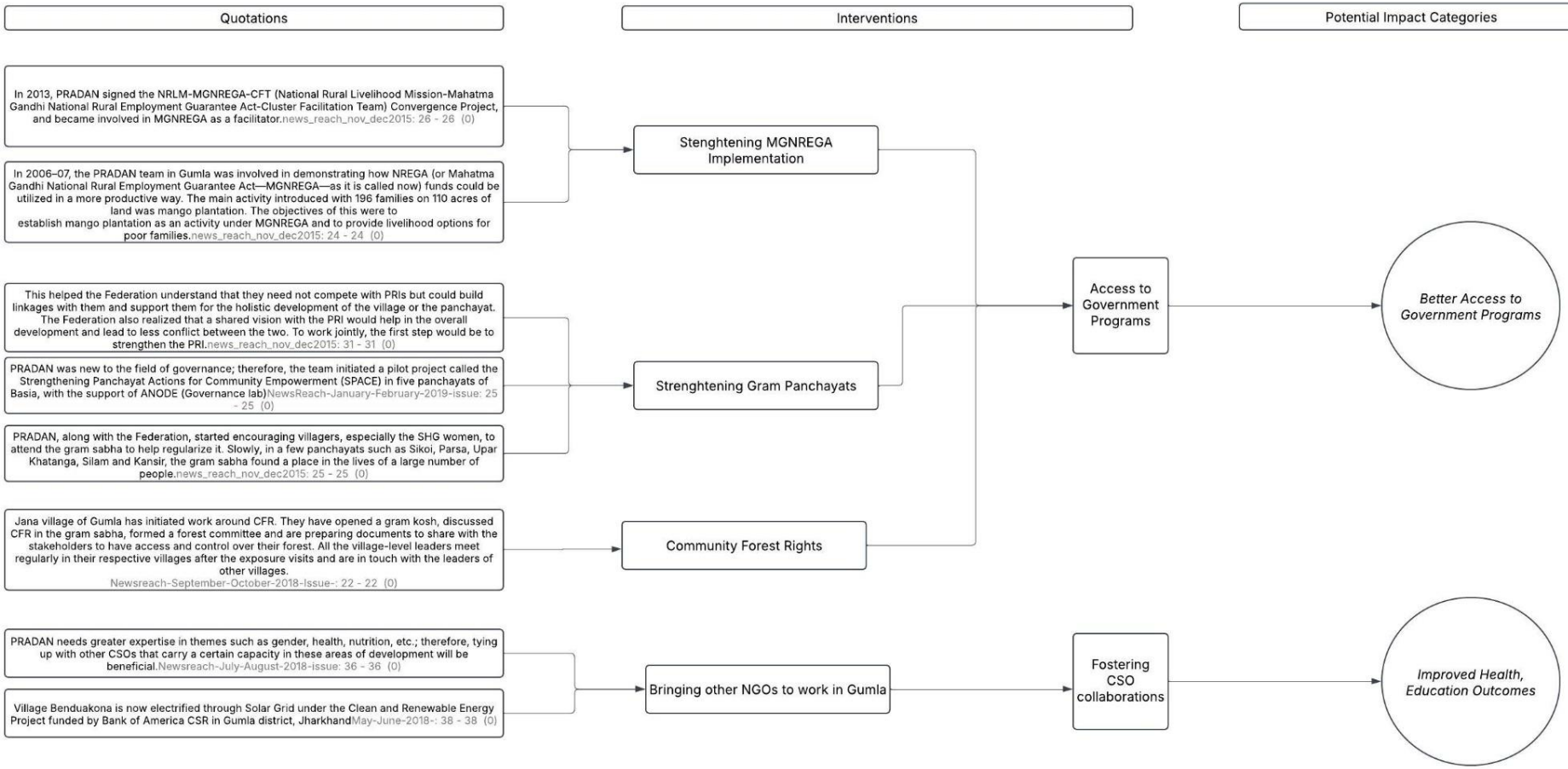
The third phase of interventions saw a full-fledged focus on the creation of agriculture production clusters and plantations. Building on the significant work done in water harvesting and in promoting commercial cropping during both kharif and rabi seasons, the focus has now shifted to creating clusters that could provide farmers with greater bargaining power for their produce. Further, plantations emerged as a good source of income for farmers who had a significant portion of uplands. Thus, with basic water-harvesting techniques on upland land parcels, mango plantations were established to provide an additional source of income for households. A new strand of interventions emerged in this phase that aimed to create Tola Sabhas (village-level committees) as part of the special Swarnjayanti Gram Swarozgar Yojana (SGSY). Setting up Tola Sabhas in a selected set of villages, PRADAN professionals engaged them in participatory resource mapping and planning processes. This enabled systematic exploration of potential watershed interventions to develop irrigation facilities in these villages.

Phase 4: Expansion with Government

Building on these sets of interventions around SHGs, non-farm activities & farm-based activities, PRADAN expanded its area of work after working on large-scale policy programs such as the Mahatma Gandhi National Rural Employment Guarantee

Act (MGNREGA) and DAY-NRLM. Not just geographically but also thematically, it expanded into the domains of education, health, and sanitation by partnering with other expert NPOs on these themes. In some sense, this fourth phase marked a significant jump in its activities, both in scope (types of activities undertaken) and in geographic scale (the number of villages it was active in). In the previous three phases, the focus was on deepening interventions in specific villages. When it was realised that this was attained in a broad sense, the policy programs provided an opportunity to replicate efforts in other villages by working closely with the governments.

Thus, through the analysis of secondary material and interviews with professionals from PRADAN, we were able to identify five broad categories of interventions as shown in Figure 3.3: (i) Non-farm-based interventions, (ii) farm-based interventions, (iii) creation of community-based organisations, (iv) access to government schemes, and (v) fostering CSO collaborations. While we could map out the potential impact each of these intervention categories would have on the communities, we could not discern the mechanisms for these very distinctly from this set of interviews. For instance, the professionals stated that all non-farm and farm-based interventions would primarily aim to increase household-level income. Even from the creation of SHGs, some articulated potential outcomes included easier access to credit from the formal banking system through credit linkages. However, the primary set of outcomes envisaged from the SHG interventions focused on building community solidarity and the social and political empowerment of women in the region. This was also illustrated through examples of many SHG leaders going on to become ward members and sarpanch in gram panchayats. While improved access to government programs was seen as a separate category of impact, the linkage would potentially also be with both empowerment and increased incomes.


Quotations
Interventions
Potential Impact Categories
In 2013, PRADAN signed the NRLM-MGNREGA-CFT (National Rural Livelihood Mission-Mahatma Gandhi National Rural Employment Guarantee Act-Cluster Facilitation Team) Convergence Project, and became involved in MGNREGA as a facilitator.news_reach_nov_dec2015: 26 - 26 (0)
In 2006–07, the PRADAN team in Gumla was involved in demonstrating how NREGA (or Mahatma Gandhi National Rural Employment Guarantee Act—MGNREGA—as it is called now) funds could be utilized in a more productive way. The main activity introduced with 196 families on 110 acres of land was mango plantation. The objectives of this were to establish mango plantation as an activity under MGNREGA and to provide livelihood options for poor families.news_reach_nov_dec2015: 24 - 24 (0)
Stenghtening MGNREGA Implementation
This helped the Federation understand that they need not compete with PRIs but could build linkages with them and support them for the holistic development of the village or the panchayat. The Federation also realized that a shared vision with the PRI would help in the overall development and lead to less conflict between the two. To work jointly, the first step would be to strengthen the PRI.news_reach_nov_dec2015: 31 - 31 (0)
PRADAN was new to the field of governance; therefore, the team initiated a pilot project called the Strengthening Panchayat Actions for Community Empowerment (SPACE) in five panchayats of Basia, with the support of ANODE (Governance lab)NewsReach-January-February-2019-issue: 25 - 25 (0)
PRADAN, along with the Federation, started encouraging villagers, especially the SHG women, to attend the gram sabha to help regularize it. Slowly, in a few panchayats such as Sikoi, Parsa, Upar Khatanga, Silam and Kansir, the gram sabha found a place in the lives of a large number of people.news_reach_nov_dec2015: 25 - 25 (0)
Strenghtening Gram Panchayats
Jana village of Gumla has initiated work around CFR. They have opened a gram kosh, discussed CFR in the gram sabha, formed a forest committee and are preparing documents to share with the stakeholders to have access and control over their forest. All the village-level leaders meet regularly in their respective villages after the exposure visits and are in touch with the leaders of other villages.
Newsreach-September-October-2018-Issue-: 22 - 22 (0)
Community Forest Rights
Access to Government Programs
Better Access to Government Programs
PRADAN needs greater expertise in themes such as gender, health, nutrition, etc.; therefore, tying up with other CSOs that carry a certain capacity in these areas of development will be beneficial.Newsreach-July-August-2018-Issue: 36 - 36 (0)
Village Benduakona is now electrified through Solar Grid under the Clean and Renewable Energy Project funded by Bank of America CSR in Gumla district, JharkhandMay-June-2018-: 38 - 38 (0)
Bringing other NGOs to work in Gumla
Fostering CSO collaborations
Improved Health, Education Outcomes

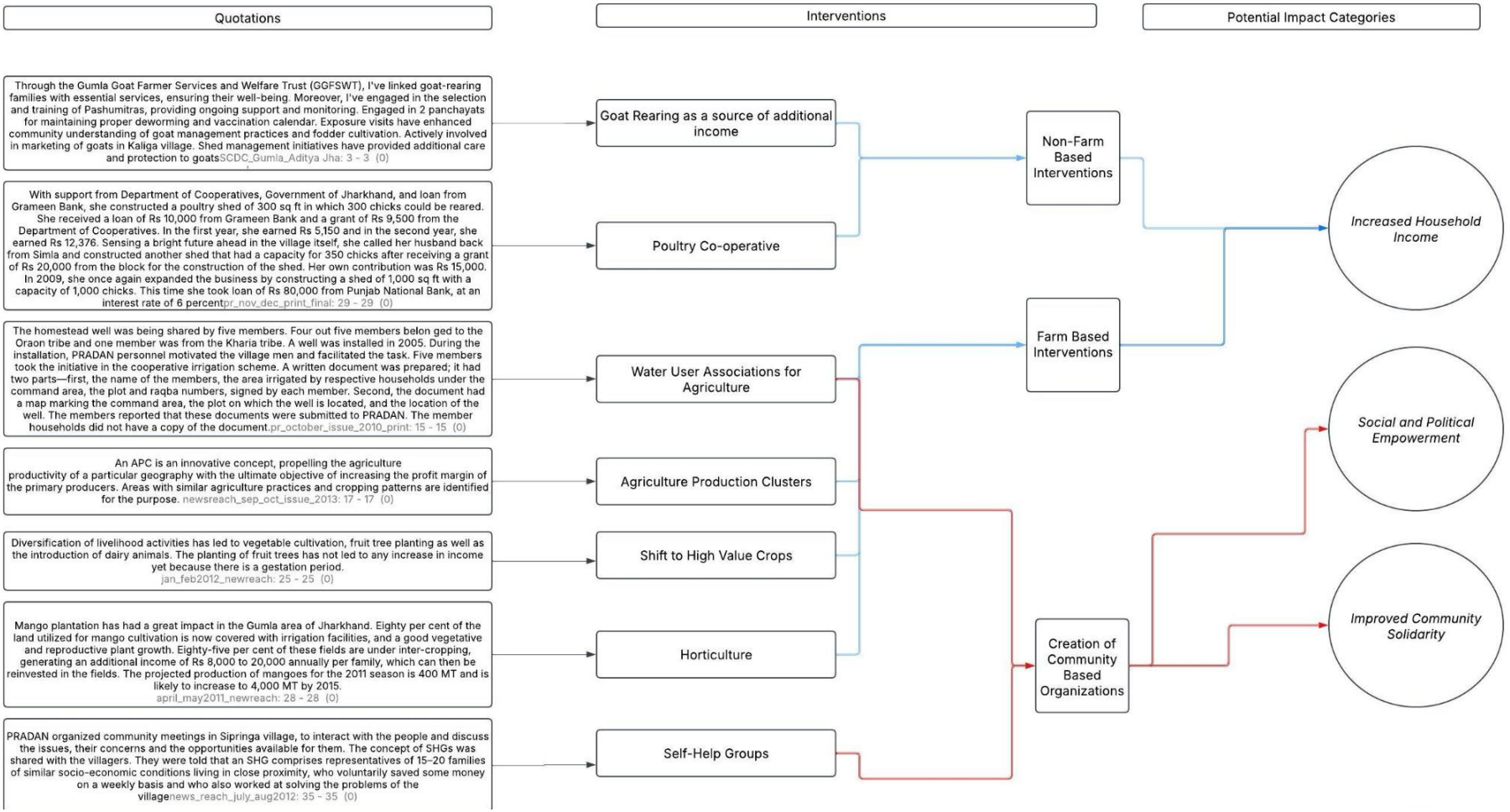


Figure 3.3: Intervention of PRADAN in Gumla and potential impact outcomes. Author's Analysis

For instance, work undertaken through MGNREGA is primarily aimed at creating community plantations and undertaking land levelling and water harvesting for individuals. While in the short run, they allow for better access to government schemes, these would eventually also yield monetary benefits for households and the village. Lastly, after much internal debate, it was decided that PRADAN would invite expert NPOs to work on aspects of development for which it lacked the necessary skill set to implement. Thus, Gram Vikas worked on creating toilets and bathrooms, Public Health Resource Network on health, Anode Governance Lab on governance, and Gram Oorja on electrification. The potential impact of these would have been reflected in improved educational and health outcomes for community members, especially women. Hence, while we did arrive at a set of potential impact outcomes to investigate mechanisms for building credible impact pathways, we conducted two rounds of fieldwork, which are discussed in the next section.

To summarise, the answer to the question of what the impact of PRADAN's interventions physically looks like is most clearly seen in the agricultural landscape of the villages, particularly in terms of increased net sown area and irrigation infrastructure. PRADAN's long-standing focus on the kharif season since the late 1990s may have led to a significant rise in the net sown area, particularly during this period. This expansion of cultivated land indicates that the interventions may have improved agricultural productivity, likely through improved access to resources, training, and support for farmers. The physical presence of irrigation infrastructure - whether in the form of wells, canals, or other water distribution systems - demonstrates PRADAN's contribution to improving water access, which is essential for sustained agricultural growth. This is a key indicator of how PRADAN's work has directly impacted farming practices, making irrigation more accessible and, by extension, enhancing crop production. Combining this with other interventions, it seems plausible to contend that, as a consequence of efforts to create agricultural surplus, we could see improvements in household incomes and the provision of capital for investment through SHGs as tangible outcomes. Further, the other potential impact outcomes identified in Figure

3.3 (creating solidarities, social and political empowerment, improving access to government schemes, and improving educational and health outcomes) require additional empirical evidence to build a stronger argument.

3.3.2. The Dhamtari Chapter

Dhamtari is an agricultural district characterised by significant internal disparities, especially with access to water, livelihoods, and institutional support. While the majority of households engage in paddy cultivation, the reliability of irrigation varies significantly across villages. Some settlements utilise solar-powered lift irrigation systems, some depend on borewells or drip irrigation, while several are wholly reliant on rainfall. These disparities generate significantly distinct economic opportunities, sometimes even within the same block. In all villages, forest products constitute a vital source of revenue. Mahua (Madhuca longifolia), tendu leaf (Diospyros melanoxylon), and harra-baheda sustain households during the agricultural off-season and serve as a safeguard in years of suboptimal crop yields. The forest economy substantially influences household resilience and differentiates Dhamtari from situations where agricultural failure directly results in distress. These livelihood conditions also redefine migration patterns within the local economy. In Gumla, the narrative centres on the transition from subsistence to improved agricultural practices, leading to reduced seasonal migration and, essentially, a return to farming following PRADAN's efforts. The change process in Dhamtari does not showcase that sequence. In some villages, migration remains low and has persisted in this manner even prior to PRADAN's involvement; in others, it is experiencing a decline. Migration is not the focal point around which livelihoods are organised. The most apparent disparity is that numerous communities in Dhamtari indicated an influx of external migrants due to the abundance of accessible work and insufficient local labour to fulfil it. This articulation was absent in Gumla, signifying a fundamentally distinct environment.

The institutional landscape within which these livelihoods are embedded is equally distinct. Unlike Gumla, where PRADAN built interventions, processes, and institutions

almost from scratch, Dhamtari is a district where PRADAN's work has been closely connected with the state. SHG-related activities were never envisioned as stand-alone community interventions; they were conceived as a means to help the state implement its programmes more effectively and to ensure that benefits reached a wider set of families. As a result, outcomes associated with SHG strengthening in Dhamtari often emerge through overlapping causal pathways shaped by PRADAN's efforts, DAY-NRLM, state schemes and the district's longer institutional history. In many ways, PRADAN served as the bridge through which the state could enter villages, build trust and deliver schemes. SHGs, therefore, occupy a very different place in Dhamtari's story. They are neither new nor dependent on PRADAN's intervention intensity for their basic functioning. Many were formed in the mid-2000s under the District Rural Poverty Project (DRPP) or through the State Rural Livelihoods Mission (SRLM), locally known as CGSRLM-Bihan. In several villages, women already knew how to save, borrow, meet regularly, and maintain records before PRADAN arrived. PRADAN did not have to build SHGs or social cohesion from the ground up as it entered a landscape where the framework for women's groups already existed. Some SHGs in Dhamtari are older and more deeply integrated into everyday village life than those in Gumla.

Interestingly, collective action also pre-dates PRADAN in several places. Some villages, such as Kohabahra, provide clear examples. They have a decades-long history of organised struggle, including land rights battles. Others became cohesive through SHGs over time. But the common thread is that social cohesion is generally higher here. People know how to mobilise, when to demand and how to push for what their village needs. Another defining feature of Dhamtari is the state's visible presence. Roads under the Jan-Man scheme, housing through PM Awaas Yojana, water connections via Nal Jal, construction of ponds and dabri (farm ponds) under MGNREGA, pensions, and a wide range of other schemes are evident in almost every village we visited. PRADAN did not enter an institutional vacuum. It entered a space where administrative structures were already active, though with some set of challenges. Over time, PRADAN's role evolved into that of a convergence medium as it worked to help

communities articulate demands, plan for scheme implementation, navigate government systems and ensure that existing entitlements were actually reached. To make sense of this impact logic, it is necessary to examine how PRADAN's engagement in Dhamtari evolved over time. Rather than following a linear intervention-outcome sequence, change here emerged through a phased, cumulative process shaped by long-term partnership with the state, shifting organisational roles and the gradual strengthening of community institutions. The phases that trace this evolution highlight how impact in Dhamtari was achieved through shifting relationships and capacities rather than through standalone interventions.

Phase 1: Entry, Groundwork, and State-Anchored Mobilisation (2005-2008)

This phase reflects the earliest articulation of the state-anchored development logic that would come to define PRADAN's work in Dhamtari. Impact during this period was less visible in livelihood outcomes and more evident in the slow work of building legitimacy with both communities and the district administration. PRADAN's role as a facilitative partner to the state, rather than a standalone implementer, was established in this context. The emphasis on surveys, profiling and institution mapping laid the groundwork for convergence-led change, while the promotion of SHGs as savings and credit collectives positioned them as future partners for government programmes. The blurred causal pathways observed later originate in this phase, during which PRADAN worked closely with state systems rather than operating in parallel with them.

Phase 2: Perspective Building and Household-Level Convergence (2009-2012)

This phase deepened the convergence logic outlined earlier by shifting the unit of planning from individual interventions to the household as a whole. Livelihood outcomes began to emerge not as isolated effects of PRADAN's programmes, but through coordinated access to public resources mediated by SHGs and emerging community institutions. The growing alignment between people's plans and government schemes marked an important transition in PRADAN's role, from direct delivery to institutional facilitation.

While decision-making power still largely rested with external actors, the foundations were laid for women's groups to act as legitimate interfaces between households and the state, reinforcing the systems-strengthening trajectory described in the opening section.

Phase 3: Community-Led Models and Institutional Deepening (2013-15)

By this phase, the emphasis on institutions as drivers of change became more explicit. SHGs and federations were no longer peripheral mechanisms for programme delivery but central actors in planning, coordination, and monitoring. This shift gives concrete form to the earlier argument that impact in Dhamtari is mediated through strengthened state-community interfaces. The integration of governance, gender and nutrition into programme design expanded the meaning of impact beyond livelihoods, aligning with Dhamtari's broader development context. PRADAN's role increasingly resembled that of a capacity-builder and systems integrator, consistent with the convergence-heavy model established at entry.

Phase 4 (2016-20): Large-Scale Outreach, Governance and Systems Thinking

This phase represents the scaling and institutionalisation of the convergence approach that had been evolving since PRADAN's entry into Dhamtari. SHG-based institutions emerged as stable platforms capable of shaping public investment flows, particularly through MGNREGA and Panchayat planning processes. Women's increasing participation in governance forums illustrates how empowerment in Dhamtari is expressed through institutional capability and public engagement, rather than solely through livelihood diversification. At this stage, impact becomes visible less through discrete outputs and more through the routine functioning of systems where community institutions can access, influence, and govern state resources with reduced dependence on PRADAN.

Phase 5 (2020-22): COVID-19 Response and Adaptive Resilience

The COVID-19 period functioned as a stress test for the systems-strengthening approach described earlier. The ability of SHGs and federations to respond quickly to a crisis by coordinating relief efforts, disseminating information, and supporting livelihood recovery demonstrated the depth of institutional ownership that had gradually been transferred across previous phases. Impact during this period is best understood not in terms of new interventions, but in the resilience of existing institutions to absorb shock and adapt. This phase reinforces the argument that PRADAN's long-term contribution in Dhamtari lies in enabling durable institutional capacity rather than delivering time-bound programmes.

Table 3.4.: Timeline of PRADAN's Key Interventions in Dhamtari

Year	Intervention Focus	Details
2005-06	Entry via DPRP	PRADAN entered Dhamtari through a formal partnership with the Government of Chhattisgarh to implement the World Bank-supported District Poverty Reduction Project (DPRP) in the Kurud block. The work began with household surveys, poverty profiling, and SHG formation.
2006-07	SHG and Livelihood Expansion	Early livelihood-planning exercises and sector-specific interventions (likely in agriculture and goat rearing) were introduced. Emphasis was on identifying poor households and building grassroots institutions. Early asset-building efforts were introduced.
2013-14	Livelihood & Governance	PRADAN re-engaged more strategically, with efforts focusing on strengthening convergence between SHGs and local government schemes, especially around governance and planning.
2019-20	MGNREGA Convergence	MGNREGA was used for structured asset creation, with SHGs involved in identifying work priorities. This helped integrate wage work with long-term asset development, such as land bunding and farm ponds.
2021-22	Women's Nutrition & Enterprise	Nutrition-sensitive interventions, such as kitchen gardens and backyard livestock, were promoted. This year also saw increased attention to women's leadership in local institutions and economic activities.
2023-24	Livelihood Deepening	PRADAN's work in Dhamtari has moved toward deepening existing livelihoods. The focus is on improving productivity, enabling women's enterprises, and leveraging SHG platforms to integrate with public programs and financial services.

Phase 6 (2023-24): Perspective Plan 2030 and Deepening Impact

The current phase consolidates the systems-oriented Theory of Change that has guided PRADAN's work in Dhamtari over two decades. With coverage largely achieved, the focus has shifted toward deepening livelihood quality, institutional autonomy and governance capability. SHG platforms now function as embedded components of the state delivery architecture, mediating access to markets, finance and public programmes. Impact is expected to emerge from the sustained performance of federated women's institutions, which can negotiate state systems, respond to shocks, and shape local development trajectories, rather than from standalone organisational interventions. This reflects the mature form of convergence and blurred causality introduced in the opening section. Across two decades, PRADAN's journey in Dhamtari illustrates a clear ToC evolution- from livelihood delivery, to convergence, to institution-led systems change. The defining feature has been a sustained partnership with government systems, resulting in blurred yet powerful causal pathways in which PRADAN's impact is mediated through strengthened state–community interfaces rather than through standalone interventions. Table 3.4. illustrates these phases and their respective impact narratives.

In summary, PRADAN's overall Theory of Change (ToC) offers a cohesive framework for assessing impact in Gumla and Dhamtari; however, local contexts create varied trajectories that demonstrate how identical institutional mechanisms - women-led self-help groups (SHGs) and federations, integration with government initiatives, and livelihood diversification - yield unique cumulative outcomes over time. From an effects perspective, Gumla illustrates 'first-order' concrete changes directly attributable to PRADAN's initial interventions, whereas Dhamtari reflects 'second-order' relational resilience inherent in established institutions. In Gumla's context, PRADAN's lift irrigation, rabi cropping, production clusters, and plantations generate a noticeable agrarian surplus: increased net sown area, efficient water utilisation, and upland commercialisation, which likely enhance household incomes and SHG capital

accumulation. These physical indicators ground impact narratives, with women's empowerment arising from solidarity (overcoming the isolation of witch-hunting) and political roles (SHG leaders serving as sarpanchs), although the mechanisms connecting agricultural and non-agricultural gains to health and education outcomes remain inferential and require further validation. At the organisational level, this corresponds to the linear logic of the initial phases (from income to social transformation); nevertheless, Gumla's 'build-from-scratch' setting enhances PRADAN's visibility, clarifying attribution while constraining systemic scale relative to subsequent organisational aspirations, such as Development Clusters.

Dhamtari, in contrast, generates diffuse, systems-level effects through facilitative convergence rather than direct implementation, utilising pre-existing Self-Help Groups, forest buffers, and state saturation (Nal Jal, MGNREGA). PRADAN's influence is evident in enhanced state-community interfaces: federations that facilitate access to schemes, collaborate with Panchayats on planning, and coordinate COVID responses, thereby demonstrating institutional resilience beyond isolated outputs. Migration patterns emphasise low-level inbound movements rather than distress-driven outflows, illustrating resilience rooted in historical cohesion (e.g., Kohabahra struggles) and enhanced by PRADAN's mediating function. In relation to the organisational Theory of Change, Dhamtari propels the logics of Phases 3-6 (institution-led governance, adaptive capacity); however, the ambiguous causality - co-created with the legacies of DPRP/CGSRLM-Bihan - transfers long-term impact assessment from identifiable assets to the habitual performance of interfaces, which corresponds with advanced systems change while complicating isolated attribution.

Fundamental similarities reinforce organisational coherence in the generation of effects: across locations, Self-Help Groups transition from credit accessibility to authoritative platforms, facilitating gender advancement (access to leadership) and multifaceted consequences (livelihoods + governance + ecology). The convergence through MGNREGA/DAY-NRLM recurs, generating cumulative effects - Gumla's

infrastructural depth enhances the leverage of Dhamtari-style schemes - while the agency continually transitions from PRADAN to collectives, reflecting the trajectory of the Theory of Change. Divergences, however, reveal the influence of context on long-term effects: Gumla's fragile foundation produces prominent, agriculture-centric transformations with the potential for enhanced empowerment, but risks unsustainability without wider integration; Dhamtari's rich ecology emphasises resilience (shock absorption through federations), yet diminishes PRADAN's unique impact in the face of state predominance. These parallels elucidate why NPO influence transcends project-level metrics: in Gumla, it manifests physically through landscape reconfiguration; in Dhamtari, relationally through institutional routines; and organisationally, synthetically via phased integration. This necessitates a cumulative perspective - beyond disjointed assessments - to understand how mechanisms shape context-specific trajectories, with consequences for evaluating enduring social change.

Now that we have established initial program theories for the organisation and analysed its similarities and variations across the two locations, we are better placed to approach our analysis of primary data, capturing community-level narratives of change. In the next section, we delve deeper into identifying potential mechanisms that could explain how these farm-based interventions might have led to the observed outcomes. We explore how improvements in irrigation, crop cycles, and overall agricultural practices might be influencing farmers' livelihoods and the broader village economy. Additionally, we discuss whether these agricultural improvements could have indirect effects on other domains, such as income, food security, or migration, which might eventually contribute to broader socio-economic changes in the villages.

3.4. Impact and contribution pathways (CMOs)

In our analysis, we built on the connections between intervention categories and the potential outcomes we had previously identified in the section above. We then

examined the transcripts from interviews with community members and focus group discussions, with a specific focus on three key aspects:

1. What changes were being discussed? This includes examining both interpersonal (individual) and community-level changes.
2. How were these changes brought about? Here, we investigated the mechanisms underlying the observed changes.
3. What role did PRADAN play in facilitating these changes? This aspect explored PRADAN's involvement, specifically how its interventions contributed to the changes that were mentioned.

To structure our analysis, we classified the villages into three categories: intensive, non-intensive, and non-PRADAN. The classification was based on the nature and consistency of PRADAN's engagement in these areas. This categorisation of villages was suggested by experienced professionals from PRADAN's team in Gumla and Dhamtari based on their insights and observations during focus group discussions (FGDs). The assumption behind this classification is that the nature and extent of changes at both the household and village levels would vary between these different types of villages.

- Intensive villages are those in which PRADAN has maintained a sustained, uninterrupted set of interventions for over two decades. This long-term and consistent involvement likely led to deeper, more lasting changes at both the individual and community levels.
- Non-intensive villages, on the other hand, are those where PRADAN's interventions have been more intermittent - characterised by periods of on-and-off engagement. This intermittent involvement may have resulted in more sporadic or less profound impacts compared to intensive villages.
- Non-PRADAN villages are those where PRADAN had no direct interventions, serving as a control group or baseline for comparison.

Through the analysis of the transcripts, we aimed to uncover the specific types of changes community members were discussing, how those changes came about, and the extent to which PRADAN played a role in facilitating or supporting them. This framework allowed us to assess the varying impacts of PRADAN's interventions across different village types and identify key factors that contribute to the sustainability and effectiveness of community development efforts. Ministry of Rural Development, Government of India (2005) contends that the villages in this region are topographically divided into three areas with distinct livelihoods and agricultural practices. In the steep hilly areas (uplands) (25% of the region), people live in small, scattered settlements near forests, relying on forest-based livelihoods such as the sale of fuelwood and non-timber forest products. Agriculture is limited, providing food security for only three to six months, and small livestock like poultry, pigs, and goats are kept. In the partially hilly areas (mid-lands) (60% of the region), agriculture is more prominent, with rain-fed paddy as the main crop and some vegetable cultivation. Farmers use bullocks and manure to maintain soil fertility, and food security extends to about nine months. Agriculture is subsistence-based, and around 50% of households depend on wage earnings. The flat, low-lying areas (15% of the region) are the most agriculturally productive, with double cropping common, and a third crop grown where irrigation is available. Food security is year-round in normal years, and people have better access to markets. In summary, the lower areas are more market-oriented and agriculturally intensive, while the upper regions depend more on forest resources. By comparing the experiences in these different settings, we could better understand how PRADAN's interventions influence long-term outcomes (see Figure 3.4). We discuss the CMO configurations below. Each CMO starts with an explanation of the respective context, mechanism and outcome, followed by how it is exhibited in each location.

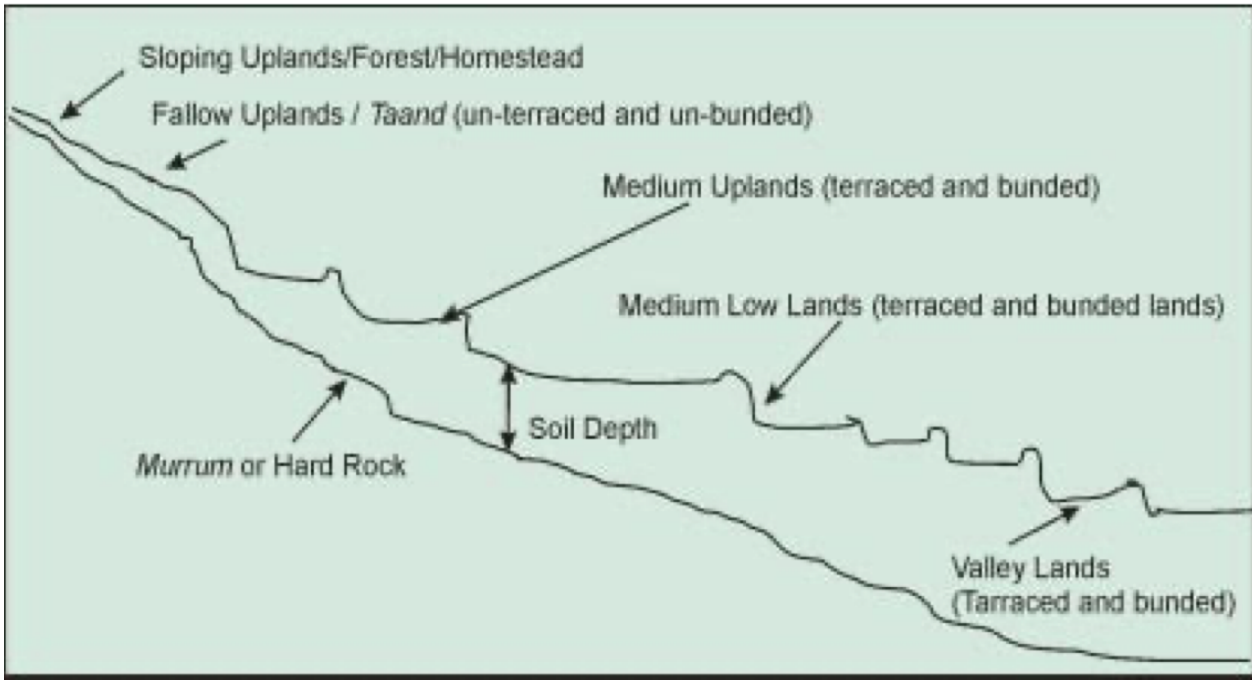


Figure 3.4: Distribution of villages in the region where Gumla and Dhamtari fall. Source: MoRD (2005)

Context 1: Intensive villages situated on lowlands and mid-lowlands

3.4.1. CMO 1a

In villages with favourable agricultural conditions but high seasonal out-migration for income (Context), PRADAN introduced improved/ scientific and commercial agriculture practices, making farming more intensive and market-oriented (Mechanisms). This broke the cycle of sustenance agriculture and migration in these villages and led to increased agricultural income, reduced migration, and a shift towards a more stable rural economy (Outcomes).

Gumla

In villages with lowlands, good soil moisture, and the potential for bunding to make water usable for two cropping seasons, PRADAN's interventions aimed at transforming the agricultural landscape. These villages experienced high seasonal out-migration, with entire families moving to urban areas for income, as agriculture was primarily a subsistence activity during the kharif season. PRADAN introduced two key strategies:

improved and commercial agriculture. The improved approach involved more time-intensive farming practices, requiring greater dedication and resources from families who had not previously considered agriculture as a primary source of income. This shift encouraged farmers to adopt better, research-based farming techniques, including better soil management and irrigation, to maximise yields. The introduction of commercial agriculture focused on producing surplus crops for sale, which allowed farmers to generate additional income. This surplus reduced the need for families to rely on migration as agriculture became more profitable and sustainable. As a result, the intervention helped increase household incomes and reduce migration, with at least some family members staying behind to manage the enhanced agricultural activities, even if men continued to migrate. This shift transformed agriculture from a subsistence activity to a commercial one, contributing to a more stable rural economy and decreasing the dependence on migration for survival.

Dhamtari

In Dhamtari, PRADAN's agricultural initiatives reflect Gumla's path of transitioning from subsistence farming to intensive, diversified practices by enhancing access to water and providing technical assistance, resulting in increased household incomes and greater livelihood stability. Dependable irrigation - through bunding, borewells, solar lifts, and farm ponds - facilitates households' transition from rain-fed paddy monoculture to year-round cultivation, crop rotation, and market-driven selections. This development mirrors Gumla's increase in net sown area and rabi commercialisation; however, Dhamtari's established forest buffers (*mahua, tendu*) and state initiatives (MGNREGA ponds) enhance resilience, mitigating distress migration and promoting inbound labour. PRADAN enables this by providing seed availability through Farmer-Producer Organisations (FPOs), offering training in the System of Rice Intensification (SRI), implementing machine-elevated beds, and supplying organic inputs such as Jeevamrit manure, facilitated by women's Self-Help Groups (SHGs). These mechanisms offer intermediate results in food patterns, crop variety,

rotation, and yields. In Jhujrakasa village, respondents described how access to seeds, new crops, and training expanded cultivation choices and altered farming practices:

"Now all the seeds are made available, sitting at home. Urad (Vigna mungo) is there, Madia (Madia elegans) is there, and Ulda is there. Earlier, FPO was not there...No one used to bring the seeds. We did not know about these things. That is why we did not grow them. Later, we learned about everything. Now we grow sunflowers also." (FGD 7, Jhujrakasa)

This illustrates a mechanism for knowledge dissemination through collectives, shifting farmers from ignorance about viable crops to proactive adoption, thereby directly linking PRADAN/FPO interventions to expanded choices and reduced input barriers. Respondents also articulated how crop choices and water requirements informed decisions around diversification:

"If you are getting a good crop of Paddy, then you can change the crop and grow something else. Also, if you grow paddy, then you need more water. Instead, you can grow Daals or Til. And you can make Jaivik manure. You can make Jeevamrit, and you get training for that." (FGD 7, Jhujrakasa)

Here, PRADAN's training is interpreted as enabling strategic diversification - substituting low-water daals/til for paddy while integrating organic practices - demonstrating how improved yields create pathways to risk mitigation and income stability. Agriculture-related interventions such as SRI and *machan* practices introduced by PRADAN are associated with several intermediate outcomes described below:

(a) Changes in dietary patterns: improved dietary patterns that include vegetables, which may contribute to improved nutrition levels. This account reveals multiple mechanisms: SHG "Didis" provide peer extension to overcome water fears; preservation techniques ensure continuity; and collective confidence-building

fosters outreach, linking agriculture to gender empowerment and community-wide nutrition gains.

“Before joining the Samooh, I did not know about planning vegetables. I always thought about what I would do if there were no water. Then Didi explained, why are you going back?" Just plant it once and see. Then I understood, and I planted and saw. Now I get green vegetables to eat throughout the year… the vegetables of the rainy season… we dry the summer vegetables, and we eat them during the monsoon. Now we don’t have that situation; every house is eating green vegetables all 12 months. Those who don’t want to join the Samooh enter the house, and we talk. We had no idea how to talk to outsiders. When we joined the Samooh, the Didis and Bhaiyas came from outside, and we got together. Now I can give my name. Earlier, I could not speak so much. A lot of changes have happened.” (FGD 10, Basin)

(b) Crop diversification: Evidence from Basin village suggests an expansion of vegetable cultivation across households and seasons.
(c) Crop rotation: This reflects learned sequencing, reducing dependence on paddy and enhancing sustainability.

“In the rainy season, we only plant Paddy. By changing it, like we have planted paddy now, but after one year, we plant Urad, then for one year you plant Daals and Tils” (FGD 7, Jhujrakasa)

(d) Improved yield in some villages: Training on sowing techniques and spacing was linked to improved cultivation practices:

“Earlier, when we used to plant it at home also, then we used to grow them all together, whatever was there, even the seeds. Now we plant them in a row. Now we place them separately… Guard is placed separately, Barbati is separate, and Chilli is separate. We used to treat Lady Finger and Maize to be planted together. But now we don’t do it like that. We plant all of them separately, into two parts or three parts. Yes, we get higher growth. Earlier, when we used to plant them all together, their weeds, etc., all came

together. That used to spoil the whole thing. That much growth did not use to take place. Also, we did not know the process of sowing seeds. PRADAN told us how all of them were to be planted. They gave training for these things. We learnt, and now we are planting them in our individual homes." (FGD 38, Baragumnla)

Overall, CMO 1a exemplifies PRADAN's fundamental approach - improved/ scientific and commercial agriculture -in converting migration-reliant subsistence economies into stable, income-generating rural systems, yielding notably consistent results in both Gumla and Dhamtari despite differing conditions. In both regions, reliable water access (Gumla's lift irrigation and bunding; Dhamtari's solar lifts, borewells, and dabries) facilitates intensive agriculture, transitioning households from kharif-exclusive paddy cultivation to year-round, market-driven practices that effectively reduce seasonal out-migration and enhance incomes. In Gumla's high-migration villages, families keep members to capitalise on rabi surpluses, transforming subsistence into economic viability through yield-maximising methods. Dhamtari reflects this trajectory while utilising existing forest buffers and governmental resources to enhance resilience, as seen by incoming labour and documented vegetable revenues. Common mechanisms include: PRADAN/FPO/SHG-facilitated seed access eliminates knowledge deficiencies; training promotes water-efficient diversification; peer extension through "Didis" fosters dietary changes; and SRI/machan techniques enhance yields through optimised spacing. The intermediate outcomes - crop rotation, nutritional improvements, and decreased weed losses - lead to improved yields and collectively disrupt migration patterns, corresponding with the organisation's Theory of Change development from livelihood provision to institutional resilience. Together, they assert that PRADAN's influence is context-driven: mechanisms such as SHG knowledge transfer and technical training create scalable economic foundations that diminish urban reliance while promoting gender empowerment and food security. This longitudinal research substantiates organisation-wide assertions of sustainable rural transformation, wherein agriculture transitions from a survival mechanism to a surplus-generating engine.

3.4.2. CMO 1b

CMO 1b: In villages with favourable agricultural conditions where PRADAN's interventions were successful in curtailing seasonal out-migration (Context), women were able to dedicate more time and resources to the functioning of the SHGs. Moreover, these villages also had a higher intensity of interactions with PRADAN professionals owing to the possibility of developing water-related infrastructure (Mechanisms). As a consequence, the SHGs in these villages provided investment loans, operated effectively, and facilitated easier access to credit (Outcomes).

Gumla

As the migration of women decreased, they were able to dedicate more time to PRADAN-supported SHG activities. These groups provided a platform for women to come together, save money, and access loans for various purposes, such as investing in agricultural inputs like seeds or tools. In villages with potential for watershed-related activities, the SHGs tended to focus on providing loans for agricultural production investments. For instance, loans were often used to purchase seeds, which could be repaid once the crops generated income. This structure enabled a steady inflow of credit to the SHGs, helping them operate efficiently and ensuring a continuous cycle of financial support for farmers.

Furthermore, the availability of water in these villages encouraged frequent visits by professionals who provided sustained agricultural interventions, including technical guidance and resources, and monitored the functioning of the SHGs and other collectives in the villages. This continuous support helped build long-term agricultural sustainability and encouraged collective economic activities. As a result, PRADAN's interventions increased agricultural productivity and income while reducing migration. Women, once primarily engaged in migration, became more involved in local economic activities through SHGs, leading to their empowerment and greater participation in decision-making processes. The regular flow of loans and the continued professional support further strengthened the SHGs and contributed to enhanced agricultural

practices. Ultimately, these interventions helped create a more stable and self-sufficient rural economy, with improved agricultural outcomes and greater community cohesion.

Dhamtari

Dhamtari's context does not centre on curtailing seasonal out-migration. Unlike in Gumla, migration is not the primary problem shaping livelihoods here. In Gumla, the impact narrative follows a clear sequence: subsistence farming leads to distress migration; agricultural revival through improved methods stabilises incomes; and migration subsequently declines. Dhamtari does not follow this logic. Migration levels were already low or declining and therefore did not constitute the central pressure point for intervention.

Instead, agricultural improvements in Dhamtari trigger a different set of outcomes. As productivity and incomes increase, households begin to aspire for better livelihoods, stronger institutions, and greater collective voice. These rising aspirations strengthen community cohesion and collective identity, which in turn support more coordinated action around agriculture and local governance. In this context, it is this growing cohesion - rather than a reduction in migration - that contributes to improvements in agricultural productivity and broader livelihood outcomes.

Overall, CMO 1b elucidates the influence of context on SHG functionality following agricultural success: in Gumla's high-migration villages with water potential, diminished female out-migration (Context) facilitates ongoing PRADAN involvement (Mechanisms), resulting in resilient SHGs that provide investment loans, operate efficiently, and grant access to formal credit (Outcomes). Dhamtari diverges significantly; the absence of migratory pressure allows agricultural advancements to drive aspirations, foster togetherness, and promote community governance, circumventing Gumla's migration self-help group process. This underscores PRADAN's adaptive influence: Gumla utilises stability for financial empowerment; Dhamtari directs excess towards institutional enhancement. Across the organisation,

both recognise Self-Help Groups as essential tools; nevertheless, local baselines dictate whether they stabilise economic cycles or enhance voice, highlighting the significance of context in comprehensive rural transformation.

3.4.3. CMO 1c

CMO 1c: In villages where SHGs worked well (Context), women were able to dedicate more time and resources to issues beyond just credit provision, including access to various schemes and programs. PRADAN enabled them by providing training on MGNREGA and Gram Panchayat Governance (Mechanisms). As a consequence, the women in these villages were able to occupy positions of responsibility in panchayats, develop their children's capacities by providing them with better education, and experience overall social and political empowerment (Outcomes).

Gumla

In villages where SHGs functioned effectively, women were able to dedicate more time and resources to various community issues beyond just credit provision. These women, once primarily focused on managing household finances and agricultural activities, began to engage more actively in local governance and development programs. PRADAN played a crucial role in facilitating this shift by providing women with training on important government schemes, such as MGNREGA, and on the functioning of Gram Panchayats. These trainings helped women understand their rights, the available public services, and how to effectively participate in and influence decision-making processes within their villages. With this newfound knowledge, women began to occupy positions of responsibility in the panchayats, a significant step towards their social and political empowerment.

In doing so, they became key players in the development of their communities, advocating for better access to resources and ensuring that local governance was more inclusive and responsive to the needs of the entire village. The ability to participate in local governance not only increased their political influence but also had a broader

impact on their families. Women who were once relegated to traditional roles gained the confidence and skills to address issues affecting their households, such as education, health, and livelihood. This empowerment enabled them to make informed decisions, improve their children's education, and invest in their development, helping break the cycle of economic vulnerability and exclusion. As they took on leadership roles, these women also served as role models, encouraging other women in the village to participate in social, political, and economic activities, further expanding the scope of empowerment. The combination of access to training, participation in local governance, and the ability to make decisions in the best interest of their families and communities fostered a sense of autonomy and pride. This process of empowerment ultimately contributed to the transformation of the village's socio-political landscape, with women becoming catalysts for change and playing a vital role in community development. Through PRADAN's support, women not only gained access to better economic opportunities but also experienced a deeper sense of social and political belonging, which significantly altered gender dynamics within their communities and enhanced their influence in local governance and decision-making.

Dhamtari

The alignment between Gumla and Dhamtari is particularly strong in women's social and political empowerment. In both contexts, SHGs serve as key spaces through which women build confidence, financial literacy, accounting skills and a collective identity. However, Dhamtari's convergence-heavy context shapes the pathways through which this empowerment unfolds. Many women in Dhamtari have prior exposure to savings and credit practices through government-run SHGs. Still, sustained engagement, often supported by PRADAN, enables these groups to evolve beyond financial collectives into platforms for learning, negotiation and collective action.

At the household level, access to SHGs reshapes women's economic roles and sense of agency. Women describe how participation in the SHG enabled them to mobilise small amounts of capital, invest in livelihood activities and gradually build confidence and

independence. A woman from Karaiha village in Dhamtari explained how access to SHG savings allowed her family to expand a petty business, purchase productive assets and eventually diversify livelihoods, while also enabling her to take on a public role as a Krishi Mitra. Reflecting on this transition, she linked economic participation with mobility and dignity, noting the significance of women travelling outside the village and taking on recognised roles such as Bank Sakhi, Udyog Sakhi and trainers.

"Before I joined the Samooh, I was limited to farming. When I had not joined the Samooh, and if someone asked for ₹5,000, I could not give the money. But through the Samooh, our condition slowly began to improve. My husband runs a small business, a shop. He says that for a ₹5,000 loan, I can put my hand out. But no, Didi, after joining the Samooh, we take ₹5,000 out of the Handi. We placed Thums Up in the Handi, and then we sold from there. We did not have a fridge. Later, with that same ₹5,000, we bought a fridge. After bringing the fridge, we said we would start it only with the Thums Up. Then, slowly, my spouse took over the business from our Baadi. In 2017, when we joined the Samooh, I started working there as a Krishi Mitra. In my mind, I made slow progress. This has improved my livelihood. When I started, I was nothing. But when a woman moves out of her village, then a lot of things happen. Where does she go? She is also spoken ill of. She goes anywhere. She picks up the cycle and goes by the cycle. But on today's date, there are 7 people who have gone out of this village, and that is a matter of great pride for me. Someone has become a Gender Master Trainer, someone has become a Udyog Sakhi, someone is a Krishi Mitra, someone is a Bank Sakhi...in these different roles, they have gone out of this village. It is a big thing to get out of this jungle village! This is a boon for my womanhood." (FGD 37, Karaiha)

This account demonstrates financial participation through SHGs, enabling mobility, leadership and a reshaping of gender norms.

As women's agency within SHGs strengthens, it extends into public and governance domains. Women participate more actively in Gram Sabhas, engage with Panchayat representatives, demand infrastructure for their village and monitor the

implementation of government schemes such as MGNREGA. Training and exposure facilitated by PRADAN on Panchayat functioning, entitlements and scheme processes enable women to navigate these systems with greater confidence. Over time, this results in women occupying formal and informal positions of responsibility, including elected roles in Panchayats and leadership positions within SHG federations.

SHGs also expand women's social worlds beyond the household and field, reducing isolation and building confidence through regular interaction. A woman from Joratarai village in Dhamtari described how joining the SHG transformed her social relationships and enabled her to participate in activities outside the village:

"Right in the beginning, before joining the SHG, we did not go out of the house. After joining the SHG, we started getting to know each other. Then we started getting to know the Didis of the village. We used to be limited only to the home and the field. After joining the SHG, we got to know each other and started talking. The Didis of the village speak so well with us. Through the SHG, we have also become friends. After joining the SHG, we started feeling very happy. Initially, the village felt as if there was nothing in it. But after joining the SHG, I started feeling the change, and after connecting with people, I started working and went for training outside. New friends formed. Now I have started feeling good. When we meet with people, they feel as if they are part of the family. And Bhaiyas also talk like brothers, so I feel very nice". (FGD 42, Joratarai)

This expansion of agency also affects household and social dynamics. Increased (relative) mobility, such as travelling for meetings, training and block-level engagements, becomes a symbol and an agent of empowerment. Household dependencies shift as women are recognised not only as earners but also as informed decision-makers capable of engaging with state systems. A woman from Kashpur reflected on how joining the SHG led to a shift from isolation and vulnerability to taking responsibility within the household and farm:

"My life used to be going to the field from home and coming back. I never used to talk to anyone, unlike now, when I can. There was no going anywhere… When I joined the

Samooh, the condition was one of utter poverty. If someone used to talk nicely, the tears would come to their eyes. I could not even talk to anyone. That was me. We have my spouse, four children and three others, my parents-in-law and grandmother-in-law; she is still alive. Now the mother-in-law has passed away a year ago. Now with only one field to produce. I took charge of the field. The in-laws have become very old. They can't even move around. They needed to be looked after." (FGD 13, Kashpur)

Collective action further amplifies these effects. SHGs serve as groups where women support one another in accessing schemes, resolving local issues and negotiating with authorities, strengthening their ability to demand accountability. As individual confidence grows, SHG also begins to function as a space for deliberation. Women from Chhindbharri described how SHG meetings function as places for discussion, decision-making and mutual support:

"In a week, we sit in on a meeting once, and 10 'didis' attend it, and we also chat among ourselves about life, about our problems, etc., so we feel good, and also we do the savings. Also, if someone is getting married in the village, then we go and help them manage and organise the event. If we have to discuss something and make decisions based upon it, even those things are discussed." (FGD 17, Chhindbharri)

A key divergence from Gumla lies in the institutional history of SHGs. In Gumla, the strength of SHGs is closely tied to PRADAN's level of engagement. Dhamtari does not follow this pattern. SHGs here existed prior to PRADAN's entry and were strengthened through government programmes, particularly under DAY-NRLM and CGSRLM-Bihan. These groups are deeply embedded in village life, allowing empowerment outcomes to persist even where PRADAN's engagement is limited and contributing to sustained pathways of impact.

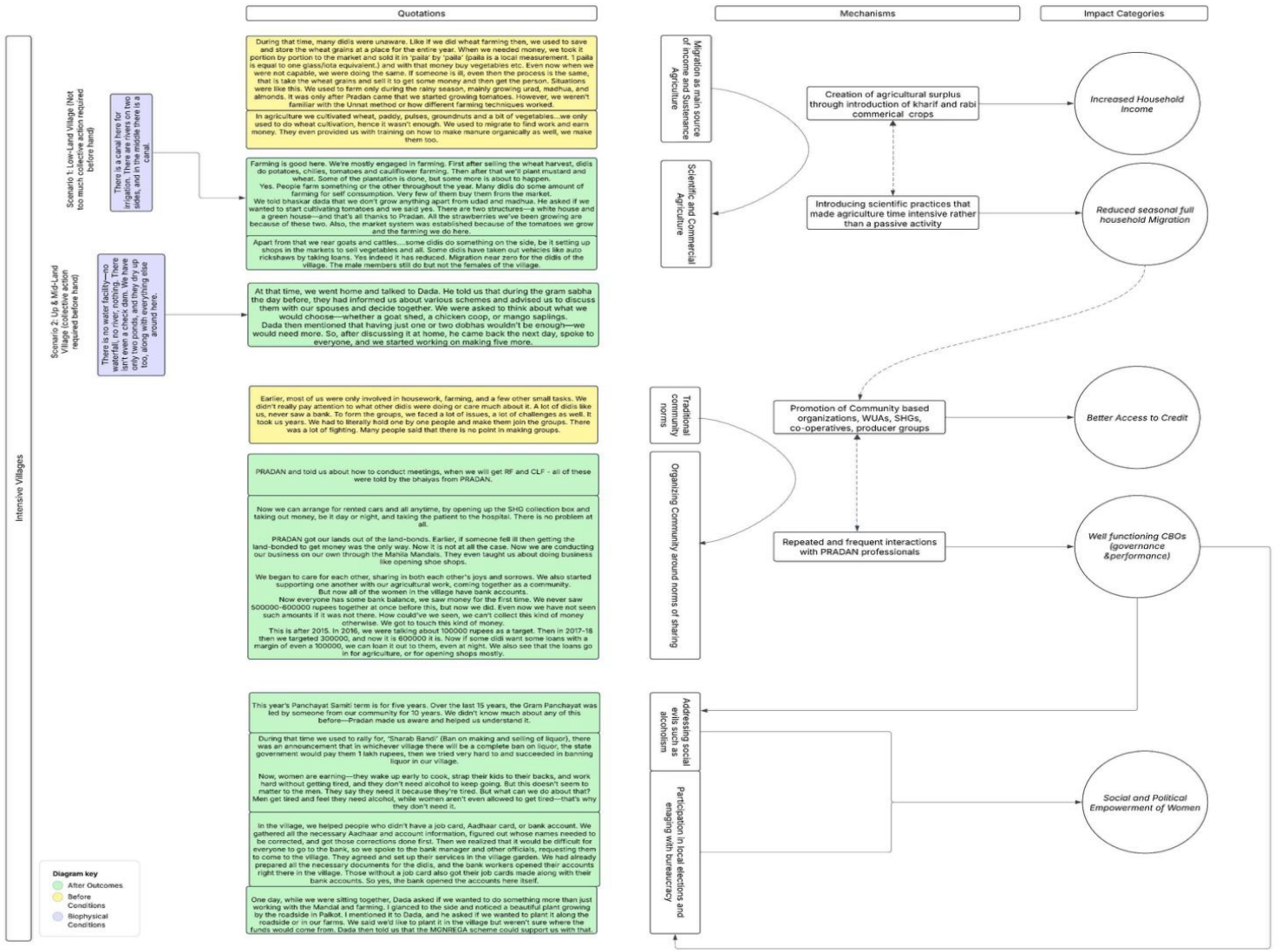


Figure 3.5.: Illustration of the development of Context-Mechanisms-Outcomes for Intensive Villages in Gumla. Author's Analysis.

Context 2: Intensive Villages on Up/Mid-land with lower access to surface water sources, such as streams

3.4.4. CMO 2

CMO2: In villages with high seasonal out-migration and limited agricultural productivity (context), PRADAN mobilised communities through strong local leadership to implement water harvesting and develop fallow uplands for commercial cropping. This included creating community plantations and facilitating land development activities such as land levelling and well digging (mechanisms). The interventions led to increased income, reduced migration, and a shift from subsistence to more productive, commercial farming practices (outcomes).

Gumla

The difference between the villages situated in the uplands and the midlands and those in the lowlands lies primarily in the role of community cohesion and leadership in PRADAN's interventions. In lowland villages, where water was more readily available and fertile soil was more accessible, the interventions could be more straightforward, relying on the existing agricultural potential. However, in villages located in upland and midland areas, where biophysical conditions such as water scarcity and less fertile soil posed significant challenges, the success of PRADAN's interventions was not only dependent on the natural resources but also on the strength of social cohesion within the community. These villages required a higher degree of solidarity among community members to undertake collective tasks, particularly those with long-term benefits that might not yield immediate returns, such as water harvesting and land improvement. To initiate these interventions, PRADAN relied heavily on local leadership. Strong community leaders played a crucial role in galvanising people, building trust, and facilitating collective action. In cases where there was a lack of strong community leadership, PRADAN partnered with existing faith-based organisations that already had deep roots in the village and the ability to unite the community. These organisations helped bridge gaps and supported the collective mobilisation needed to

undertake intensive tasks such as digging wells, creating hapas, and land levelling, all essential for making the land productive in areas with poor water availability. The focus on community cohesion became particularly pronounced in villages with less favourable biophysical conditions. In these areas, collective action was indispensable for overcoming the environmental challenges. Water harvesting, for example, requires significant labour, time, and resources, but the long-term benefits of such initiatives - such as water storage for multiple cropping seasons - could only be achieved if the community was united and committed to the task. Social cohesion, therefore, became a critical factor in ensuring the successful implementation of these interventions. Without the community's backing, these activities would not have been possible, as many of the tasks required large-scale cooperation and labour contributions from villagers.

Dhamtari

In Dhamtari, villages located in the uplands and midlands with limited access to surface water face constraints of a similar nature, though the reasons behind them differ. Agricultural productivity in these villages is shaped by uneven water availability, dependence on rainfall and the absence of natural lowland conditions that support paddy cultivation. In this context, collective action plays a central role in determining whether villages can access government schemes and undertake land and water development at scale.

Across these villages, collective mobilisation through SHGs, Village Organisations (VOs) and other community platforms enables communities to articulate demand more effectively and secure public works. Infrastructure such as ponds, irrigation facilities, land development works and roads tends to materialise more quickly when demands are made collectively rather than at the level of individual households. This process of collective planning and engagement with government departments is described clearly by respondents from Govindpur, a village in Dhamtari, who spoke

about how repeated planning exercises and engagement with officials led to the creation and deepening of ponds and water structures over time:

"[Number of ponds] 4 ponds. There are 2 personal ponds. Yes, it was built at that time. Before that, there had been the Dharsarimand and the pond of Samuda was deepened, and Nirmala Ghat was constructed. And because there were no taps around, then order taps. That was all that was there. Then there were small rivulets, where if there was a flow of water, then only that used to flow. And when planning was done in Chinbari for the first time, the department people came and did a good amount of work. And for the personal one, it was thought that if we made that, then the government would take away the land. Then what will we do? They would not even ask for it. Then, slowly, after going there, the work began; around that place, the planning, etc., happened. Then they started making it around this place in nearby villages. Then the work continued after that." (FGD 24, Govindpur)

This illustrates how the collective articulation of need, combined with planning, enabled villages to build water infrastructure through state systems and schemes.

A distinctive feature of Dhamtari is the way communities respond to these biophysical constraints. Rather than shifting away from paddy cultivation, villagers have actively invested in converting midland land into lowland fields suitable for paddy. They do this through land levelling, bunding and sometimes by accessing irrigation through wells or a solar lift irrigation system. Participants from Kashpur described how MGNREGA planning helped with land levelling, dabri construction and irrigation expansion, alongside their own contributions to deepen and improve structures:

"There is one more reason. The main means is farming. In farming, I told you about NREGA planning, and in that, you get the Tikra. Now in Tikra, Paddy will not grow. So something had to be done. As part of NREGA planning, they tell us how we can make our land plain or increase the source of water, and what we can do. Then we can dig up Dabri, and along with that, if a farmer is anxious to increase his income, and everyone is anxious, all those who are sitting here can do the farming of vegetables. And along with

vegetables, there are borewells. There are 5 of them. And along with them, there are drips installed here. In three places, there are facilities for drip irrigation. Three have been given as donations, and some have been put up by the farmers. And besides these three, there are 7 farmers who have put up their own drips. NREGA does the Dabri digging, but the rest of the farmers can at least dig up the Dabri on their own, also, and see if that works. So the Dabri that Bhaiya has seen and come to has been dug by the people themselves. The digging, which is done by NREGA, what happens is that they dig up less, about 3 feet or 5 feet. But the Dabri should be 10 feet. And this has been done by the Didis themselves, digging one foot at a time. If such a Dabri is dug, the same can later be done at the Panchayat level as well. That planning can be done by all the Didis and Bhaiyas together. That also makes it permanent." (FGD 13, Kashpur)

An essential enabling condition in several Dhamtari villages is their history of political mobilisation. Some villages have decades of experience organising around land and forest rights, negotiating with the state. This history has produced communities with high levels of political awareness, confidence and readiness to act collectively. As a result, villages often enter PRADAN's interventions with strong preconditions for mobilisation already in place. In Chhindbharri, a village in Dhamtari, women described how Gram Sabha-led planning, collective land walks and direct engagement with senior officials transformed priorities around water storage into actual sanctioned work:

"Then there was a gram sabha held, and we expressed our views and concerns in it on how to store water, and agriculture. All the farmers were there. Then we visited all the lands around, to evaluate and discuss solutions. All the villagers together went around to see what the water source was and how we store it.

So after the intervention of the bhaiyas and the 'Pradhan' of the village, water is stopped along the way and stored in small ponds. (Dabri) that were made in the village.

So when all these works started happening, Circle Officers, District Collectors, etc., came to visit our village. We had invited them, and they obliged. Then we told them our work, plans, and our water-related problems, so we want to make ponds in the village,

so they asked us who all will participate in it, so we said that we all are interested, so they arranged a workshop for two days, here in the village." (FGD 17, Chhindbharri)

Within this context, PRADAN's role is primarily that of a facilitator, involving support for communities in working with government systems, creating village development plans to align collective demands with available schemes, and introducing interventions for land and water development. Outcomes such as improved irrigation access, stabilised agricultural production and reduced seasonal migration emerge from the interaction between collective work and state-supported interventions, rather than from standalone project-driven efforts.

Context 3: Non-Intensive Villages

3.4.5. CMO 3

In villages characterised by unfavourable biophysical conditions - such as poor water access and low soil fertility - alongside weak social organisation (context), PRADAN's engagement remained intermittent and insufficient to trigger sustained collective action or adaptive agricultural practices (mechanism). As a result, agricultural productivity showed limited improvement, seasonal migration persisted as a coping strategy, and community cohesion remained weak, constraining the overall impact of interventions (outcome).

In villages marked by adverse biophysical conditions - such as inadequate water access, low soil fertility, and impermeable rock formations - alongside weak social organisation (Context), PRADAN's involvement was sporadic and inadequate to instigate enduring collective action or adaptive agricultural practices (Mechanism). As a result, agricultural output showed minimal improvement, seasonal migration remained the predominant coping mechanism, and community cohesion remained tenuous, thereby limiting the overall effectiveness of interventions (Outcome). The 'non-intensive' villages in Gumla and Dhamtari exemplify the limitations of PRADAN's organisational Theory of Change, in which structural obstacles impede institutional mechanisms such

as SHG formation and technical training, underscoring the need for contextual preconditions to achieve cumulative impact.

In Gumla, non-intensive villages illustrate how biophysical limitations hinder agricultural change, sustaining a detrimental cycle of subsistence farming and out-migration. Villages located on impermeable rock formations are deficient in soil moisture and water retention, essential for fundamental kharif production, much less so for rabi intensification or upland growth, as observed in more advantageous regions. PRADAN's foundational interventions - lift irrigation, bunding, and scientific methodologies - are impractical in this context due to the absence of surface streams and gradients that hinder the establishment of harvesting structures. Consequently, families regard agriculture as a seasonal means of livelihood, with entire households moving to metropolitan centres after the monsoon for remittances, perceiving farming as ancillary rather than sustainable. This environment directly compromises the functionality of SHGs, a fundamental element of PRADAN's Theory of Change. The relocation of women disrupts meetings and savings, leaving groups understaffed and focused on consumption loans (e.g., for home crises) rather than productive expenditures such as seeds or tools. In the absence of agricultural surplus to facilitate repayment cycles, SHGs are unable to cultivate capital or solidarity, reflecting the constraints of Phase 1, which presumed that economic stability would ensue from livelihoods. PRADAN implemented non-agricultural alternatives - poultry, goatry, and microenterprises financed through tribal welfare grants - yet these initiatives struggle due to mobility constraints. Migrants favour immediate metropolitan earnings over hazardous endeavours, and sporadic professional visits cannot maintain training or market connections. The outcome is negligible productivity gains, persistent reliance on migration, and feeble cohesion, in stark contrast to the agrarian surpluses and strengthened federations of intensive communities. In this context, PRADAN's role becomes merely symbolic, underscoring that without essential biophysical facilitators, even strong processes produce minimal results.

The non-intensive villages of Dhamtari encounter similar yet distinct issues, primarily characterised by severe water scarcity that persists despite their proximity to dams, borewells, or forest ponds. Summer groundwater depletion, malfunctioning borewells, and reliance on a single drinking water supply impede livelihoods, whilst monsoon-induced waterlogging delays sowing and damages crops in low-lying areas. In contrast to Gumla's rock barriers, seasonal variations are exacerbated by inconsistent infrastructure, restricting most households to a single-cycle paddy system with no opportunity for diversification, rotation, or vegetable cultivation. Forest barriers (*mahua, tendu*) offer seasonal relief; yet, agriculture continues to be unstable, fostering desires for security rather than complete migration - although distress-driven outflows happen in the most affected villages. PRADAN's mechanisms - SRI training, FPO seeds, and SHG-mediated organics - exhibit varying adoption correlated with pre-existing social cohesion. For instance, in the villages Keregao and Bhandarwadi, robust mobilisation facilitates advancements despite water challenges. Self-Help Groups consolidate resources for borewell shares or *dabri* upkeep, promoting collaborative labour that surpasses biophysical constraints:

"We joined the Samooh, with the cooperation of everyone, by collecting money there, and an organisation was formed. That money got collected, and that gave us strength. We have worked very hard to reach this stage. How can one keep asking for money at home? But we had to do that from our parents-in-law." (FGD 25, Keregao)

This demonstrates how SHG solidarity fosters internal capital and determination, transforming women from passive recipients into active investors. Peer pressure and collective efforts surmount household opposition, facilitating adaptation strategies such as kitchen gardens or communal irrigation, resulting in productivity clusters during challenging times and aligning with the institution-led development of organisational Phase 3. In contrast, Gidhawa village is stagnant due to insufficient cohesion. In the absence of governance engagement or support from Self-Help Groups, women identify domestic restrictions and mobility issues as obstacles.

“(My spouse) used to go to the shop and then had to go to teach. When he had to go out, it was difficult to come to the meeting. I wanted to save money and wanted to do something. But when I wanted to do something, I could not do anything” (FGD 5, Gidhawa)

Patriarchal routines and seclusion disrupt collectives, making PRADAN's visits, though longstanding yet infrequent, ineffectual. In the absence of cohesive support for training, water emergencies remain unaddressed, agriculture continues to depend on rainfall, and results reflect CMO 3: constrained yields, vulnerable self-help groups, and dependence on inconsistent canal water supply. As a result, while PRADAN professionals continued to visit these villages, the interventions had a relatively low impact compared to more intensive areas where mechanisms were adopted over a sustained period.

CMO 3 reveals PRADAN's limitations in non-intensive environments across various sites: Gumla's biophysical determinism precludes mechanisms that sustain migration-SHG dysfunction; Dhamtari demonstrates that social cohesion serves as a crucial moderator, with its presence (Keregao) creating exceptions through endogenous strength, while its absence (Gidhawa) reinforces dependency. Across the organisation, this moderates the aspirations of Phase 6 - expansion through clusters/FPOs presupposes advantageous baselines that are lacking - confirming that impact necessitates both biophysical viability and social capital to empower SHGs as agents of change. From a longitudinal impact perspective, non-intensive villages delineate attribution boundaries: PRADAN contributes where mechanisms are effective (cohesive pockets); however, structural circumstances determine scalability. Interventions continue to be ethical imperatives, although results are limited, necessitating the prioritisation of intensive areas for measurable, replicable change while guiding adaptive strategies - such as focused cohesion-building - for marginalised groups owed for greater success.

Context 4: Non-PRADAN villages

3.4.6. CMO 4

Fieldwork extended to non-PRADAN villages in Gumla and Dhamtari offered a critical counterfactual, illuminating SHG dynamics under the DAY-NRLM saturation approach, alongside community cohesion and government scheme engagement, in the absence of PRADAN's direct involvement. These visits tested assumptions about PRADAN's unique contribution, revealing contextual nuances that shape institutional functionality and collective action. While data limitations precluded definitive comparisons with non-intensive PRADAN villages, patterns emerged highlighting how biophysical conditions, historical mobilisation, and leadership mediate outcomes independently of organisational intensity.

In the Gumla non-PRADAN village studied, NRLM-formed SHGs existed but lacked the vibrancy of PRADAN-intensive sites. Members showed limited engagement and capacity for resource mobilisation, confining groups to basic savings rather than to transformative socio-economic roles such as investment loans or federation-building. This echoes CMO 3 dynamics in non-intensive PRADAN villages, where weak participation hampers SHGs. In this context, DAY-NRLM's broad-based saturation approach—focused on universal coverage — may require deeper, sustained handholding to fully catalyse long-term activity. Convergence places additional demands on existing systems. Integrating NRLM and MGNREGA requires women to engage more closely with formal administrative processes to access the schemes, which is unfamiliar to many. Limited confidence in these interactions can affect the effectiveness of scheme delivery, shaping the pace at which empowerment outcomes emerge, much like Gumla's PRADAN non-intensive villages, where biophysical limits already constrain collective momentum.

Yet, countervailing strengths surfaced: robust community cohesion around forest land rights victory after disputes. A homogeneous religious identity fostered solidarity, enabling unified action in which leadership proved decisive. Key figures invested time

and personal costs to navigate the administrative ecosystem, securing collective rights that bolstered village identity. This demonstrates endogenous social capital - absent PRADAN - can drive landmark gains, challenging attributions of cohesion solely to organisational interventions. Leadership's altruistic commitment mirrors that of PRADAN-facilitated leaders (e.g., SHG *sarpanchs*) but emerges organically, suggesting that Gumla's tribal contexts harbour latent mobilisation potential when catalysed by existential stakes such as land.

Dhamtari's non-PRADAN villages underscore water availability as the paramount biophysical driver, dictating feasible change trajectories. Abundant or infrastructure-enabled water correlates with visible agricultural intensification and income gains, akin to PRADAN-intensive sites; severe scarcity, conversely, caps outcomes regardless of institutional design. This reinforces CMO 3: mechanisms falter without enabling conditions, but DAY-NRLM saturation fills voids, yielding strong SHGs, dense networks, and collective action in several cases. Unlike Gumla's predictable weakness in non-intensive/PRADAN-light areas, Dhamtari defies linearity. Non-PRADAN villages often boast resilient SHGs from prior mobilisations (DPRP/CGSRLM-Bihan), exposure visits, and DAY-NRLM, building social capital autonomously. Constrained biophysical sites - acute water stress - ironically attract PRADAN's heaviest engagement as strategic targeting, not weakness markers. This flips the narrative: intensity responds to need, not vice versa, with non-PRADAN areas sometimes outperforming due to state saturation (Nal Jal, MGNREGA).

3.5. Conclusion and Discussion

In this chapter, we conducted a systematic qualitative analysis to address a fundamental research gap: understanding the cumulative, longitudinal impact of PRADAN's work in specific geographies, beyond the fragmented, project-level evaluations that dominate the NPO landscape. The chapter operationalises a realist evaluation approach by developing Context-Mechanism-Outcome (CMO) configurations grounded in twenty years of organisational evolution, secondary

documentation, and community narratives from two geographically and institutionally distinct locations: Gumla and Dhamtari. Our approach recognises that NPO impact cannot be understood through attribution claims alone - asking “Did PRADAN cause this?” - but rather through contribution claims that examine how PRADAN's mechanisms, activated in specific contexts, interact with other institutional actors (the state, DAY-NRLM, market forces, etc.) and biophysical conditions to produce observable outcomes. This reframing is essential for capturing cumulative impact, where the sum of multiple, phased interventions across domains (agriculture, gender, governance, ecology, etc.) over time produces effects that single-program evaluations systematically obscure.

Figure 3.6. provides a synthesis of findings from this chapter. To read this, we move within each row from left to right. For instance, in intensive villages, in terms of income enhancement (farm- and non-farm-based), PRADAN’s interventions helped shift households from subsistence to improved and commercial agriculture. The nature of this relationship is positive and marked. The sign does not indicate the strength or weakness of a relationship; rather, it shows the broad direction of change. Similarly, particularly in villages falling in the midlands, the shift from fallow lands to horticulture has been shown with a positive sign. And thirdly, the creation of Community-Based Organisations (poultry and goatry) in these villages is shown with a positive sign. These mechanisms fall under the broad impact outcome category of income enhancement. Their overall outcome is to reduce full-family seasonal migration by providing additional income support through the generation of agricultural surplus and by making agriculture a time-intensive rather than leisure-based activity.

Next, moving rightwards into the domain of collectivisation, we see that SHGs have worked well here due to the high intensity of interactions with PRADAN professionals. The intensity results from the potential to receive feedback as newer interventions are implemented over time. This also makes the shift from first-generation Community Based Organisations (WUAs-Co-operatives) to SHGs and PGs more efficient, creating

different platforms for building community solidarity in these villages. Further, moving rightwards, we see that because these SHGs and other Community-Based Organisations (CBOs) work well (in terms of loan provision and governance), the potential for women to realise their capabilities is higher in intensive villages. This is demonstrated through activities such as serving in leadership positions in panchayats and improving their children's educational and health outcomes, among others. Thus, as we move from left to right, we see a shift due to interrelated aspects of interventions and outcomes in each category.

For the second row, we see that the link between sustenance agriculture and migration is not broken in non-intensive villages due to the inability to create an agricultural surplus owing to topographical reasons. We show this with positive and negative signs, as so far we have evidence on the negative side, but it would be interesting to explore in the next phase in villages where we know this has broken down, yet has not yielded outcomes similar to those in intensive villages. Similarly, we show that, because migration persists, interventions in non-farm-based activities are scattered and do not sustain. We see SHGs not functioning well here, owing to a focus on consumption loans and lesser interactions with PRADAN professionals due to intermittent interventions. As a consequence, not too many platforms exist for building community solidarity, and the empowerment of women remains restricted to participation in panchayats and the development of interpersonal skills.

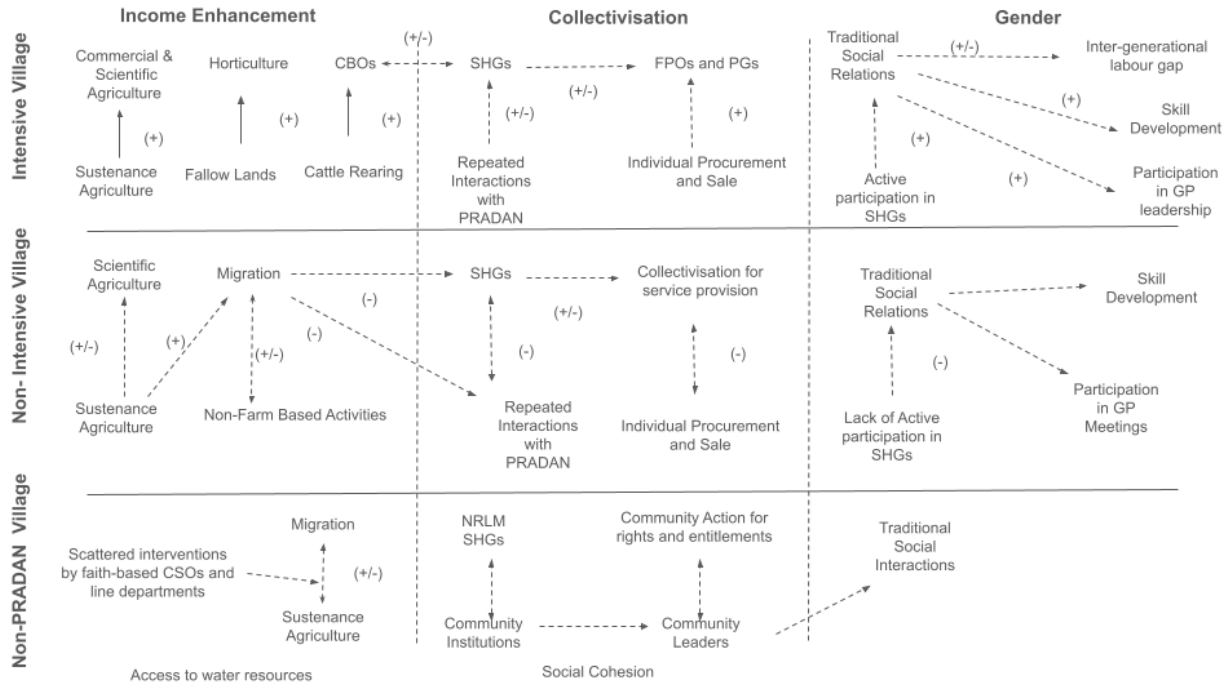


Figure 3.6.: Impact and contribution pathways. Author's Analysis.

We have also attempted to convert these CMOs and impact pathways into testable hypotheses, as shown in Table 3.5. This provides a bridge between qualitative insight and quantitative validation that follows in the next chapter. Qualitative analysis excels at understanding how and why; quantitative analysis excels at measuring magnitude and scope. By marrying them through the CMO framework, we avoid both the interpretive looseness of pure narrative and the reductionism of purely quantitative metrics. The hypotheses specify directional expectations (if mechanism, then outcome) and conditional relationships (CMO 1b outcome becomes CMO 1c context), thereby enabling empirical investigation while preserving the complexity of social change.

The testable hypotheses we specify are not endpoints but invitations: they await quantitative validation in the subsequent chapter, where survey data, comparison villages, and statistical estimation can refine, refute, or confirm our qualitative insights.

Table 3.5. Converting CMOs into testable hypotheses

CMO	Context (C)	Mechanism (M)	Outcome (O)	Hypothesis	Variables
Productive Agriculture	Water access, fertile soil, and a history of migration	Scientific farming & irrigation	↑ Crop surplus, ↓ migration, ↑ income	Higher agri productivity → ↓ migration	Crop yield, irrigation (C/M); seasonal migration (O)
				Irrigation + techniques → ↑ income	Irrigation access, practice adoption (M); annual income (O)
SHGs & Empowerment	Mature SHGs, women in governance	Credit access, training	↑ Women's leadership, ↑ entitlements, ↑ empowerment	SHGs activity → ↑ women in governance	SHG presence (C); participation in PRIs (O)
				SHGs → ↑ women's empowerment	SHG participation (M); women's enterprise/farm income (O)
				SHGs → ↑ formal credit access	SHG status, credit sources (O)
Collective Action in Scarcity	Water scarcity, land degradation	Community mobilisation, local leadership	↑ Sustainability, ↓ migration, ↑ income	Mobilisation → ↑ agri productivity	Mobilisation Index (M); Net sown area (O)
				Cohesion → ↑ water + agri income	Trust index (M); water access + agri income (O)
Low-Engagement Villages	Poor resources, weak institutions	Intermittent/weak NPO presence	↓ Productivity, ↑ migration, ↓ cohesion	Lack of mechanisms in poor contexts yields negative outcomes	

Thus, the four sub-sections in this chapter, taken together, construct a single analytical argument:

PRADAN's cumulative impact emerges through organisationally coherent, contextually contingent mechanisms operating over two decades, producing observable outcomes in agriculture, institutions, and politics, whose contribution can be estimated empirically while acknowledging co-production with state, market, and community forces.

This recognition of co-production - with state, market, and community - ensures humility about organisational contribution. Yet the coherent, testable framework ensures that PRADAN's learning is captured, its mechanisms clarified, and its impact on rural livelihoods, institutions, and governance subjected to evidence-based scrutiny. In doing so, this chapter advances both accountability (what did PRADAN contribute?) and learning (under what conditions, through which mechanisms, with what effects?).

Section 1 on the evolution of the overall ToC establishes that organisational coherence: PRADAN's logic evolved from economic empowerment to institutional deepening to systems integration. This evolution is not random; it follows a learning arc in which each phase builds on lessons from the previous. Phases 1-2 create livelihoods and SHG platforms; Phases 3-4 deepen these institutions and link them to markets; Phases 5-6 test resilience and scale integration. This coherent logic explains why we expect cumulative effects: each phase's mechanisms activate conditions for the next phase's mechanisms. Section 2 on initial program theories establishes contextual contingency: the same organisational logic unfolds differently in Gumla versus Dhamtari because their initial conditions differ. In Gumla, the PRADAN's role is highly visible and traceable. In Dhamtari, PRADAN navigates existing structures, making its role facilitative and causality blurred. Yet both trajectories are consistent with organisational ToC evolution; they are not deviations, but instantiations of the same underlying logic adapted to local realities. Section 3 of impact and contribution pathways establishes

observable outcomes: the analysis is grounded not in abstract claims but in material changes - irrigation systems, cropping patterns, and women in governance. These outcomes are not PRADAN's sole products but are plausibly shaped by PRADAN's mechanisms, which work alongside state infrastructure, market signals, and community initiatives. This final Section 4 establishes empirical testability by specifying CMOs as formal hypotheses with variables and estimators, thereby creating a pathway for quantitative validation. This final section does not claim proof but rather specifies how proof might be sought and under what conditions hypotheses might be refuted, revised, or confirmed.

The analytical power of this approach lies in its ability to prevent false dichotomies: we are neither arguing that PRADAN is solely responsible for the observed changes (an attribution claim that is rarely sustainable in real-world contexts) nor that PRADAN's contribution is unmeasurable or inherently ambiguous (a claim that forecloses evidence-based learning). Instead, we position PRADAN's impact as an empirically estimable contribution within a complex system where multiple actors and forces co-produce outcomes. This framing aligns with both realist evaluation principles (context and mechanisms matter; causation is contingent) and accountability imperatives (we can estimate marginal effects and learn from variance).

4. Quantitative Analysis: Primary Survey and Geo-Spatial Data

Building on our qualitative analysis further, we broke down the CMO configuration to assess correlations based on cross-sectional data (from the survey) and panel data (from the geospatial analysis) as follows:

CMO Configuration 1

Context: Villages with favourable agricultural conditions (e.g., access to water, fertile soil) and a history of seasonal out-migration for income.

Mechanism: Introduction of scientific farming techniques and improved irrigation.

Outcome: Increased agricultural surplus, reduced seasonal out-migration, and more stable rural economies.

Using this, we derive two testable hypotheses for examination:

Hypothesis 1:

H1a: PRADAN villages will show higher agricultural productivity (measured by Normalised Difference Vegetation Index) compared to villages with no interventions by PRADAN.

H1b: PRADAN villages with higher agricultural productivity (measured by Normalised Difference Vegetation Index) will show a significantly lower level of seasonal out-migration compared to non-PRADAN villages with lower agricultural productivity.

Hypothesis 2:

H2: Households with access to irrigation and improved agricultural techniques will report significantly higher annual household income compared to households without access to these interventions by PRADAN.

CMO Configuration 2

Context: Villages with well-functioning Self-Help Groups (SHGs), particularly those in which women are actively involved in local governance.

Mechanism: Formation and support of SHGs, access to credit, and training on governance and scheme utilisation.

Outcome: Increased women's participation in local governance (e.g., Gram Panchayats), greater access to financial resources, and enhanced social and political empowerment.

Using this, we derive four testable hypotheses for examination:

Hypothesis 3:

H3: Villages with active PRADAN-promoted SHGs will have significantly higher levels of female mobility and participation.

Hypothesis 4:

H4: HHs in villages with PRADAN-promoted SHGs will report significantly higher levels of income generation (measured by business income or farm income from SHG activities) compared to women in villages without SHGs.

Hypothesis 5:

H5: HHs in villages with PRADAN-promoted SHGs will report significantly higher levels of access to credit from formal sources such as banks and co-operatives as compared to women in villages without SHGs.

Hypothesis 6:

H6: Villages with active PRADAN-promoted SHGs will have significantly higher levels of government scheme entitlement receipts.

CMO Configuration 3

Context: Villages with water scarcity and poor agricultural productivity require collective action for water harvesting and land development.

Mechanism: Mobilisation of community members for water harvesting, land development activities, and the establishment of local leadership for collective action.

Outcome: Improved agricultural sustainability, increased income, and reduced migration due to enhanced community infrastructure and cohesion.

Using this, we derive two testable hypotheses for examination:

Hypothesis 7:

H7: Villages where community mobilisation for water harvesting and land development was successfully implemented will show significantly higher crop acreage compared to villages where such mobilisation was absent.

Hypothesis 8:

H8: Stronger community cohesion (measured by indicators such as trust among villagers, participation in community events, and collective action) will be positively associated with better access to water and higher agricultural income in water-scarce villages.

CMO Configuration 4

Context: Villages with unfavourable biophysical conditions (e.g., poor water access, infertile land, etc.) and weak social structures.

Mechanism: Intermittent PRADAN interventions or lack of sufficient engagement.

Outcome: Limited impact on agricultural productivity, higher levels of seasonal migration, and weaker community cohesion.

These four emerging patterns reflect how the combination of PRADAN's interventions, the local context, and the mechanisms triggered by these interventions is generating specific outcomes. They highlight the importance of contextual factors such as community cohesion, available biophysical resources, and the socio-economic dynamics of the area in determining the success or failure of development initiatives.

We utilise remote sensing data for village classification to identify villages with similar biophysical conditions, and household-level surveys are conducted to gather more detailed data on the impact of PRADAN's interventions. Given that social, institutional and biophysical aspects emerged as important factors in our articulation of the context, it was deemed a prudent strategy to incorporate one of these as a sampling variable to maximise variation. Biophysical attributes could be mapped over two decades; hence, they were chosen as a sampling variable, along with PRADAN's own classification of villages into intensive, non-intensive, and non-PRADAN. This will help refine the CMO configurations and better understand the specific mechanisms through which interventions lead to the observed outcomes.

4.1. Data and Methodology

4.1.1. Pre-fieldwork: village classification for agricultural suitability

Before conducting the primary surveys, we constructed a village-level agricultural suitability measure to (i) characterise baseline agro-ecological conditions across the study geography and (ii) support stratification of the sampling frame. It is difficult to determine the agricultural suitability of villages in our sample based on a single indicator. Therefore, we rely on multiple indicators derived from various datasets and construct a multidimensional or composite index. To ensure comparability, all indicators - such as rainfall, temperature, and others - are normalised to a common scale ranging from 0 to 1.

$$Indicator\ \kappa = (\varkappa_\kappa - min(x_k))/\ (max(x_k)\ - min(x_k))$$

Where:

$\varkappa_\kappa$= the value of the κ-th indicator (for a particular observation, village)

min(x_k) , $max(x_k)$ = the minimum and maximum values of indicator κ across all villages

Given that each indicator contributes differently to agricultural potential, it is important to assign appropriate weights when constructing the composite index. We derive these weights using Principal Component Analysis (PCA), which allows us to capture the relative importance of each indicator based on the variation it explains across the dataset. Next, we create a composite index for each village for the year 2005, which we use as the baseline year.

$$Index_i = \sum_{k=1}^{K} \quad w_k \times \widetilde{x_{ik}}$$

Where:

$Index_i$= composite index value for a village

w_k= weight assigned to indicator k from PCA

$\widetilde{x_k}$= normalised value of indicator k for unit i (village)

k = total number of indicators

Table 4.1. Secondary datasets used to construct the agricultural suitability index

Data source	Resolution (m)	Variables used	Unit
MODIS-250 Terra	250	NDVI (vegetation productivity proxy)	–
Copernicus Landcover	100	Agricultural area identification	–
CHIRPS	5566	Rainfall	mm
TerraClimate	4638.3	Runoff and temperature	mm; °C
FABDEM	30	Slope	degrees
Rural Access Index (RAI)	742	Road infrastructure/access	–
GLC FCS30D	30	Irrigated area, rainfed area, surface water	sq. km
Soil Organic Matter	250	Soil organic matter	%

Notes: NDVI is used as an indicator of agricultural productivity. MODIS refers to the Moderate Resolution Imaging Spectroradiometer, which is onboard the Terra satellite and is provided by NASA (Huete et al., 1999). CHIRPS stands for Climate Hazards Centre InfraRed Precipitation with Station data, made available by the Climate Hazards Centre at the University of California, Santa Barbara (Funk et al.,2015). Run off and Temperature were sourced from (Abatzoglou et al., 2018). FABDEM stands for Forests and Buildings Removed Digital Elevation Model (Hawker et al., 2022). The common time period across all the above datasets is 2005–2022. Copernicus Landcover was used to define agricultural areas (Dominique et al., 2018), rural access index data were sourced from (Iablonovski et al., 2024), organic carbon data from (FAO, 2023), and data about irrigated and rainfed areas from (Zhang et al., 2023). These datasets originate from diverse sources and have varying spatial resolutions. All data were spatially aggregated to the village level using a village boundary shapefile, allowing for consistent village-level analysis.

Based on this composite index, we classify villages in Gumla and Dhamtari into four quartiles as discussed above.

The village-level indicators were created from multiple remote-sensing and gridded datasets with varying spatial resolutions; all inputs were spatially aggregated to the village level using village boundary shapefiles Table 4.1. Based on the four agricultural quartiles and three types of villages as classified by PRADAN, we divided the villages in Gumla and Dhamtari into 12 cells each, ensuring proportionate representation of each in our sample (see Table 4.2 and Table 4.3).

Table 4.2: Distribution of Villages in Gumla

PRADAN Villages	Agricultural Suitability Index				
	Q1 (Not Suitable)	Q2 (Less Suitable)	Q3 (Suitable)	Q4 (Highly Suitable)	Total
Non-PRADAN	107	89	104	129	429
	24.94	20.75	24.24	30.07	100.00
	45.15	37.71	44.26	54.66	45.44
	11.33	9.43	11.02	13.67	45.44
Non-Intensive PRADAN	63	83	68	63	277
	22.74	29.96	24.55	22.74	100.00
	26.58	35.17	28.94	26.69	29.34
	6.67	8.79	7.20	6.67	29.34
Intensive PRADAN	67	64	63	44	238
	28.15	26.89	26.47	18.49	100.00
	28.27	27.12	26.81	18.64	25.21
	7.10	6.78	6.67	4.66	25.21
Total	237	236	235	236	944
	25.11	25.00	24.89	25.00	100.00
	100.00	100.00	100.00	100.00	100.00
	25.11	25.00	24.89	25.00	100.00

The first row has *frequencies*; the second row has *row percentages*; the third row has *column percentages,* and the fourth row has *cell percentages.* Q1, Q2, Q3 and Q4 refer to the first, second, third and fourth quartiles, respectively.

Table 4.3: Distribution of Villages in Dhamtari

PRADAN Villages	Agriculture Suitability Index				
	Q1 (Not Suitable)	Q2 (Less Suitable)	Q3 (Suitable)	Q4 (Highly Suitable)	Total
Non-PRADAN	43	65	116	130	354
	12.15	18.36	32.77	36.72	100.00
	29.66	40.88	72.96	83.33	57.19
	6.95	10.50	18.74	21.00	57.19
Non-Intensive PRADAN	63	53	21	10	147
	42.86	36.05	14.29	6.80	100.00
	43.45	33.33	13.21	6.41	23.75
	10.18	8.56	3.39	1.62	23.75
Intensive PRADAN	39	41	22	16	118
	33.05	34.75	18.64	13.56	100.00
	26.90	25.79	13.84	10.26	19.06
	6.30	6.62	3.55	2.58	19.06
Total	145	159	159	156	619
	23.42	25.69	25.69	25.20	100.00
	100.00	100.00	100.00	100.00	100.00
	23.42	25.69	25.69	25.20	100.00

4.1.2. Power Calculations

We used data from the Mission Antyodaya[4] (2020) dataset to inform our understanding of the variability in outcomes across villages. This helped establish realistic assumptions for standard deviations and effect sizes in our power calculations.

[4] Krishnan et al. (2024) develop a Rural Multidimensional Deprivation Index (RDI) using the same dataset for Chattisgarh. Dhamtari district (Raipur Division) ranks 23rd out of, with an SD of ~130) provides 28 districts in Chhattisgarh. Nagri block shows the highest deprivation with greatest need for intervention, particularly requiring attention to secondary education and vocational training. This is followed by Magarlod block, showing second most deprived, requiring targeted development in higher education and infrastructure, followed by Dhamtari block with moderate deprivation levels and reasonable service provisioning. Lastly, Kurud block is the best performing block, demonstrating effective service delivery suitable for replication. PRADAN has maximum presence in Nagri block as of 2024. Prasanna et al. (2025) also analyse the same index for Gumla district. They show that Gumla exhibits severe rural multidimensional deprivation, ranking third highest statewide. It clusters with Simdega and Garhwa in high deprivation, driven by health (37% share), infrastructure (31%), and education (32%) gaps, topped by lack of vocational training centres (12.35%), sanitary toilets (10.95%), and drainage (9.78%). Albert Ekka is the worst performing block, followed by Bishunpur, Palkot, and Dumri. Bharno fares best relatively. PRADAN is active in Palkot and is now entering into collaborative mode work in other poor performing blocks.

While Pradhan Mantri Jan Dhan (PMJDY) access doesn't directly measure income, savings, or credit, it is a reasonable proxy for financial inclusion, which can be a crucial part of the rural development goals. In many rural development interventions, access to banking services is seen as a precursor to other financial benefits, such as savings or access to credit. This also seems plausible for PRADAN, given its emphasis on access to credit across its interventions over the years.

Key proxy indicators and their descriptive statistics are presented in Table 4.4 below.

Table 4.4.: Relevant variable from Mission Antyodaya, 2020

Proxy Variable	Gumla (Mean, SD)	Dhamtari (Mean, SD)
PMJDY Access (Households)	95.1, 132.0	111.0, 126.5

We see that the variable PMJDY access shows substantial variation across villages (SD ~130), allowing detection of differences of ~50–52 households. The substantial variation in PMJDY access across villages (as seen in the dataset, with an SD of ~130) provides a strong basis for detecting differences between groups (villages in this case). As per the power calculation setup, we can detect differences of 50–52 households with this variable, which is meaningful for rural development studies, where changes in household access to financial services can have ripple effects on economic outcomes. Even though this variable is not a perfect match for income, savings, or credit, we can still set a judicious MES (Minimum Effect. The MES for PMJDY access could range from 0.34 to 0.45, depending on the expected changes in financial inclusion outcomes. In terms of power, this is achievable given the strong standard deviation in PMJDY access (SD ~130)

Now, the total villages in study universe = 948 (Gumla) + 623 (Dhamtari) = 1,571

Next, in each village, we plan to survey 10 households. Assuming:

Power = 80%

Alpha = 0.05

Two-sided test

Cluster sampling: households sampled within villages

We use design effect (DE) to adjust for clustering.

$$DE = 1 + (m - 1).\rho$$

Where:

m =10 households per village

ρ=0.05 (ICC from literature)

So:

DE =1.45

Let's say each stratum (e.g., Intensive–Q1–Gumla) has:

Gumla : 10 villages × 10 households = 100 households

Dhamtari : 7 villages × 10 households = 70 households

Effective sample sizes:

Gumla: $\eta_{effective} = \frac{100}{1.45} \approx 69$

Dhamtari: $\eta_{effective} = \frac{70}{1.45} \approx 48$

These are the sample sizes after adjusting for clustering.

With n=69 per group (Gumla strata), we can detect d ~ 0.34–0.38. With n = 48 per group (Dhamtari strata), we can detect d ≥ 0.45.

Thus, while Gumla strata are powered to detect d ≈ 0.34 Dhamtari strata are underpowered for d = 0.34 but can detect moderate effects.

However, owing to budgetary constraints, we restrict ourselves to this effect size, as we plan to club clusters to improve the power of our analysis (e.g., clubbing Q1 and Q2 together and then comparing them with Q3 and Q4). Thus, we finalised our sample cap at 201 villages.

Gumla sample = 0.6033 × 201 ≈ 121 (rounded to 120)

Dhamtari sample = 0.3967 × 201 ≈ 80 (rounded to 81)

Village allocation per stratum:

Gumla: 120 villages ÷ 12 strata = 10 villages per stratum

Dhamtari: 81 villages ÷ 12 strata ≈ 6.75 ≈ 7 villages per stratum (rounded)

Thus:

Gumla: 10 villages × 10 HHs = 100 HHs per stratum

Dhamtari: 7 villages × 10 HHs = 70 HHs per stratum

4.1.3. Survey and Sample Characteristics

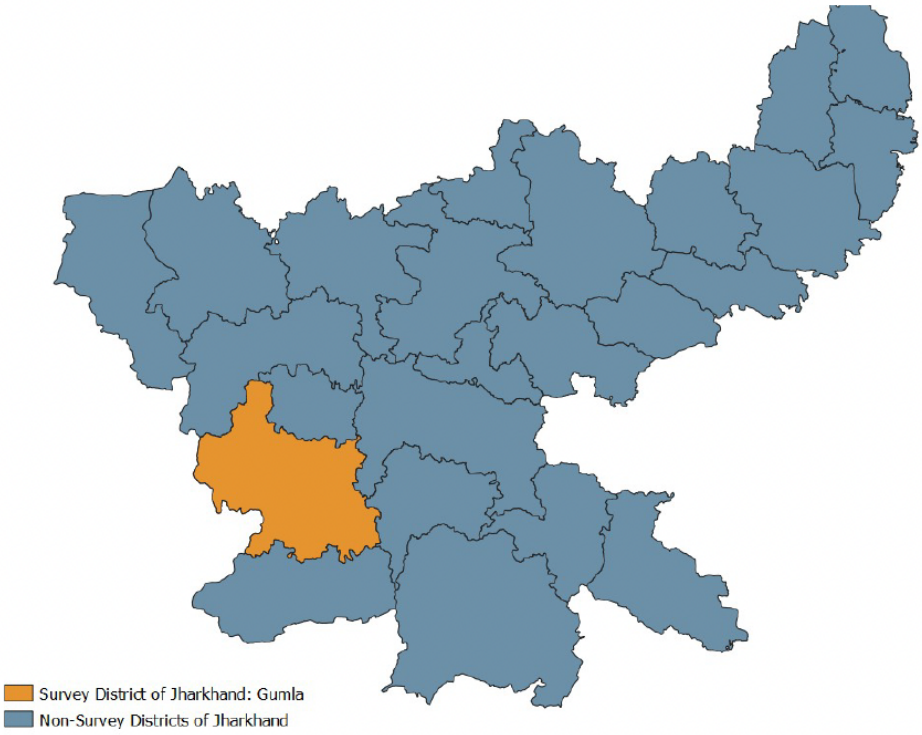
The study collected primary data from 2,010 households across 201 villages using a multistage stratified sampling design. In total, 120 villages were covered in Gumla and 81 in Dhamtari (Table 4.5 & Figure 4.1). Within each sampled village, we surveyed 10 households using a spatially distributed selection approach: two households were randomly selected from each of five reference points - the village centre (typically the location where the pucca road ends and/or where the community hall is located), and the north, south, east, and west directions - yielding a total sample of 2,010 households. We implemented two complementary primary instruments: (i) a household survey (n = 2010), (ii) a village-level survey (n = 201). The household questionnaire had two parts: a detailed module administered to men, and a shorter module administered to the second-oldest woman in the household to capture gender-relevant outcomes and intra-household dimensions. The village survey was administered to knowledgeable

respondents such as elected representatives, SHG/community leaders, or respected village elders. All participants were informed in advance, and informed consent was obtained prior to data collection.

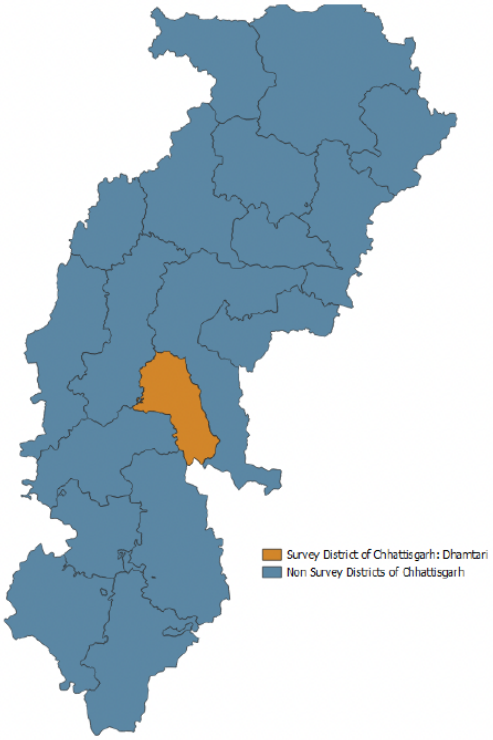
The household survey recorded detailed information on socio-economic characteristics and agricultural production, including input use, cultivation practices, and access to services such as credit and extension services. We also collected GPS coordinates for surveyed households. Importantly, for the main agricultural plots operated by half of the surveyed households, enumerators recorded geographic coordinates at the plot corners. These corner points were later used to construct polygon plot geometries (shapefiles), enabling consistent, plot-level extraction of remote-sensing indicators (Figure 4.2).

Table 4.5. Distribution of Villages Block-Wise in the Sample (n=201)

District	Block	Non-PRADAN Villages	Non-Intensive PRADAN	Intensive PRADAN	Total Villages
Dhamtari	Dhamtari	20	0	0	20
	Kurud	14	0	0	14
	Magarlod	12	2	0	14
	Nagri	0	18	15	33
	Sub-Total	46	20	15	81
Gumla	Albert Ekka	9	0	0	9
	Basia	0	5	4	9
	Bharno	6	0	0	6
	Bishunpur	8	0	0	8
	Chainpur	9	0	0	9
	Dumri	8	0	0	8
	Ghagra	0	8	7	15
	Gumla	0	11	4	15
	Kamdara	0	4	2	6
	Palkot	0	8	4	12
	Raidih	0	4	6	10
	Sisai	13	0	0	13
	Sub Total	53	36	31	120



(a) Jharkhand (Survey district: Gumla).



(b) Chhattisgarh (Survey district: Dhamtari).

Figure 4.1. Survey Districts

Figure 4.2. Example of a single plot geometry formed from plot coordinates collected during the survey.

A key methodological consideration in this study was the absence of a comprehensive household-level sampling frame, which necessitated a multi-stage randomisation approach centred at the village level. In the first stage, villages were randomly selected from lists provided by PRADAN and categorised by PRADAN's presence (PRADAN villages versus non-PRADAN villages). This classification relied on PRADAN's official documentation, ensuring an initial balance reflective of the organisation's operational footprint. In the second stage, within each selected village, households were chosen randomly using a systematic grid-based sampling technique. This method facilitated spatial representativeness, minimising clustering biases and capturing diverse household experiences across the village geography. To validate and refine the PRADAN village classification at the household level, the survey instrument incorporated direct, self-reported questions about households' engagement with the

NPO. This approach yielded a more granular and reliable measure of PRADAN's actual reach, as it drew from respondents rather than aggregated administrative records.

Despite these rigorous procedures, the survey revealed discrepancies between anticipated and observed PRADAN household coverage, highlighting the dynamic nature of NPO operations in rural settings. Several factors could explain these variations. First, PRADAN's village-level presence does not guarantee uniform household engagement; interventions often prioritise vulnerable groups, resulting in uneven penetration across communities. Second, external influences - such as household mobility, program evolution, or respondent recall - may have influenced self-reports. Third, logistical challenges in remote areas, including Gumla and Dhamtari, could lead to misaligned survey data capture.

In the Gumla district, the study anticipated a sample distribution of approximately 56% households from PRADAN villages and 44% from non-PRADAN villages, based on PRADAN's documented activities. The actual survey results showed close alignment: 48% of households reported PRADAN engagement, while 52% reported none (Figure 4.3).

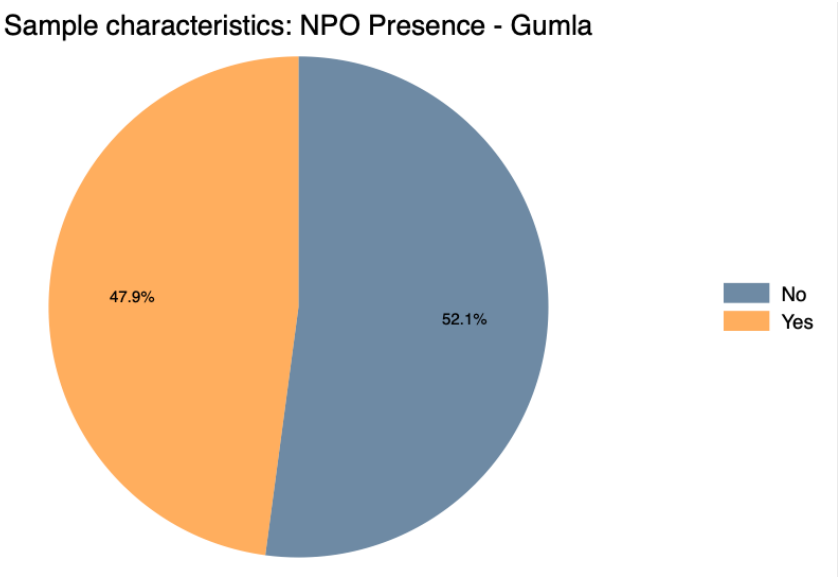


Figure 4.3. Sample Distribution based on NPO presence - Gumla

This modest deviation (8 percentage points) preserves analytical comparability between PRADAN and non-PRADAN subgroups, enabling meaningful statistical inferences on intervention impacts, such as differences in livelihood outcomes, asset ownership, or social capital.

By contrast, Dhamtari district showed a more pronounced mismatch. Expectations were for 43% PRADAN households and 57% non-PRADAN, informed by PRADAN's established interventions in the region. However, only 15% of surveyed households affirmed PRADAN involvement, with 85% reporting no connection. This substantial underrepresentation (28 percentage points below projection) leaves the sample with insufficient power for robust subgroup analyses in Dhamtari, limiting the ability to conduct intended comparisons (e.g., t-tests or regression models isolating PRADAN effects). Aggregated district-level findings remain valid, but nuanced subgroup insights are constrained.

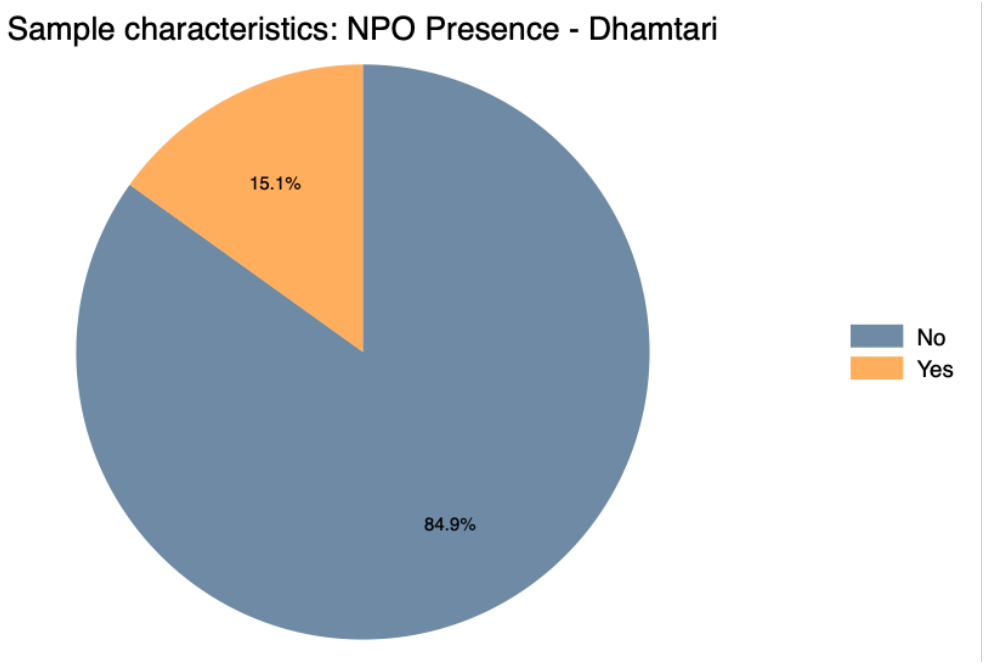
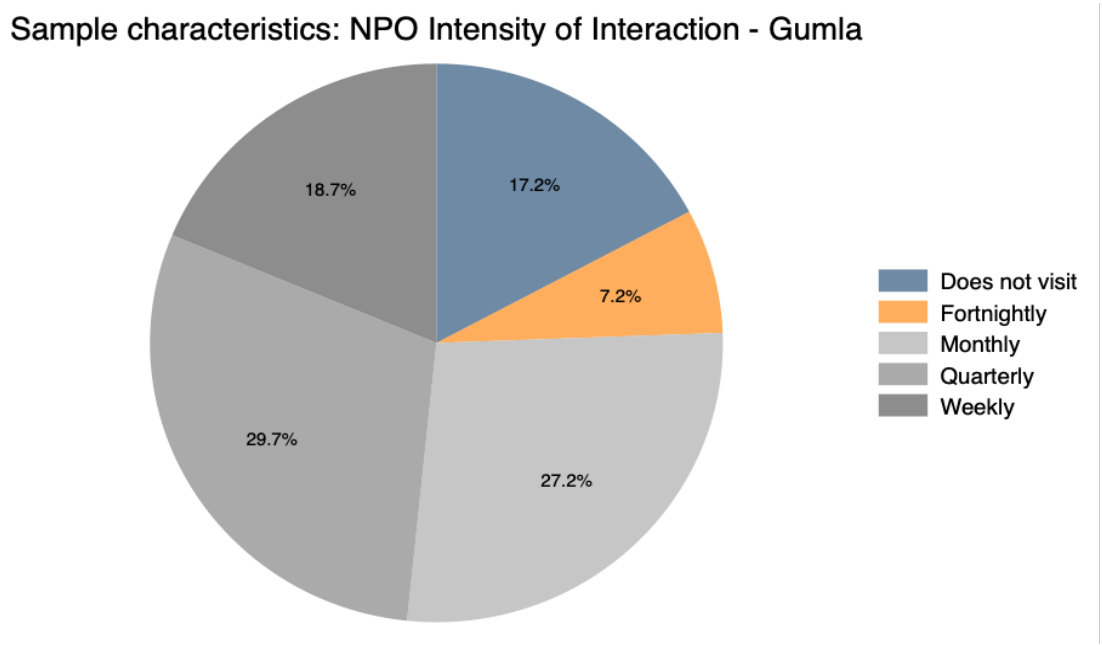
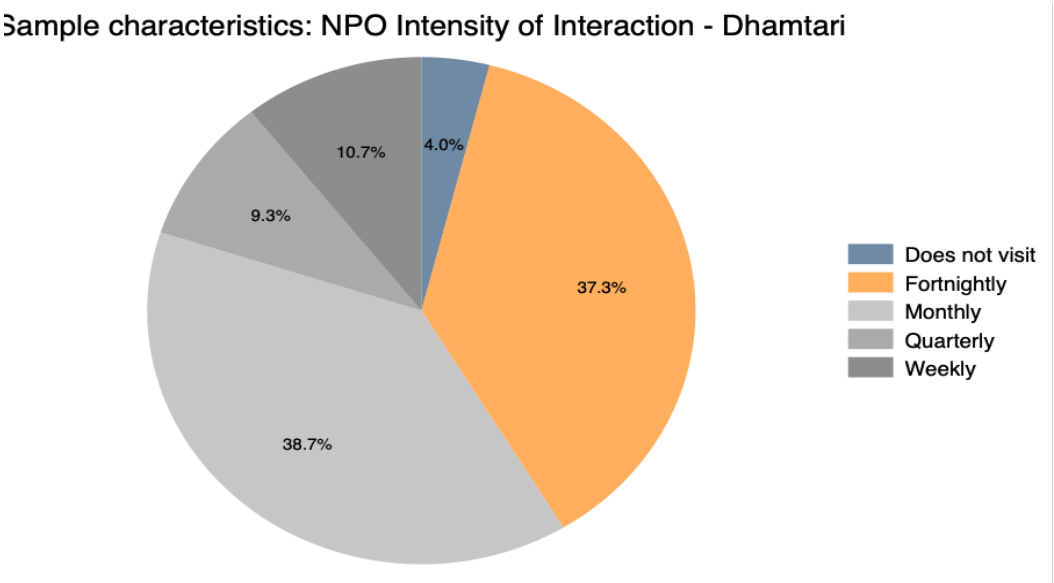


Figure 4.4. Sample Distribution based on NPO presence - Dhamtari

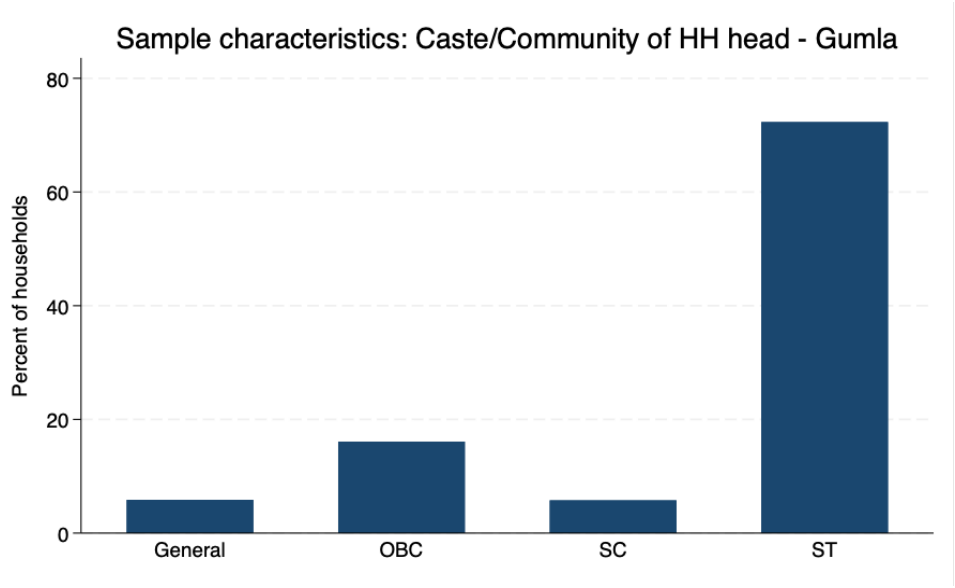
In terms of the frequency of interaction with PRADAN, in Gumla, contact is relatively diffuse: 17.2% of households report that the organisation does not visit, while the rest are spread across weekly (18.7%), monthly (29.7%), and quarterly (27.2%) visits, with only 7.2% reporting fortnightly interaction. This suggests a mix of engagement levels: a sizable group experiences low or no contact, while a substantial share sees the NPO at least monthly.





In Dhamtari, interaction is much more regular and centred on set schedules. Only 4% of households report no visits, while 37.3% report fortnightly contact and 38.7% monthly interaction. Weekly (10.7%) and quarterly (9.3%) visits are smaller shares but still present.

Across the two districts, the samples depict quite different social compositions and material conditions, with some common vulnerabilities cutting across locations. In Gumla, Scheduled Tribe (ST) households dominate the sample, accounting for roughly three-quarters of all households, while Other Backward Classes (OBC) form a modest minority and General and Scheduled Caste (SC) groups each represent only a small share.



In Dhamtari, by contrast, the social profile is more mixed: OBC and ST households together form the bulk of the sample, with OBC slightly higher than ST, and a noticeable SC presence, while General-category households remain a very small fraction. This indicates that both sites are strongly oriented towards historically underserved groups, but that Gumla is far more tribal in character than Dhamtari in our sample.

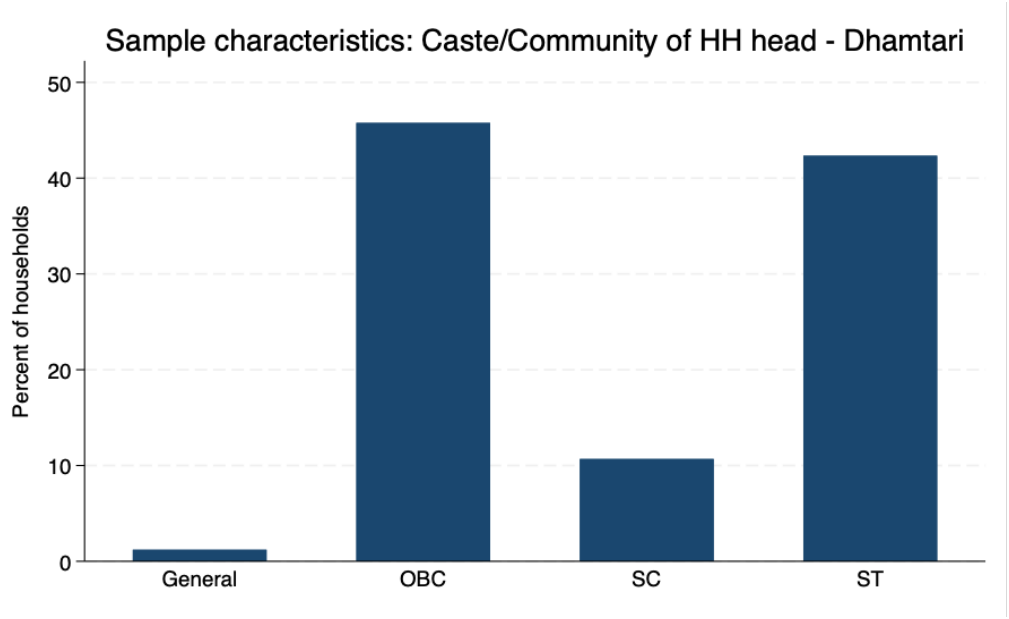


Figure 4.6. Caste of the household head - Gumla and Dhamtari

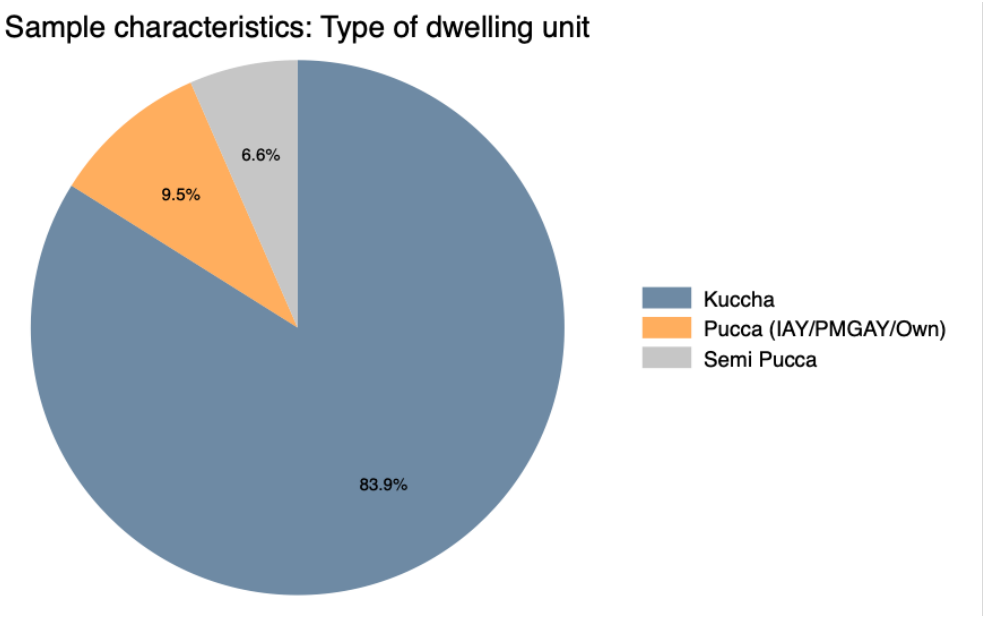


Figure 4.7. Type of Dwelling Unit- Gumla

Housing conditions further underline this contrast. In Gumla, the vast majority of sampled households live in kuchcha structures (84%), with only a small proportion residing in pucca houses constructed through schemes such as Indira Awaas Yojana/Pradhan Mantri Awaas Yojana-Gramin (IAY/PMAY-G) or out of their own resources (10%); semi-pucca dwellings form a minor category (6%). Dhamtari shows

the reverse pattern: over two-thirds of households live in pucca units, around one-fifth in kuchcha homes, and a small remainder in semi-pucca dwellings. This suggests significantly better housing quality and likely higher asset bases in Dhamtari relative to Gumla in our sample.

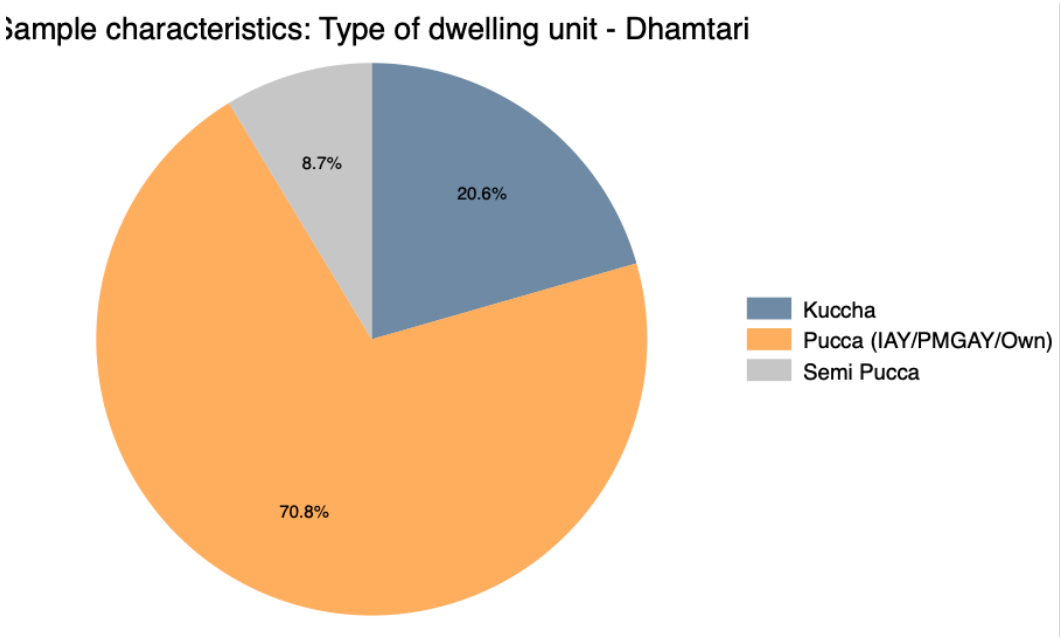


Figure 4.8. Type of Dwelling Unit- Dhamtari

Water access patterns exhibit both similarities and differences, and the charts distinguish households by the presence of NPOs. In Gumla, wells account for the largest share of drinking-water sources among non-NPO households, followed by taps, groundwater and piped connections, whereas in the NPO intensive areas, reliance on wells remains high but is somewhat lower, with slightly greater use of taps and groundwater and a comparable though modest uptake of piped water. This suggests that NPO presence does not radically transform water-source profiles but may be associated with incremental diversification away from sole dependence on wells. In Dhamtari, the split between NPO and non-NPO areas is more pronounced: among non-NPO households, a large majority rely on piped water, with smaller segments using ground water, taps or wells; in NPO-covered areas, piped water still dominates but at a markedly lower share, with a larger portion using ground or tap water. This pattern may

reflect the specific siting of NPO programmes in relatively underserved pockets that have not yet fully transitioned to piped supply, even within an overall better-served district.

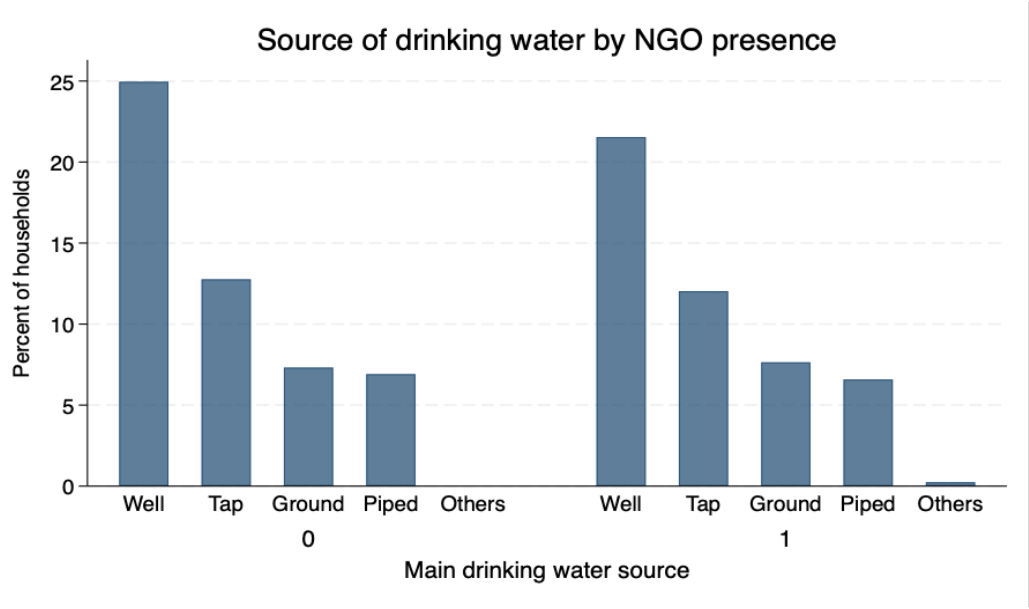


Figure 4.9. Source of Drinking Water by NPO Presence - Gumla

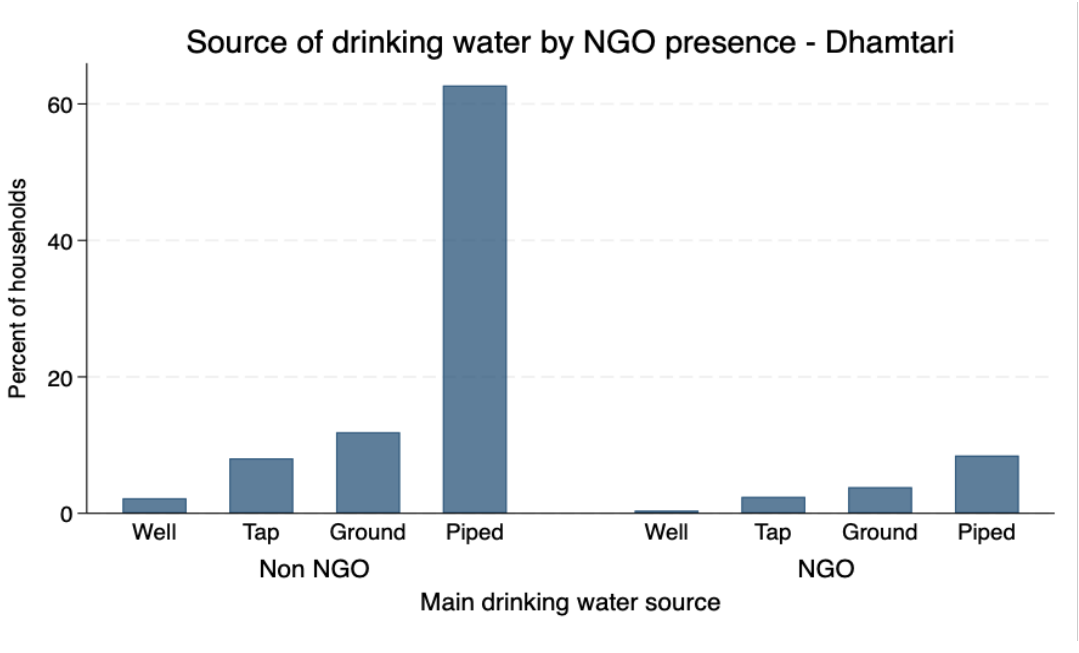


Figure 4.10. Source of Drinking Water by NPO Presence - Dhamtari

Taken together, these sample characteristics point to a clear difference between the two locations: Gumla's respondents are predominantly tribal and disproportionately housed in kuchcha dwellings, signalling deep structural deprivation despite some diversity in drinking-water sources. Dhamtari, while still focused on underserved groups such as OBCs, SCs, and STs, exhibits substantially better housing and more extensive piped water coverage.

4.2. Analysis - Agricultural Productivity

Our first two hypotheses, which emerge from CMO configurations, pertain to changes in agricultural productivity. We do so in two ways: first, by developing panel data for a satellite-based proxy estimate of agricultural productivity. The second is based on comparisons (t-tests) between PRADAN and non-PRADAN villages using the cross-sectional survey data. The former provides panel data estimates, while the latter provides important cross-sectional correlational patterns in productivity, migration, and income.

4.2.1. Remotely sensed vegetation index and agro climatic data

To measure agricultural productivity at the plot level, we computed the Normalised Difference Vegetation Index (NDVI) at a monthly frequency for each plot geometry for 2017–2024[5]. NDVI is defined as

$$NDVI = NIR - Red / NIR + Red'$$

[5] The analysis focuses on the 2017–2024 period because this is the first interval for which high-resolution (10 m) satellite imagery is consistently available to calculate plot-level NDVI with sufficient spatial precision and temporal regularity. At coarser resolutions, individual plots in smallholder settings are either mixed with neighbouring land uses or suffer from substantial measurement error due to mixed pixels, making NDVI a noisy and potentially biased proxy for agricultural productivity. Using 2017–2024 data therefore maximises comparability across plots and time, ensures that vegetation dynamics are observed at an agronomically meaningful scale, and allows a balanced monthly panel to be constructed across all treated and comparison villages.

where healthy vegetation absorbs more red light for photosynthesis and reflects more near-infrared (NIR) radiation. NDVI values lie between 0 and 1 in our setting; higher values indicate greater vegetation greenness and, by extension, higher crop vigour/productivity

NDVI is a well-established proxy for agricultural productivity when reliable ground-based or administrative yield data are unavailable, and prior studies show that it is strongly correlated with observed yield outcomes across diverse contexts (Akhoon et al., 2023; Asher & Novosad, 2020; Deininger et al., 2023; Jaafar & Woertz, 2016; Rampa & Lovo, 2023). Since our primary survey provides yield information only in cross-section, we construct a plot-by-month NDVI panel to study changes in agricultural productivity over time.

NDVI was computed using Sentinel-2 imagery (European Space Agency), which provides high-spatial-resolution (10 m) observations with a frequent revisit rate. To minimise noise from clouds and atmospheric conditions, we restricted the image stack to scenes with cloud cover $\leq$ 20% and retained the highest-quality observation available for each plot-month (when two scenes were available within a month). This procedure yields a balanced plot-by-month panel that we use as the main productivity outcome. To account for weather-related confounding and to improve precision, we also constructed time-varying climate controls for the same period. Rainfall was derived from CHIRPS, and temperature was sourced from TerraClimate data.

We estimate fixed-effects panel regressions to examine whether agricultural productivity differs between villages where PRADAN operates and comparable villages without PRADAN. Our outcome variable is agricultural productivity measured using monthly NDVI at the plot level. The key explanatory variable, PRADAN Presence, is a binary indicator that equals 1 if PRADAN is working in the village and 0 otherwise. We control for rainfall and temperature (recorded at plot centroids), since weather shocks and seasonal conditions can directly affect vegetation growth and NDVI. To account for unobserved heterogeneity, we include village fixed effects, which absorb time-

invariant village characteristics such as access to input markets, availability of extension infrastructure (e.g., KVKs), irrigation potential, road connectivity, and soil conditions. We also include month fixed effects to capture common seasonal patterns in NDVI that are shared across villages (for example, systematically lower NDVI in the early months of the agricultural cycle). Standard errors are clustered at the village×month level[6].

Our econometric specification is:

$$VI_{it} = \beta_0 + \beta_1 PRADAN\ Presence + \beta_2 Rainfall_{it} + \beta_3 Temperature_{it} + \delta_v + \lambda_t + \epsilon_{it}$$

where VI_{it} denotes the vegetation index (NDVI) for plot i observed in month t. $\delta_v\ and\ \lambda_t$ denote village and month fixed effects, respectively, and ϵ_{it} is an error term. The coefficient of interest is β_1, which captures the average difference in NDVI between PRADAN and non-PRADAN villages, conditional on weather controls and fixed effects.

Given that PRADAN's interventions in Gumla (late 1990s) and Dhamtari (from 2008) predate our remote-sensing window, the 2017–2024 estimates should be interpreted as capturing medium- to long-run differences in agricultural productivity between villages with and without sustained PRADAN presence, rather than short-run impact immediately after program roll-out. In other words, the coefficients indicate whether, after many years of potential engagement, PRADAN-supported villages exhibit systematically higher NDVI profiles than otherwise similar non-PRADAN villages,

[6] Standard errors are clustered at the village level because the identifying variation in PRADAN Presence and the main sources of unobserved shocks operate at that spatial unit, and observations within a village are therefore likely to exhibit correlated errors over time and across plots. Key omitted factors that drive NDVI - such as village governance, local market access, irrigation schemes, and common weather or pest shocks - operate at village level and induce correlation across all households and plots in that village. Village-level clustering correctly allows for arbitrary correlation within this relevant unit of aggregation, whereas household-level clustering would only allow correlation within households over time and ignore the strong cross-household dependence generated by shared village conditions. Moreover, PRADAN's interventions have operated by creating cross-household dependence by developing community based organizations of different types.

conditional on weather and fixed effects. This is valuable for assessing whether the organisation's agricultural and natural-resource interventions are associated with persistently greener, more productive fields in the steady state.

Table 4.6. reports the main results for Gumla. The outcome variable is productivity measured by log(NDVI). Column (1) presents pooled estimates using all months and indicates that annual productivity in PRADAN villages is higher: NDVI is about 0.8% higher relative to villages without PRADAN. Columns (2) and (3) disaggregate by season. Productivity differences are positive in both seasons, with NDVI about 0.7% higher during kharif and 3.6% higher during rabi in PRADAN villages. Overall, Table 4.6. suggests a positive association between PRADAN presence and NDVI-based agricultural productivity. Consistent with these patterns, qualitative insights from interviews indicate that PRADAN is actively engaged with households through agronomic advice and support for practices such as rainwater harvesting and improved cultivation methods.

Table 4.6. Season-wise Productivity. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI).

	(1)	(2)	(3)
VARIABLES	Annual Productivity	Kharif	Rabi
PRADAN Presence	0.008***	0.007***	0.036***
	(0.001)	(0.001)	(0.003)
Rainfall	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Temperature	-0.004***	-0.004***	-0.003***
	(0.000)	(0.000)	(0.001)
Observations	38,868	37,522	3,841
R-squared	0.654	0.659	0.680
Village Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Clustering	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.7. examines heterogeneity by household headship. Column (1) shows that male-headed households in PRADAN villages exhibit higher NDVI (about 1.1%) relative to male-headed households in non-PRADAN villages. In contrast, the corresponding estimates for female-headed households are negative. This divergence points to the

need for targeted support and stronger inclusion of female-headed households, who may face distinct constraints in access to labour, inputs, and information, as well as in decision-making power.

Table 4.7. Agricultural Productivity based on Head of the Household. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI)

	(1)	(2)
VARIABLES	MHH	FHH
PRADAN Presence	0.011***	-0.027***
	(0.001)	(0.004)
Rainfall	0.000***	0.000***
	(0.000)	(0.000)
Temperature	-0.004***	-0.004***
	(0.000)	(0.001)
Observations	34,703	4,097
R-squared	0.662	0.660
Village Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Clustering	Yes	Yes

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: MHH and FHH refer to male-headed and female-headed households, respectively. NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.8. splits the sample by elevation (lowland, midland, and upland). The results indicate sizable productivity gains in PRADAN villages, with NDVI about 4.4% higher than in non-PRADAN villages. Qualitative evidence also aligns with these findings, suggesting that PRADAN-supported practices may be particularly beneficial in more challenging agro-ecological settings.

Table 4.8. Agricultural Productivity Based on Elevation. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI)

VARIABLES	(1) Lowland	(2) Midland	(3) Upland
PRADAN Presence	0.0012 (0.0023)	0.0447*** (0.0036)	-0.0013 (0.0028)
Rainfall	0.0003*** (0.0000)	0.0004*** (0.0000)	0.0003*** (0.0000)
Temperature	-0.0047*** (0.0005)	-0.0033*** (0.0007)	-0.0044*** (0.0007)
Observations	21,878	7,755	9,167
R-squared	0.6922	0.6927	0.6378
Village Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Clustering	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.9. compares crop groups by classifying plots as cereals (e.g., rice, maize) or non-cereals (e.g., pulses, vegetables). Both categories show higher NDVI in PRADAN villages: cereals exhibit about a 1.2% increase, while non-cereals show about a 0.9% increase. These patterns suggest that productivity gains are not limited to one crop type.

Table 4.9. Agricultural Productivity by Crop Type. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI)

	(1)	(2)
VARIABLES	Cereals	Non-Cereals
PRADAN Presence	0.012***	0.009***
	(0.001)	(0.003)
Rainfall	0.000***	0.000***
	(0.000)	(0.000)
Temperature	-0.004***	-0.003***
	(0.000)	(0.001)
Observations	34,161	4,707
R-squared	0.666	0.671
Village Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Clustering	Yes	Yes

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.10. focuses on paddy plots and distinguishes three cultivation methods reported in the survey: (i) direct seeding without nursery, (ii) nursery with System of Rice Intensification (SRI), and (iii) nursery without SRI. The estimates show positive differences for direct seeding and nursery without SRI (about 0.7% and 1.0% higher NDVI, respectively). The SRI category does not show comparable gains, suggesting implementation constraints or a need for more targeted support to realise the benefits of SRI practices. This formed one of PRADAN's initial intervention strategies and has proved to have had long-standing effects.

Table 4.10. Agricultural Productivity by Paddy Cultivation Method. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI)

	(1)	(2)	(3)
VARIABLES	Direct Seeding	Nursery with SRI	Nursery without SRI
PRADAN Presence	0.007**	-0.008	0.010***
	(0.003)	(0.006)	(0.002)
Rainfall	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Temperature	-0.003***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.000)
Observations	2,762	4,837	22,371
R-squared	0.738	0.687	0.685
Village Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Clustering	Yes	Yes	Yes

Notes: NDVI refers to the Normalised Difference Vegetation Index.PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.11. analyses whether effects vary by land fragmentation. Using survey responses on the total number of plots owned, we classify households as non-fragmented if they have 1-2 plots and fragmented if they have 3 or more plots. Productivity gains differ across these groups: NDVI is about 1.2% higher for fragmented households in PRADAN villages and about 3.2% higher for non-fragmented households. This pattern is consistent with the idea that fragmented holdings can raise coordination costs and reduce the feasibility of adopting productivity-enhancing practices at scale.

Table 4.11. Agricultural Productivity by land fragmentation. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log (NDVI)

VARIABLES	(1) Fragmented	(2) Non-Fragmented
PRADAN Presence	0.012***	0.032***
	(0.002)	(0.003)
Rainfall	0.000***	0.000***
	(0.000)	(0.000)
Temperature	-0.004***	-0.005***
	(0.001)	(0.001)
Observations	12,809	13,041
R-squared	0.726	0.676
Village Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Clustering	Yes	Yes

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Finally, Table 4.12 reports estimates separately for irrigated and rainfed plots. The results indicate a 1.2% increase in NDVI for rainfed plots in PRADAN villages (Column 2), highlighting PRADAN's potential to reduce exposure to rainfall risk through interventions such as water harvesting and improved moisture management. For irrigated plots, productivity differences between PRADAN and non-PRADAN villages appear smaller, suggesting that gains may be concentrated where baseline risk and constraints are greater.

Table 4.12. Agricultural Productivity by irrigation status. NDVI Estimates - Gumla

Outcome Variable is Productivity Measured by log(NDVI)		
	(1)	(2)
VARIABLES	Irrigated	Rainfed
PRADAN Presence	-0.000	0.012***
	(0.000)	(0.001)
Rainfall	0.000	0.000***
	(0.000)	(0.000)
Temperature	-0.005	-0.005***
	(0.000)	(0.000)
Observations	1,224	24,626
R-squared	0.698	0.691
Village Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Clustering	Yes	Yes

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

Table 4.13. reports the fixed-effects panel estimates for Dhamtari. Unlike the patterns observed in Gumla, we do not find evidence of higher NDVI-based agricultural productivity in villages with PRADAN presence compared with those without. If anything, the point estimates suggest that productivity in PRADAN villages is modestly lower than in non-PRADAN villages. A plausible explanation is program placement: PRADAN may have initially targeted relatively poorer-performing or more constrained villages, and these baseline disadvantages could continue to be reflected in productivity outcomes even after controlling for time-invariant village characteristics. In addition, PRADAN's presence in Dhamtari is more recent than in Gumla, and

productivity impacts may take longer to materialise. Given that the baseline (pooled) estimates for Dhamtari do not indicate positive differences, we do not pursue further heterogeneity analyses for Dhamtari analogous to the sub-sample results presented for Gumla.

Table 4.13. Season-wise Productivity. NDVI Estimates - Dhamtari

Outcome Variable is Productivity Measured by log (NDVI)

	(1)	(2)	(3)
VARIABLES	Annual Productivity	Kharif	Rabi
PRADAN Presence	-0.017***	-0.012***	-0.027***
	(0.004)	(0.003)	(0.006)
Rainfall	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Temperature	-0.016***	-0.016***	-0.016***
	(0.001)	(0.001)	(0.001)
Observations	24,499	24,371	12,620
R-squared	0.431	0.440	0.429
Village Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Clustering	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: NDVI refers to the Normalised Difference Vegetation Index. PRADAN Presence is a binary indicator equal to 1 if PRADAN is working in the village and 0 otherwise. Standard errors are clustered at the village#month year level.

To translate the NDVI differences documented in PRADAN villages into interpretable changes in crop yields, we use district-level yield statistics of Jharkhand state published by the Ministry of Agriculture and Farmers Welfare.2 In parallel, we construct a district-

month NDVI series by aggregating NDVI pixels within each district boundary to obtain an administrative-scale measure that is directly comparable to official yield data. We then estimate a district-level panel regression that relates administrative yield (tonnes per hectare) to district NDVI, controlling for rainfall and temperature, and including district and time fixed effects. This specification allows us to quantify the empirical relationship between NDVI and on-the-ground yield in the context of Jharkhand while accounting for time-invariant district differences and common time shocks. The estimates in Table 4.14 confirm that NDVI is strongly correlated with administrative yield: a one-unit increase in NDVI is associated with a 4.45-tonne-per-hectare increase. Using this estimated mapping, we convert the NDVI effects reported in the main results tables into yield-equivalent impacts. Specifically, Table 4.15. reports (i) the NDVI coefficients from our main specification outlined above (expressed in non-log form for comparability across specifications for conversions) and (ii) the corresponding implied yield changes. The implied yield effect is calculated by multiplying the NDVI estimate by 4.45 to obtain tonnes per hectare, then multiplying by 10 to express it in quintals per hectare. Overall, the yield-equivalent gains associated with PRADAN's presence range from about 0.4 to 2.7 quintals per hectare, as summarised in Table 4.15.

Table 4.14. Conversion Factor NDVI to Yield

VARIABLES	(1) Yield(tonnes/hectare)
NDVI	4.454***
	(1.467)
Rainfall	0.002
	(0.003)
Temperature	2.062
	(3.899)
Observations	118
R-squared	0.763
District Fixed Effects	Yes
Year Fixed Effects	Yes

*** p<0.01, ** p<0.05, * p<0.1

Notes: The coefficients are presented in non-logarithmic form. Standard errors are reported in parentheses.

Table 4.15. Conversion of NDVI to Yield in quintal/ hectare

Particulars	NDVI	Yield (quintal/hectare)
Based on the season		
Kharif	0.01	0.4
Rabi	0.03	1.3
Based on the gender of the Head of Household		
Male Headed Household	0.01	0.4
Based on Elevation		
Midland	0.06	2.7
Based on Crops		
Cereals	0.02	0.9
Non-Cereals	0.01	0.4
Based on the Paddy Cultivation Method		
Direct Seeding	0.01	0.4
Nursery Without SRI	0.01	0.4
Based on Irrigation		
Rainfed	0.02	0.9
Based on Land Fragmentation		
Fragmented	0.01	0.4
Non-Fragmented	0.04	1.8

Across all specifications for Gumla, PRADAN presence is associated with modest but robust long-run gains in agricultural productivity, whereas no such gains are visible in Dhamtari.

In the pooled Gumla panel, PRADAN villages show NDVI about 0.8% higher than comparable non-PRADAN villages; using the calibrated NDVI–yield mapping, this translates into an average long-run yield gain of roughly 0.4 quintals per hectare per

year. Seasonally, effects are positive in both kharif and rabi, with particularly pronounced gains in rabi: a 3.6% higher NDVI implies an increase of about 1.6 quintals per hectare in the dry season, suggesting that PRADAN's water-harvesting and agronomic support are especially valuable when moisture stress is binding.

Heterogeneity analyses show that these productivity gains are not uniform. Among male-headed households, PRADAN presence is associated with about 1.1% higher NDVI (around 0.5 quintals per hectare), whereas female-headed households exhibit lower NDVI than their non-PRADAN counterparts, indicating that women farmers have not yet fully benefited from programme support. By elevation, the largest benefits occur in midland plots, where NDVI is higher by about 4.5% - equivalent to roughly 2.0 - 2.1 quintals per hectare - pointing to sizable, long-run gains in more challenging agro-ecologies.

Crop-wise, PRADAN villages see NDVI gains of about 1.2% for cereals and 0.9% for non-cereals, corresponding to yield increases of roughly 0.5 and 0.4 quintals per hectare, respectively, indicating broad-based improvements rather than crop-specific effects. For paddy, direct seeding and nursery-without-SRI methods show NDVI gains of 0.7 and 1.0% (around 0.3–0.4 quintals per hectare), while SRI plots do not exhibit clear productivity advantages, suggesting implementation or scaling constraints for SRI in this context.

Land fragmentation results suggest stronger gains among households with fewer plots: non-fragmented holdings show about a 3.2% NDVI increase - roughly 1.4–1.5 quintals per hectare - compared with around 1.2% (≈0.5 quintals per hectare) for fragmented households, consistent with the idea that consolidated plots make it easier to adopt and sustain improved practices. Finally, NDVI gains are concentrated in rainfed plots, where a 1.2% increase corresponds to about 0.5 quintals per hectare; irrigated plots show essentially no differential, implying that PRADAN is particularly effective at raising long-run productivity where baseline water risk is high.

Thus, overall, we find evidence supporting H1a in Gumla, i.e., PRADAN villages see increased agricultural productivity in the long run.

4.2.2. Survey Data Analysis - Agricultural Incomes, Productivity and Migration

In Gumla, agricultural incomes are consistently higher in NPO villages than in non-NPO villages across almost all seasons, with especially statistically significant differences in Kharif and total agricultural income. Kharif earnings rise from roughly the upper ₹20,000s in non-NPO villages to the Rs 30,000 in NPO villages, and confidence intervals overlap only slightly, indicating a substantively and statistically meaningful gap. Rabi incomes are lower in absolute terms but still somewhat higher in NPO locations, while summer incomes remain close to zero everywhere, reflecting severe water constraints. Horticultural income is small but marginally higher in NPO villages, suggesting limited diversification into higher-value crops. Aggregating across seasons, total agricultural income is markedly higher in NPO villages - around the low ₹30,000s versus a little above ₹20,000 in non-NPO areas - corroborating NDVI-based evidence that long-run productivity gains in PRADAN villages translate into meaningful income differences.

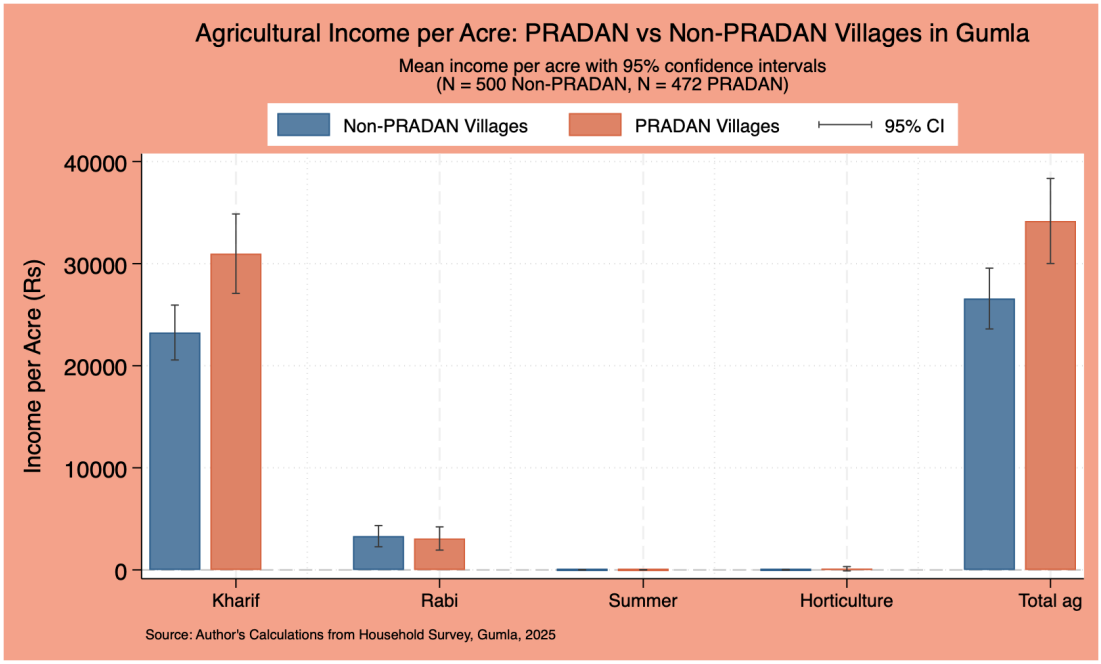


Figure 4.11. Differences in agricultural income by NPO Presence - Gumla

In Dhamtari, both NPO and non-NPO villages exhibit higher overall agricultural incomes than in Gumla, but NPO villages still hold an advantage across seasons. Kharif incomes in non-NPO villages are around Rs 40000, and in the mid-₹30,000s in NPO villages, with overlapping but clearly upward-shifted confidence intervals. Rabi earnings are substantial for both groups and slightly higher for NPO villages, consistent with better irrigation and double-cropping, while NPO villages also register small but noticeable summer incomes, unlike Gumla. Horticulture remains a negligible share across regions, suggesting that high-value crop diversification remains limited despite stronger water control. Total agricultural income reaches about ₹50,000 in non-NPO villages and roughly ₹45,000 in NPO villages, indicating sizable absolute differences. Combined with NDVI results showing no clear productivity edge for PRADAN villages here, these income gaps likely reflect cropping choices and market integration rather than purely higher yields.

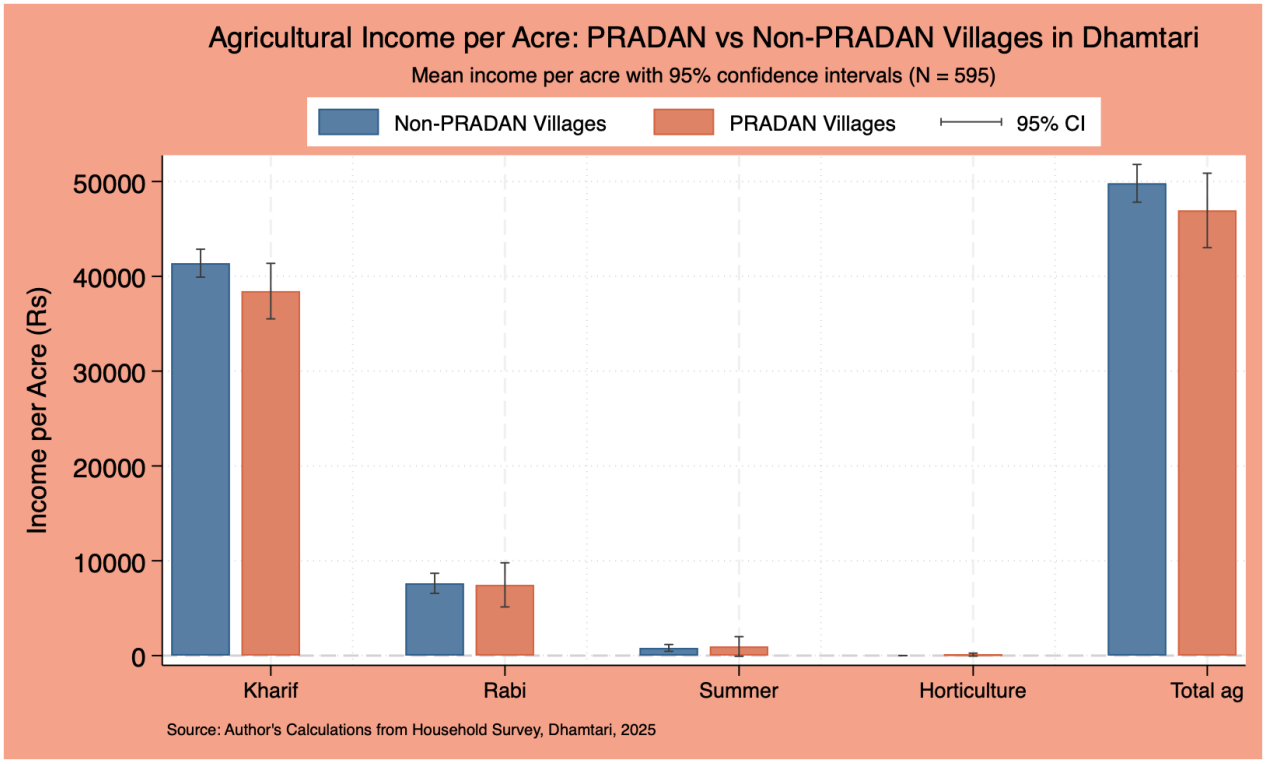


Figure 4.12. Differences in agricultural income by NPO Presence - Dhamtari

In Gumla, almost the entire cultivated area of the main plot is used for Kharif crops across all topographic positions, with both NPO and non-NPO villages reporting percentages in the mid- to high-90s. Upland plots in NPO villages appear to have slightly higher Kharif coverage than those in non-NPO villages, but the confidence intervals overlap substantially, suggesting that this difference is not statistically significant. This could be indicative of the horticultural work undertaken by PRADAN in the last one and a half decades. In midland and lowland plots, Kharif coverage is essentially identical between NPO and non-NPO areas, again with overlapping intervals and means clustered close to 98–100%. Overall, these figures indicate that PRADAN's presence in Gumla does not operate through expanding the share of land under Kharif cultivation on the primary plot, which is already near saturation; instead, productivity and income differences are more likely driven by changes in practices and input use. This is essentially the argument we had also corroborated qualitatively: that scientific cultivation practices have probably led to the observed differences.

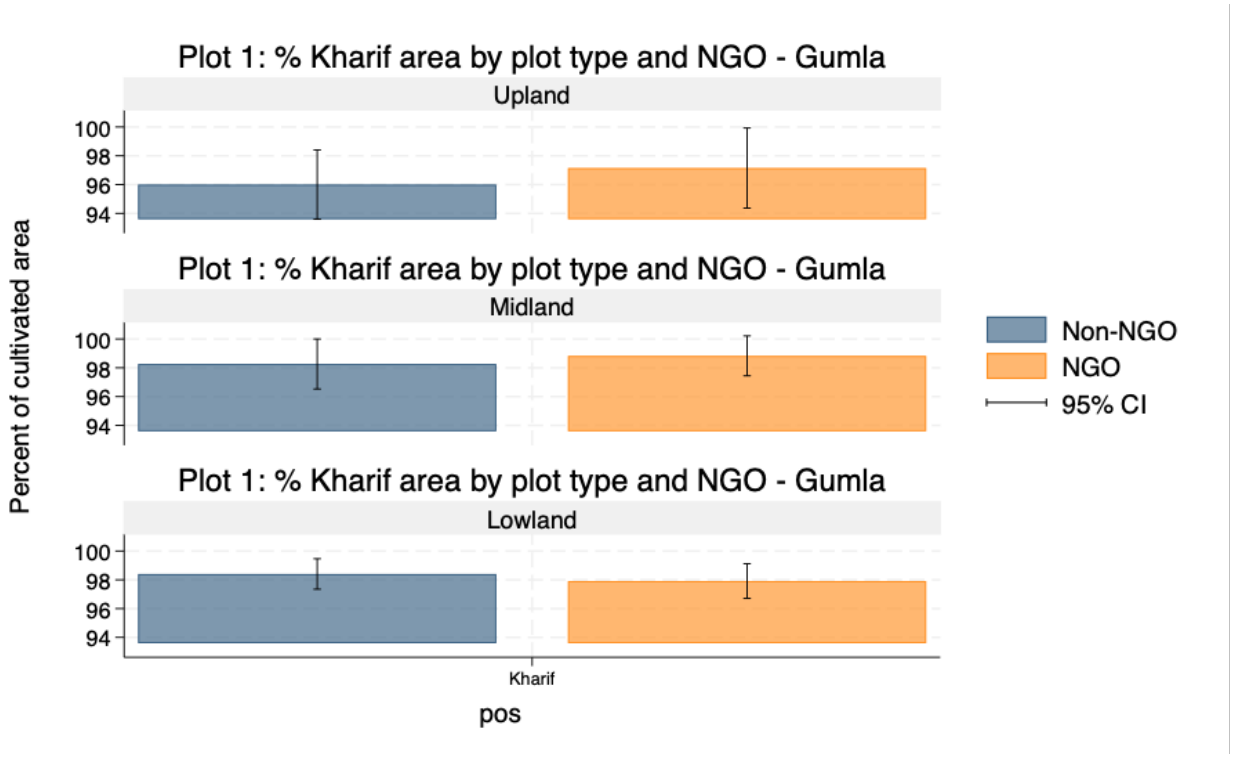


Figure 4.13. Differences in agricultural productivity by plot location - Gumla

In Dhamtari, similarly, we see very high Kharif coverage on the main plot across upland, midland, and lowland positions, with percentages close to or slightly above 100 % for both NPO and non-NPO villages, reflecting near-universal monsoon cultivation. Upland and midland plots in NPO villages have Kharif shares that are visually similar to those in non-NPO villages, and the 95% confidence intervals overlap almost completely, indicating no statistically meaningful difference in the extent of Kharif land use. In the lowlands, Kharif coverage is again extremely high in both groups, with NPO villages possibly marginally higher but well within overlapping confidence bands. Taken together, the Dhamtari plots reinforce the pattern seen in Gumla: PRADAN's presence does not significantly alter the proportion of main-plot area under Kharif cultivation, which is effectively saturated everywhere. Any observed differences in NDVI or agricultural income between NPO and non-NPO villages in Dhamtari, therefore, arise from differences in intensity or quality of cultivation, not from the extensification of Kharif-cropped area.

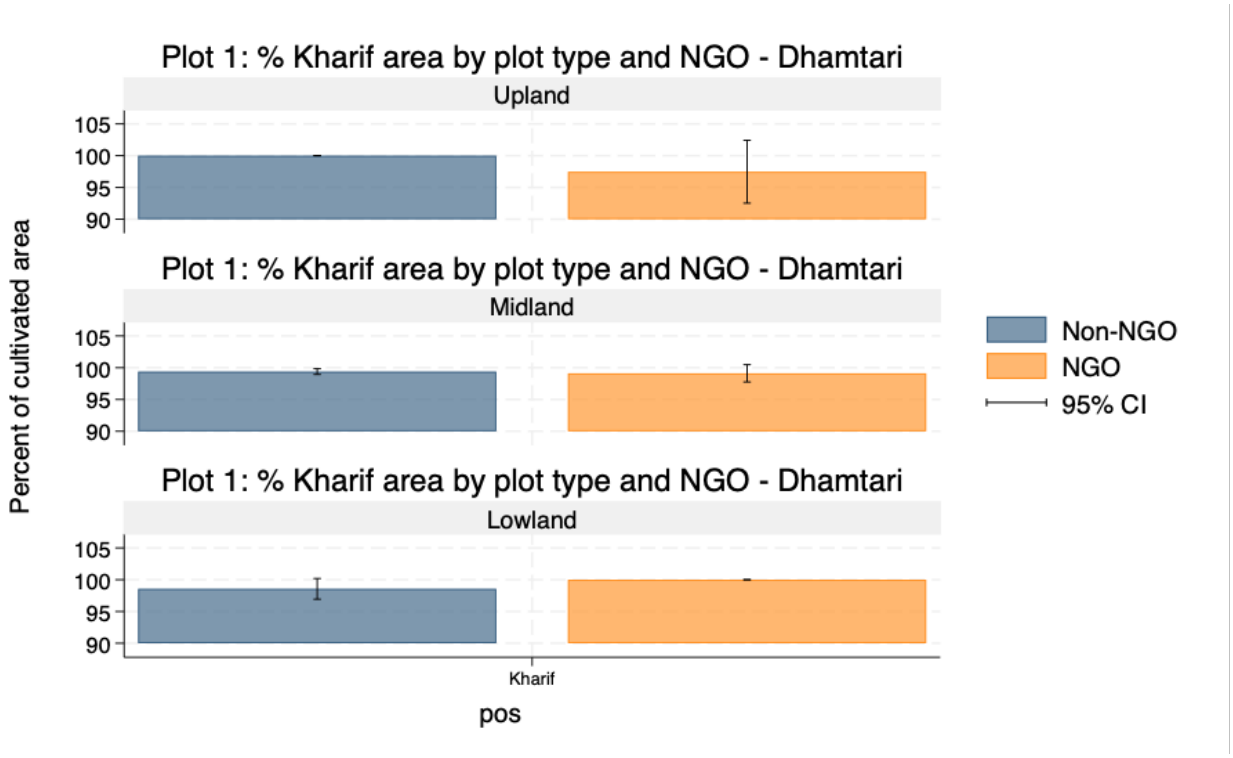


Figure 4.14. Differences in agricultural productivity by plot location - Dhamtari

Next, we analyse the data pertaining to migration. Migration from Gumla is strongly age-selective and reason-specific, with broadly similar patterns across NPO and non-NPO villages, but with notable nuances by programme presence, gender, and type of work. In both sets of villages, migration is overwhelmingly a youth and prime-age phenomenon: for moves motivated by "better employment," around 58% of migrants in NPO villages and 67 percent in non-NPO villages are 18–29, while roughly 37 and 25% respectively are 30–44; virtually no migrants are above 60, and very few fall below 18. This indicates that longer-term, aspirational labour migration is largely undertaken by young adults, with a slightly more youth-skewed profile where NPO support is absent, *suggesting earlier entry into migration streams in non-NPO areas*. Brick-kiln and construction migration show a similar age concentration, but with an even clearer gendered pattern: these physically demanding jobs are dominated by men in the 18–44 cohort, and female participation is markedly lower than in other forms of migration, reflecting constraints linked to physical intensity, living conditions at worksites, and women's continuing responsibility for unpaid care and on-farm work at home.

In NPO-supported villages, about 61% of construction migrants are 18–29, and 24 per cent are 30–44, whereas in non-NPO villages, the age distribution is somewhat older, with roughly 46% in 18–29, 38% in 30–44, and 14% in 45–59, implying a greater reliance on older workers where alternative opportunities are thinner. When migration purposes are compared within age cohorts, the hierarchy of reasons is strikingly stable across NPO and non-NPO settings: in the 18–29 and 30–44 groups, better employment is the dominant motive everywhere, followed by brick-kiln and construction work as key secondary reasons; harvest-related and tourism-related movements are numerically small and concentrated among the same working-age adults.

NPO villages show slightly lower reliance on brick-kiln work and a somewhat higher share of construction and other better-quality employment within the younger cohort, while non-NPO areas lean more heavily on brick kilns, hinting at marginal improvements

in the composition rather than the scale of migration under PRADAN presence. Among older adults aged 45–59, migration is rarer but still present, again mainly for construction and brick-kiln employment in both NPO and non-NPO villages, with non-NPO locations exhibiting a somewhat larger fraction of older migrants, consistent with more prolonged dependence on physically arduous wage work. For children and adolescents (0–17) and the elderly (60+), migration of any kind is negligible, and where such moves are reported, they typically involve the accompaniment of working-age relatives rather than independent labour migration, with no systematic difference by NPO status.

Overall, these patterns suggest that PRADAN's presence in Gumla does not fundamentally alter who migrates by age, nor the broad ranking of migration motives, but is associated with a modest shift away from harsh brick-kiln employment among younger adults and towards slightly more diversified or better-quality employment, while persistently lower female participation in both brick-kiln and better-employment migration underscores the gendered constraints that remain largely unaddressed. No comparable age- or reason-specific differences between NPO and non-NPO villages are observed in Dhamtari, where migration profiles by cohort and purpose are broadly similar across programme status. Thus, we do not find evidence to support H1b, which linked the increased agricultural productivity to lower seasonal migration in PRADAN villages.

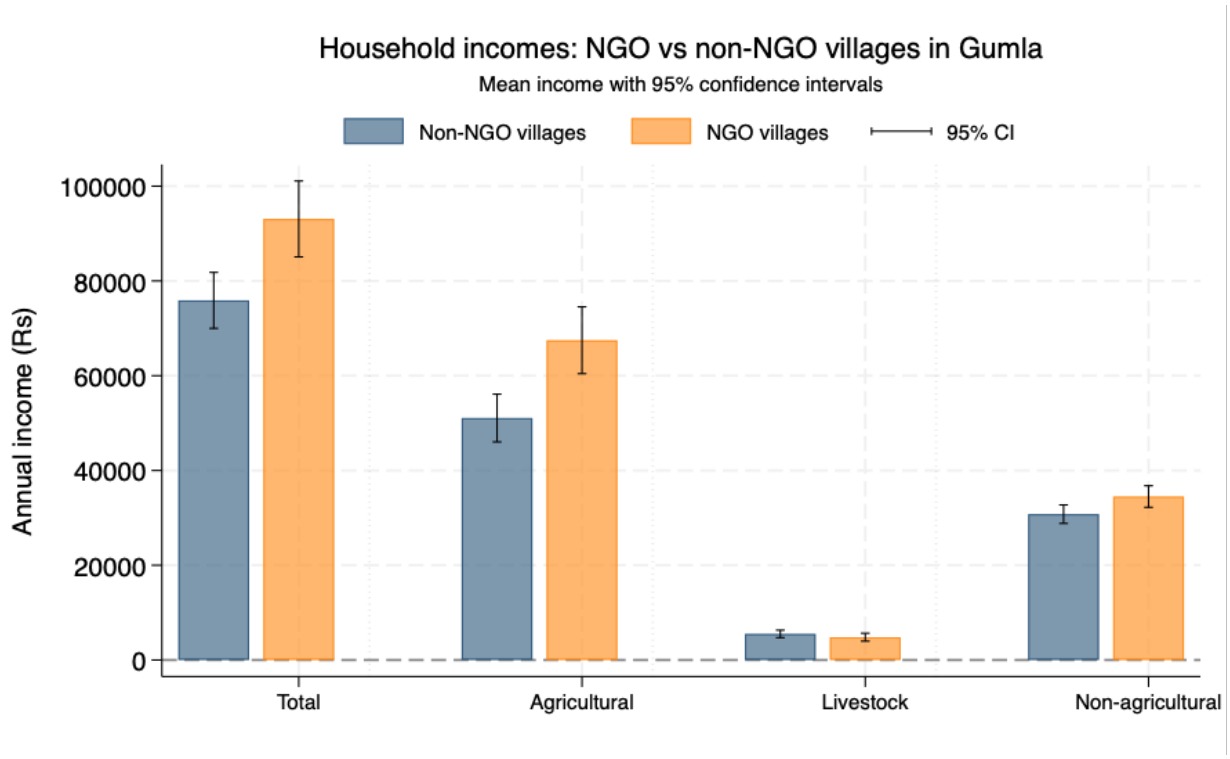


Figure 4.15. Differences in total household income - Gumla

Lastly, we check annual household incomes from different sources across PRADAN and non-PRADAN villages. In Gumla, households in NPO villages earn consistently higher incomes than those in non-NPO villages across all components, with the clearest differences in total and agricultural income. Mean total income rises from roughly the mid-₹70,000s in non-NPO villages to the low-₹90,000s in NPO villages, with a statistically meaningful gap. Agricultural income follows a similar pattern, increasing from just above ₹50,000 to around ₹68,000–₹70,000. Non-agricultural income is modestly higher in NPO villages, whereas livestock income remains very small for both groups, and the confidence intervals largely overlap, implying no clear difference in that component. Overall, in Gumla, PRADAN-type interventions are associated mainly with higher crop-based earnings, complemented by modest gains in non-farm work, leading to a sizable uplift in total household income relative to non-NPO villages.

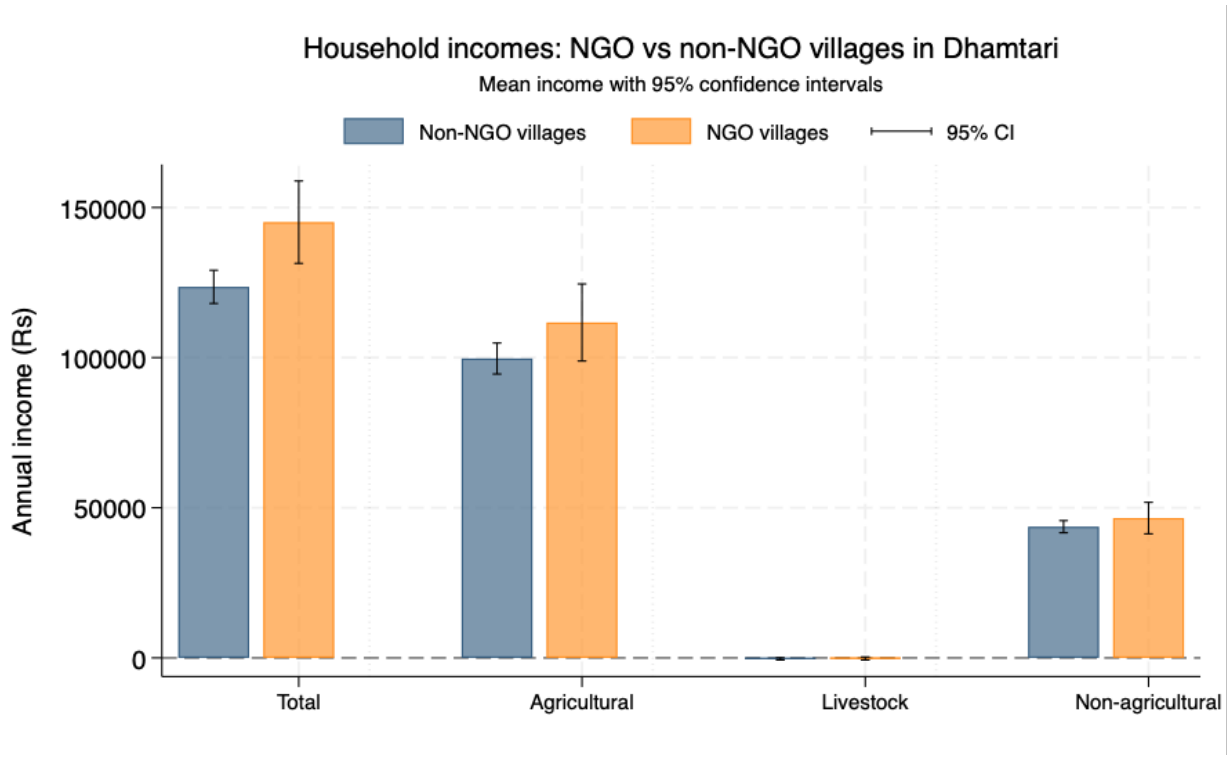


Figure 4.16. Differences in total household income - Dhamtari

In Dhamtari, income levels are higher overall than in Gumla, but the NPO–non-NPO pattern is more muted. Total income is around ₹120,000 in non-NPO villages and rises to roughly ₹145,000 in NPO villages, indicating a positive yet less sharply estimated NPO advantage. Agricultural income also increases from about ₹100,000 to ₹112,000–₹115,000 in NPO villages, again without statistical significance. Non-agricultural income is very similar across NPO status, with nearly identical means and overlapping confidence bands, suggesting that non-farm opportunities are shaped more by the broader local economy than by programme presence. Livestock income is negligible in both groups. NPO villages in Dhamtari enjoy somewhat higher total and agricultural incomes in absolute terms, but the differences are smaller and less statistically robust than those observed in Gumla.

Thus, we find evidence supporting H2 only in Gumla: households in PRADAN villages are likely to have higher incomes than those in non-PRADAN villages.

4.3. Analysis - Gender

We created five indices to provide a multidimensional picture of women's empowerment that runs from individual capabilities to collective influence (Table 4.16). The Resource Access Index captures how freely a woman can move to essential services, participate in local forums, access and control money, and stay informed about state support. Higher scores here mean that women can independently visit markets and health centres, attend meetings, learn about schemes, and manage their income in their own name. The Self-Efficacy Index, built with PCA from questions on confidence, voice and civic engagement, measures a woman's internal sense of agency: whether she feels able to speak up in family discussions, disagree respectfully, be included in major decisions, vote independently, and attend gram sabha or community meetings when issues matter to her household. Higher values indicate that women not only have formal access to spaces but also believe they can use those spaces effectively. The Household Influence Index (labelled as "Household" or "Household decisions" in the graphs) focuses more narrowly on financial and collective decision-making: say over large purchases, responses to financial emergencies, day-to-day budgeting, and local priority-setting. High scores mean women are either equal or leading decision-makers on these fronts and speak often and proactively about community problems, including through collective action.

Table 4.16. Empowerment Indices

Subsection		Full Question Text	Coding Scheme	Analysis Type
Resource Access Index	1	How freely can you visit the market, health centre, or other essential places without permission?	1=Not at all allowed; 5=Completely free to go anytime	Mean
	2	How often do you attend community meetings or women's groups on your own?	1=Never; 5=Always	
	3	How informed are you about government schemes or services available to women in your area?	1=Not informed at all; 5=Very well informed	
	4	How easily can you access or save money in your name without seeking permission?	1=Not at all; 5=Completely independently	
	5	How much control do you have over how your personal income is used?	1=No control; 5=Full control	
Self-Efficacy Index	1	How confident are you to speak up during family discussions that affect your life?	1=Not confident at all; 5=Fully confident and assertive	PCA
	2	How freely can you express disagreement with family members in a respectful way?	1=Not at all; 5=Always freely	
	3	How often do others in your family involve you in important decisions?	1=Never; 5=Always	
	4	How confident are you in choosing whom to vote for without being influenced by others?	1=Not confident at all; 5=Completely confident and independent	
	5	How willing are you to attend a community or gram sabha meeting if it affects your household or village?	1=Not willing; 5=Very willing and proactive	
Structural Decisions Index	1	Who decides how the money you earn will be used?	1=Mainly husband; 2=Jointly; 3=Mainly You	Mean
	2	Who usually makes decisions about healthcare for yourself?	1=Husband/Someone Else; 2=Jointly; 3=Mainly You	
	3	Who usually makes decisions about major household purchases?	1=Husband/Someone Else → 2=Jointly → 3=Mainly You	
Mobility Index	1	Are you usually allowed to go to markets (within village)?	1=Not at all; 2=With Someone Else Only; 3=Alone	PCA
	2	Are you usually allowed to go to the health facility?	1=Not at all; 2=With Someone Else Only; 3=Alone	
	3	Are you usually allowed to go to places outside the village?	1=Not at all; 2=With Someone Else Only; 3=Alone	
Household Influence Index	1	How much influence do you feel you have in decisions about large household purchases?	1=No influence; 5=Complete authority or equal say	Mean
	2	If a financial emergency occurred, how much say would you have in deciding how to handle it?	1=No say; 5=Final say or joint final decision	
	3	How much control do you have over the household's day-to-day financial planning?	1=No control; 5=Full control	
	4	How much influence do you feel you have in setting priorities at the village or community level?	1=No influence; 5=Very strong influence and leadership role	
	5	How often do you engage in discussions about community issues (like safety, water, jobs) with others?	1=Never; 5=Very frequently and proactively	
	6	How often do you participate in collective activities to raise demands for services?	1=Never; 5=Very frequently and proactively	

In contrast, the Structural Decisions Index shifts attention from perceived influence to who formally makes key decisions about a woman's own earnings, her health care, and major household purchases. Here, moving from "mainly husband" to "jointly" to "mainly you" directly reflects shifts in intra-household power structures; higher scores signify that women's preferences are structurally embedded in decision rules rather than depending solely on negotiation or goodwill. Finally, the Mobility Index uses PCA on questions about whether a woman can travel to markets, health facilities and outside-village locations not at all, only with an escort, or alone. This index captures norms and restrictions around physical movement, which often condition access to work, services and social networks. Together, these indices enable the analysis to differentiate among women who have some nominal say but limited mobility or resources, those who enjoy mobility and resources but lack confidence or structural authority, and those who are empowered across all dimensions.

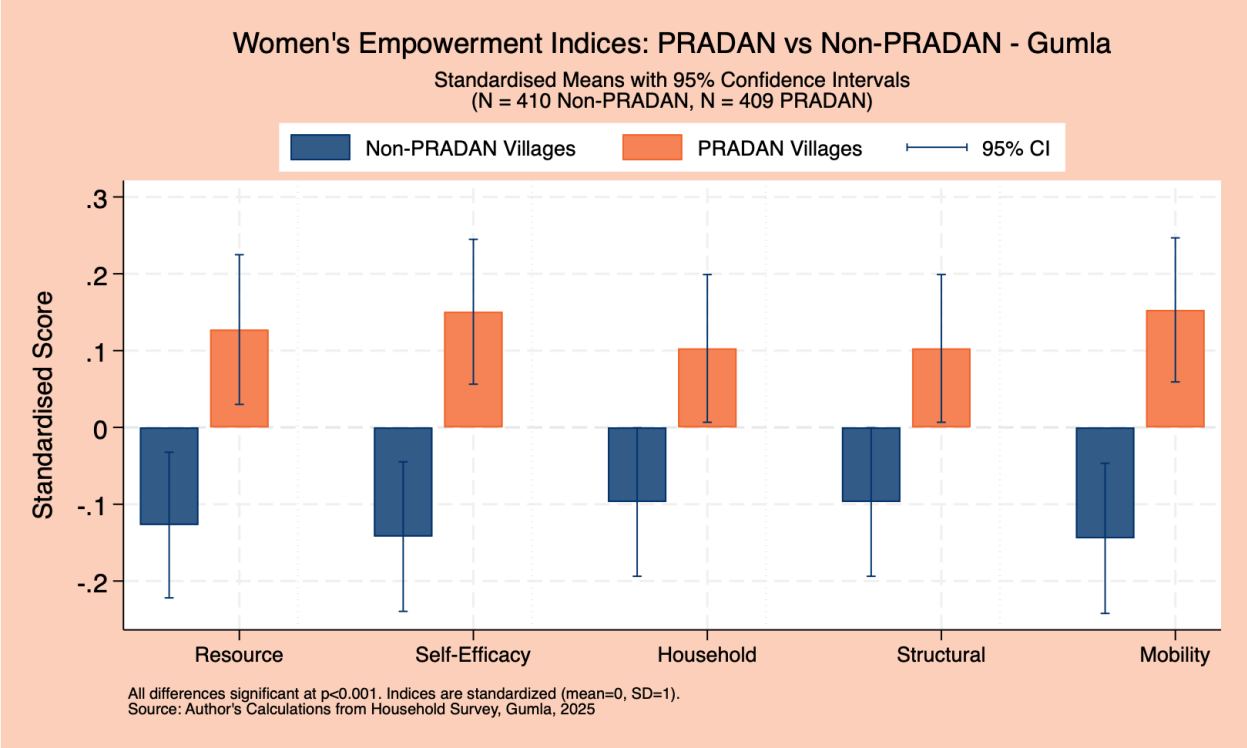


Figure 4.17. Women's Empowerment Indices- Gumla

In Gumla, women in PRADAN villages score uniformly and significantly higher than women in non-PRADAN villages on every empowerment index: resources, self-efficacy, household influence, structural decisions, and mobility. Since all indices are standardised (mean 0, SD 1), PRADAN women are roughly 0.2–0.25 SD above the sample mean in each domain, while non-PRADAN women lie about 0.15–0.2 SD below it, implying a total gap of around 0.35–0.45 SD per index. This pattern suggests that PRADAN's presence is associated not only with greater practical access to money, information and public spaces, but also with stronger internal confidence, more equal say over major economic and health decisions, and formalised shifts towards joint or female-led decision-making at the household level. The mobility index is also substantially higher, indicating that empowered movement to markets, health facilities and outside-village locations is an important channel through which these gains materialise.

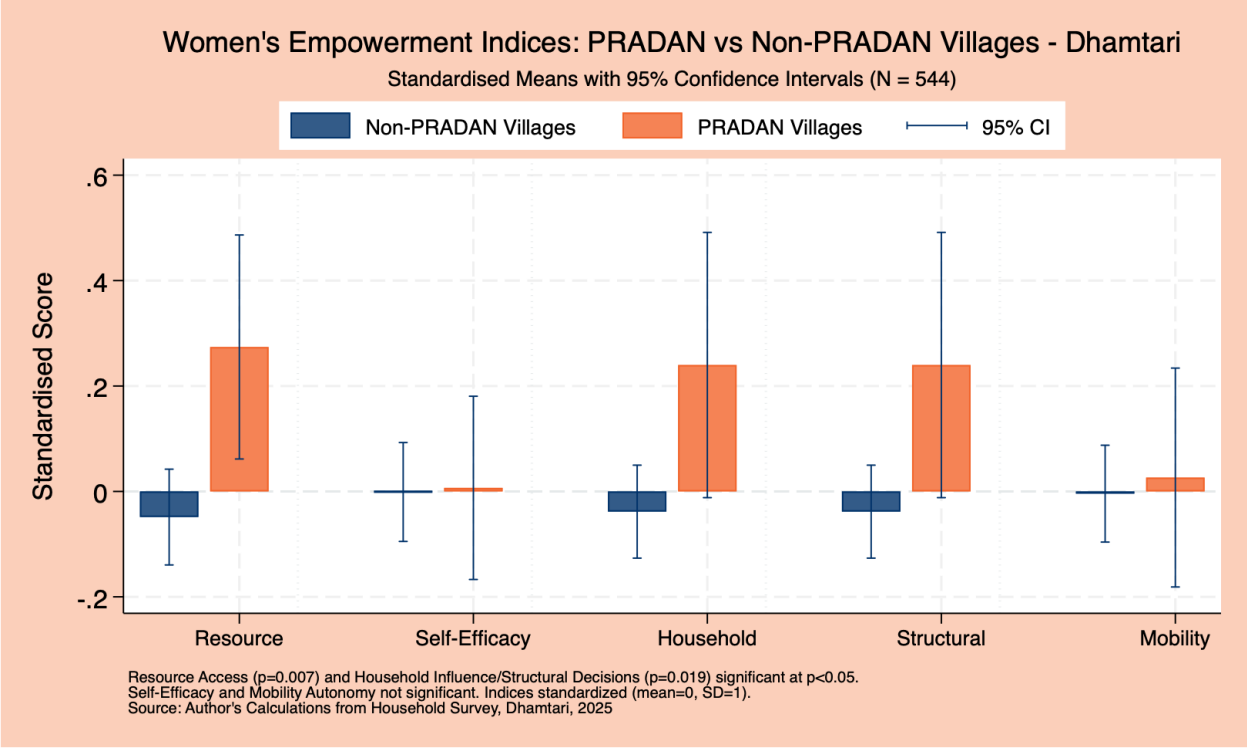


Figure 4.18. Women's Empowerment Indices- Dhamtari

In Dhamtari, PRADAN villages again exhibit higher standardised scores than non-PRADAN villages on resources, self-efficacy, household influence, and structural decisions, with differences of roughly 0.3–0.4 SD, indicating strong, statistically significant gaps. Women in PRADAN villages report greater independent access to money and information, higher confidence to speak, vote and act collectively, and more decisive roles in spending decisions and health-care choices. However, the mobility index shows a different pattern: non-PRADAN women sit slightly above zero, while PRADAN-village women lie modestly below, and the confidence intervals overlap more, suggesting no clear or even slightly negative effect on freedom of movement. This contrast implies that PRADAN's strongest contributions in Dhamtari have been in economic, cognitive and structural empowerment, whereas deep-seated mobility norms have been slower to shift and may require more direct, norm-focused interventions. This would also imply that mobility dimensions require significant time to manifest as changes.

In Dhamtari, women's time-use profiles show that PRADAN's presence is associated with a modest reallocation of time, but not a dramatic reduction in unpaid care burdens. Women in PRADAN-supported villages spend slightly more of their day on unpaid care (around 29–30%) than women in non-PRADAN villages (about 26%), with this increase being statistically meaningful. This likely reflects both continued responsibility for water collection, childcare and household tasks and possibly higher standards of care in better-off households. At the same time, women in PRADAN villages devote somewhat less time to income-generating work (roughly 14–15% versus 18% in non-PRADAN villages), with overlapping but clearly shifted confidence bands, indicating a small but noticeable reduction in direct income work. However, leisure time is slightly higher in PRADAN villages (around 16–17% compared with 15%), suggesting some gains in discretionary time that may be used for rest, meetings or social activities. Time spent on travel and maintenance (including commuting, fetching inputs and other chores outside the home) is very similar across programme status - about 40–41% of the day - with overlapping confidence intervals, indicating

that improvements in empowerment and incomes have not yet translated into shorter travel or drudgery-related time burdens. Overall, PRADAN's work in Dhamtari appears to have strengthened women's agency and incomes without substantially lightening their daily care and mobility work, resulting in a "double burden" in which gains in empowerment coexist with persistent time poverty.

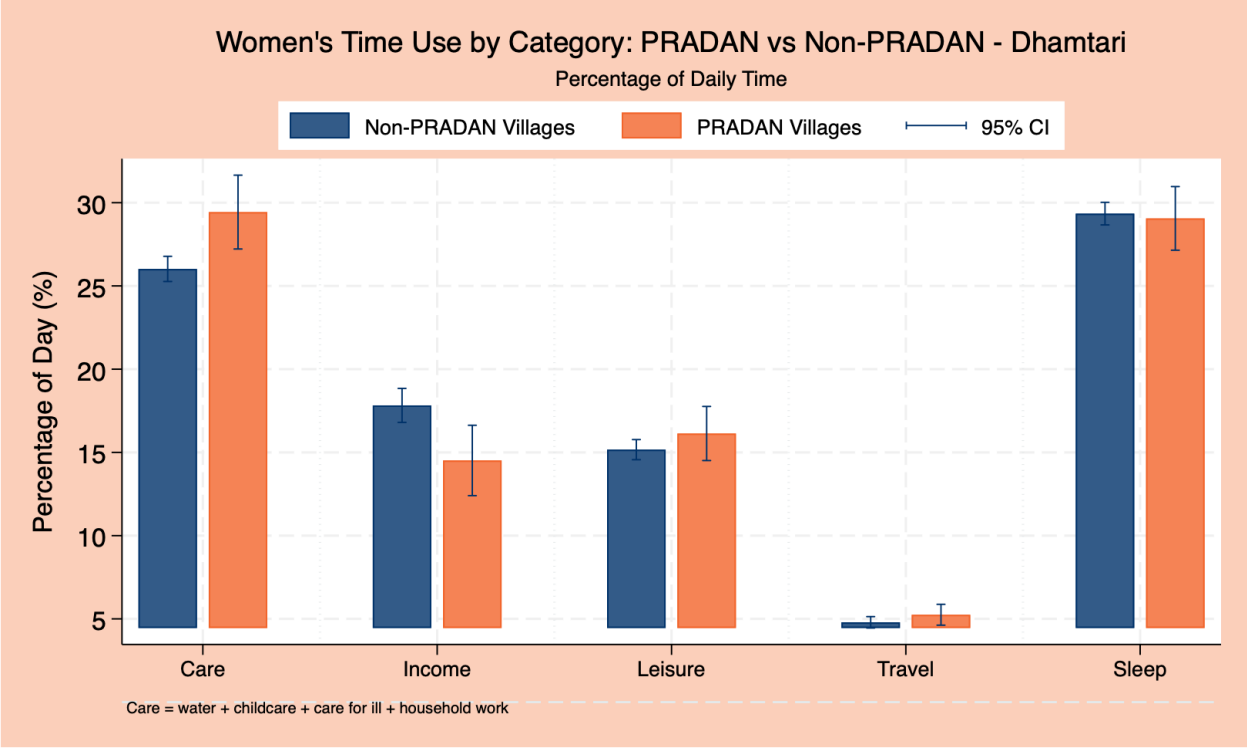


Figure 4.19. Women's Time Use Analysis- Dhamtari

In Gumla, the time-use charts show a different pattern: PRADAN is associated with a shift from unpaid care to income work, alongside small increases in travel and maintenance time. Women in non-PRADAN villages spend close to 30 per cent of the day on unpaid care, whereas this falls to about 26–27% in PRADAN villages, with non-overlapping or barely overlapping confidence intervals, indicating a statistically meaningful reduction in care burdens. At the same time, income work rises from roughly 19 per cent of the day in non-PRADAN villages to about 20–21% in PRADAN villages, suggesting that women are spending an extra 1–2 percentage points of their

day in wage or self-employment activities, consistent with PRADAN's focus on livelihoods and SHG-based enterprises. Leisure time remains low in both groups - around 11–12% - but is slightly higher in PRADAN villages, indicating small gains in rest or social time despite greater labour market engagement. Travel and maintenance time, already high at about 40% in non-PRADAN areas, increases to roughly 41–42% in PRADAN villages, reflecting the additional trips needed for income activities, group meetings, or access to markets and services. Together with the empowerment indices, these results suggest that in Gumla, PRADAN has helped women reallocate time away from pure domestic care into paid work and public engagement.

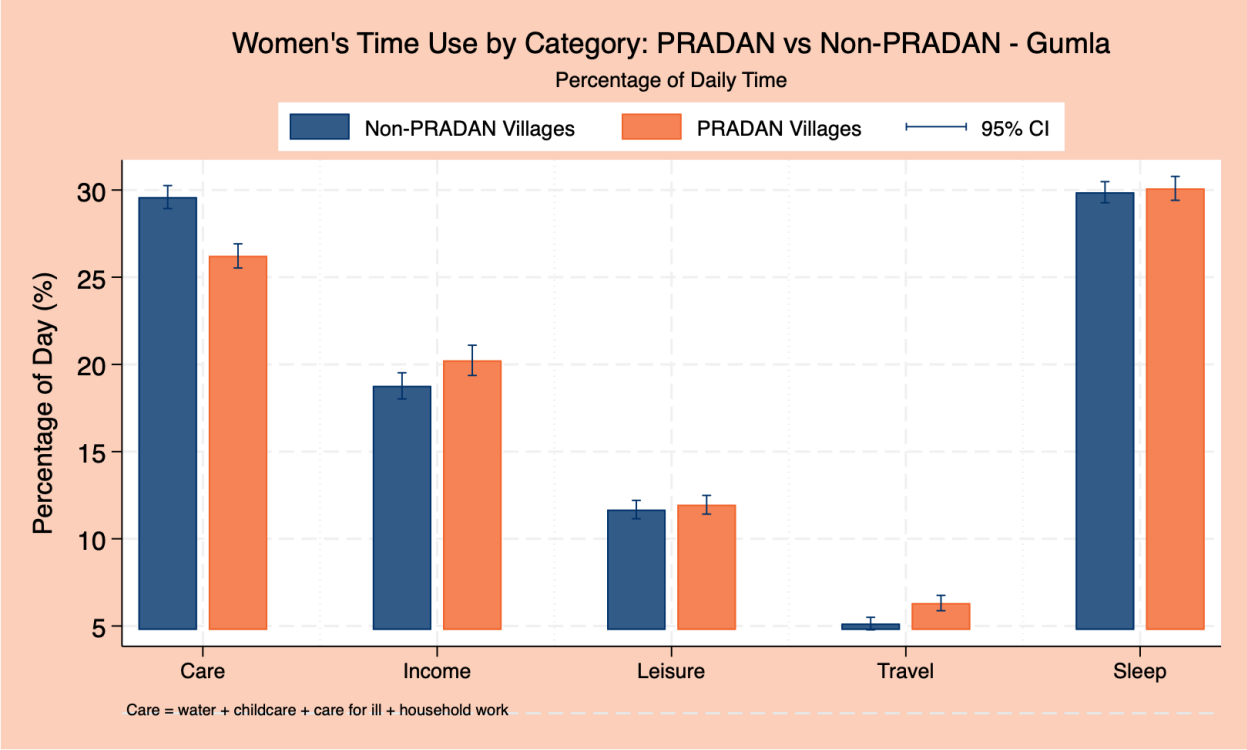


Figure 4.19. Women's Time Use Analysis- Gumla

In summary, across both districts, PRADAN's presence is associated with broad gains in women's empowerment, but the way these gains interact with time use differs between Gumla and Dhamtari. In Gumla, women in PRADAN villages have substantially higher scores than those in non-PRADAN villages on all five indices -

resource access, self-efficacy, household influence, structural decisions and mobility - with gaps of roughly 0.35–0.45 standard deviations and non-overlapping confidence intervals. At the same time, time-use data show that women in the PRADAN-supported region shift a meaningful share of their day from unpaid care work towards income-generating activities, with unpaid care falling by about 3 percentage points and income work rising by 1–2 percentage points, alongside slightly higher leisure and travel/maintenance time. This suggests a pattern of "empowered intensification": women gain resources, voice and decision-making power and simultaneously expand their economic roles, even though overall time burdens - especially travel and drudgery - remain high.

In Dhamtari, PRADAN also raises empowerment scores on resources, self-efficacy, household influence and structural decisions, with large, statistically significant gaps relative to non-PRADAN villages, but mobility remains weaker and does not clearly improve. Time-use patterns here show higher unpaid care and slightly lower income work in PRADAN villages, with similar travel/maintenance time and marginally more leisure. This combination points to "empowerment within constraint": women exercise more say over money and decisions and feel more confident, yet they continue to shoulder substantial care responsibilities and face slower changes in norms around movement and labour-force participation.

4.4. Village-level Analysis

The following analysis summarises the comparative results from village-level questionnaires across three village categories: Non-NPO villages, Non-intensive NPO villages, and Intensive NPO villages. The data examines the impact of NPO interventions on gender dynamics, social cohesion, and community mobilisation. Based on the Chi-square tests performed, the results generally indicate that while positive trends are evident in intervention areas, few differences have yet to reach statistical significance.

The village-level survey reveals a complex picture regarding gender roles. Across all village types, the most common response regarding household responsibilities was that “both men and women are sharing responsibilities more equally” (48% overall). However, the non-NPO villages were the most likely to report status quo, with 53% stating roles “remained the same,” compared to only 17.6% in intensive villages. Although not statistically significant (p=0.64), this suggests that intensive NPO presence may correlate with a disruption of traditional stagnation, even if a uniform shift toward equality hasn't fully materialised. Similarly, regarding women’s participation in livelihoods, the majority of respondents across all groups reported that “more women are now involved” (81% overall). Surprisingly, non-NPO villages reported the highest rate of increased involvement (46%) compared to intensive villages (24%). This counterintuitive finding might suggest that economic pressures are driving women into the workforce independently of NPO facilitation, or that the baseline for “involvement” differs across regions.

One of the most notable findings concerns social capital. Trust levels appear higher in Non-NPO villages, where 47.7% of respondents reported having “a lot” of trust in one another, compared to only 24.6% in Intensive villages (p=0.34). While this difference is not statistically significant, the trend aligns with development theories suggesting that external interventions can initially disrupt traditional social fabrics or heighten awareness of inequalities, temporarily lowering perceived community trust. However, when it comes to inter-caste cooperation, the trend flips. Intensive villages reported “Never” or “Rarely” working together at lower rates (0%) compared to Non-intensive villages (80% of the “Rarely” responses came from this group). This suggests that intensive interventions may be effectively reducing the most severe forms of social exclusion, even if they haven’t yet generated high levels of generalised trust.

In terms of decision-making, non-NPO villages were surprisingly the most likely to report that “a diverse group” participates (46%), whereas intensive villages were more evenly split. This could indicate that formalising leadership structures might

inadvertently concentrate decision-making among specific leaders rather than the broad informal consensus often found in traditional settings. Finally, regarding girls' age of marriage, the vast majority (93%) across all groups reported that girls are getting married later. The consistency of this finding (p=0.49) suggests that delaying marriage is likely driven by broader macro-level factors (such as state laws or economic shifts) rather than by specific local NPO interventions.

The most statistically significant finding (p=0.006) was regarding Lift Irrigation Systems. The presence of such systems was markedly higher in Intensive villages (32.3%) than in Non-NPO villages (5.7%). This is a clear attribution of impact. Lift irrigation requires significant capital investment, technical expertise for installation, and complex community organising for maintenance and water distribution. It is exactly the type of 'heavy' intervention that defines an intensive PRADAN program. The absence of such infrastructure in Non-NPO villages highlights a gap that neither the state (which often focuses on larger dams or canals) nor the community (which lacks capital) could fill on its own. The NPO here serves as a critical bridge, bringing technology and management capacity that fundamentally alter the village's agricultural potential.

Similarly, the analysis of institutional presence distinguishes between basic and advanced mobilisation. Self-Help Groups (SHGs) were found to be ubiquitous, present in 98% of all villages regardless of type. However, differentiation appears at the next level of complexity: Producer Groups. These groups, which aggregate produce for better market access, were found exclusively in Intensive villages (6.5%), with zero presence in the other two categories (p=0.054). This finding is highly significant. It suggests that while basic social mobilisation (SHGs) can arguably be achieved with light touches or through government replication, economic aggregation requires the sustained, intensive handholding that an NPO can provide.

An interesting anomaly appeared in the data regarding Primary Health Centres (PHCs). Their presence was significantly higher in Non-NPO villages (26.4%) than in

Intensive villages (9.7%) (p=0.017). This likely reflects a selection bias in NPOs' choice of where to work. PRADAN often targets the most remote, marginalised, and “last-mile” villages precisely because infrastructure like PHCs is limited.

Finally, the analysis looked at the interface between the village and the state. Interestingly, there was no significant difference in the frequency of visits by government officials (p=0.28) or in access to basic schemes like electricity (p=0.37).

4.5. Conclusion and Discussion

The overall evidence from Gumla and Dhamtari provides selective but meaningful support for the theory-driven CMO configurations, while also showing where expectations are not borne out or cannot yet be tested rigorously. Across the board, PRADAN’s strongest and most consistent effects emerge in long-run agricultural productivity and incomes in Gumla, and in women’s empowerment and institutional support in both districts. In contrast, the evidence is weaker or mixed regarding migration patterns, income and productivity in Dhamtari, and community-level social capital and governance.

CMO 1 – Agriculture, irrigation and migration (H1–H2, H7–H8)

For H1a, there is clear support in Gumla but not in Dhamtari. Panel regressions using plot-level NDVI show that in Gumla, PRADAN villages have higher agricultural productivity than non-PRADAN villages: NDVI is about 0.8% higher annually, 0.7% higher in kharif and 3.6% higher in rabi, implying long-run yield gains of roughly 0.4–1.6 quintals per hectare. These gains are larger in midland areas and among non-fragmented holdings and rainfed plots, consistent with the idea that PRADAN’s water-harvesting and agronomic interventions are most valuable where constraints are greatest. In Dhamtari, however, NDVI in PRADAN villages is slightly lower than in non-PRADAN villages, so H1a is only partially supported: the productivity edge appears in a long-standing intervention region (Gumla) but not in the newer one.

H1b links higher productivity in PRADAN villages to lower seasonal out-migration. The study documents detailed reasons and age profiles of migration in Gumla and notes that migration for "better employment," brick kilns and construction is concentrated among young and prime-age adults, with similar patterns in NPO and non-NPO villages. As a result, there is no empirical basis in the current analysis to claim that more productive PRADAN villages systematically experience less seasonal migration than comparable low-productivity locations.

H2 posits higher household income for those with irrigation and improved techniques. There is supportive but indirect evidence. In both districts, PRADAN villages display higher agricultural and total household incomes than non-PRADAN villages; for example, in Gumla, total household income rises from the mid-₹70,000s in non-NPO villages to the low-₹90,000s in NPO villages, driven largely by gains in agricultural income. In Dhamtari, total income rises from about ₹1,20,000 lakh to roughly ₹1,45,000 lakh, with a positive but less sharply estimated difference. At the same time, village-level analysis shows that lift-irrigation systems - capital-intensive water-harvesting infrastructure - are far more common in PRADAN intensive villages (32.3%) than in non-NPO villages (5.7%), with a statistically significant difference ($p=0.006$). This is exactly the type of irrigation and land-development intervention envisaged under the CMO. Nonetheless, the data do not isolate households that actually use these systems and directly compare their incomes with those of otherwise similar households without access. Thus, the pattern is consistent with H2 (villages and households in PRADAN-supported areas are better irrigated and richer).

H7 explicitly connects successful community mobilisation for water harvesting and land development to higher net sown area. The village-level evidence on lift-irrigation coverage strongly supports the first part of this mechanism - PRADAN's intensive programmes do create more water-related infrastructure than would otherwise exist - but we do not find a net-sown-area difference across village categories.

H8 links stronger community cohesion - trust, participation, collective action - to better water access and agricultural income in water-scarce settings. Here, the evidence is mixed and in some ways counterintuitive. Trust in fellow villagers is actually reported as higher in non-NPO villages (47.7% report “a lot” of trust) than in intensive PRADAN villages (24.6%), although the difference is not statistically significant. At the same time, intensive PRADAN villages report far fewer cases of “never” or “rarely” working together across castes, suggesting that the most extreme forms of social exclusion are lower where interventions are strongest. As noted, income and irrigation access are higher in PRADAN-supported areas. Taken together, this pattern does not align neatly with H8: community cohesion, as proxied by generalised trust, is not clearly stronger in NPO villages, even though irrigation and income outcomes are better. It is possible that intensive programmes initially disrupt traditional social fabrics or sharpen awareness of inequalities, reducing reported trust even as they enable new forms of cross-caste cooperation and collective management of water. In strict hypothesis-testing terms, however, H8 is not supported.

CMO 2 – SHGs, gender and empowerment (H3–H6)

The SHG-based configuration receives stronger empirical backing. H3 predicts higher female mobility and participation in villages with active PRADAN-promoted SHGs. In Gumla, this is clearly supported: on standardised indices, women in PRADAN villages score about 0.35–0.45 standard deviations higher than those in non-PRADAN villages on resources, self-efficacy, household influence, structural decisions and mobility. Time-use data also show that women in PRADAN villages spend slightly less of their day on unpaid care work and more on income work, leisure, and travel, reflecting greater engagement beyond the home. In Dhamtari, PRADAN villages show higher scores on resources, self-efficacy, household and structural indices, but the mobility index is similar or slightly worse than in non-PRADAN villages. Women there gain voice and decision-making power, yet continue to face strong mobility constraints. Overall,

H3 is strongly supported in Gumla and partially supported - with an important mobility caveat - in Dhamtari.

H4 expects higher income generation from SHG-linked activities in PRADAN villages. The agricultural income comparisons support this in Gumla: NPO villages earn substantially more from farming, and women allocate more time to income work, consistent with SHG-mediated livelihood diversification and improved practices. In Dhamtari, NPO villages also show higher total and agricultural incomes, but women spend slightly less time in income work than in non-PRADAN villages, even as empowerment scores rise. This suggests that in Dhamtari, a larger share of incremental income may come from male labour, mechanisation, or cropping shifts rather than women's own labour supply. Thus, H4 is supported in Gumla and only weakly, indirectly supported in Dhamtari.

H5 posits higher access to formal credit among households in PRADAN SHG villages. Similarly, H6 proposes a higher receipt of government scheme entitlements in villages with active PRADAN SHGs. We don't find evidence in the data to support or reject these hypotheses.

Village-level gender and cohesion (H7–H8 extensions)

The village questionnaires add nuance to gender norms and social cohesion, but do not deliver many statistically significant differences. Perceptions that men and women share household responsibilities more equally are common across all village types. While intensive NPO villages are much less likely to report that roles have "remained the same," the differences are not statistically significant. Likewise, all village categories report higher women's participation in livelihoods; surprisingly, non-NPO villages report the largest increase, suggesting that broader economic pressures, not only NPO work, push women into income-earning roles. The age at marriage for girls is reported to be rising everywhere, again with no NPO–non-NPO difference, pointing to macro-level drivers such as law and economic change. These patterns reinforce an

important qualifier: many desirable social changes are happening state-wide, so village-level contrasts often fall short of statistical significance even when point estimates look favourable for NPO areas.

In sum, the evidence best supports hypotheses that tie intensive PRADAN engagement to (a) higher long-run agricultural productivity and incomes in Gumla; (b) significant improvements in women's empowerment across multiple dimensions, especially in Gumla; and (c) the creation of heavy, community-managed irrigation infrastructure in intensive villages. Hypotheses that require explicit links between productivity and migration, cohesion and water outcomes, or SHGs and formal credit or scheme uptake cannot be confirmed or refuted with the current data. In Dhamtari, results are more modest and mixed: empowerment is higher, but mobility and NDVI-based productivity are not, and income gains, while present, are less clearly tied to women's own labour or SHG activity.

5. Conclusion: Towards a Framework for long term impact assessment of Nonprofits working in Rural Development

Evaluating the impact of rural development interventions is as much an epistemological challenge as a methodological one. Traditional evaluation paradigms, often dominated by the randomised control trial (RCT) or short-term quasi-experimental designs, are excellent at attributing causality for discrete inputs - such as a new seed variety or a cash transfer - over short time horizons. However, organisations such as PRADAN, Seva Mandir, and Gram Vikas operate on a fundamentally different timeline and logic. Their work is not merely about asset transfer but about 'structural transformation': shifting the deep-seated institutional, socio-economic, and ecological trajectories of a region over decades.

5.1. The Challenge of the Long-Term Assessment

Taking a long-term perspective in impact evaluation means asking how interventions shape systems, behaviours, and outcomes over decades rather than project cycles. This expands what can be learned, but it also multiplies the challenges evaluators face (Mayne, 2020). First, long timeframes magnify causal complexity. Multiple interventions, policies, shocks, and social changes often overlap, making it impossible to isolate a single cause in counterfactual terms. Causal packages evolve as contexts change, so the original theory of change may no longer describe how outcomes are being produced 10–20 years later. This forces a shift from attribution ("what fraction of impact is ours?") to contribution ("were we a necessary part of the causal package, and how?"), relying on generative causality, pathway-level theories of change, and carefully constructed causal narratives.

Second, data problems become acute. Records from earlier phases may be incomplete, lost, or inconsistent with later monitoring systems, and definitions or indicators often change over time. Key actors move on or cannot accurately recall

details, weakening interview-based reconstructions. This constrains the precision of quantitative estimates and requires triangulating multiple imperfect sources. Structured evaluability assessments are therefore critical up front: they clarify which questions can realistically be answered and what level of causal claim is defensible, given the available evidence. Third, context does not stand still. Political systems, markets, technology, and social norms shift, sometimes fundamentally altering the mechanisms through which an intervention operates. An innovation that was radical at inception may later be mainstream policy; impacts observed decades later may partly reflect these broader shifts rather than the original design alone. Evaluations must therefore reconstruct timelines for both intervention and context and often work with multiple, time-sequenced theories of change rather than a single, static model. Finally, there are institutional and resource constraints. Stakeholders, including donor partners, want quick, accountability-oriented answers, while long-term evaluations demand sustained funding, access, and methodological sophistication that are rarely available. As a result, many evaluations default to short-term effectiveness questions, risking the omission of transformative changes that only emerge at tipping points or through slow accumulation. Addressing the *long durée* challenge thus requires not just technical tools like contribution analysis, but also a shift in expectations: from neat causal estimates to credible, evidence-based narratives about how interventions have interacted with evolving systems over time.

In addition to these challenges, normative pessimism often discourages nonprofits from studying their long-term impact. Many question the value of such exercises, arguing that organisations ultimately intend to withdraw and let communities steer their own development processes, and that looking back in great detail can seem self-aggrandising rather than useful. Yet, precisely because development is messy, contingent, and slow, organisations need sustained learning to keep adapting their strategies. Examining impact beyond project cycles and explicitly problematising structural dimensions of change that take years to sediment, generate insights that

are valuable not only for the organisation's own professionals but also for others working in similar thematic domains.

Experiences from existing long-term studies make this clear. Reflections on intergenerational educational change in Gram Vikas's schools (Nous Consultants, 2024), village-level institutional transformation in Seva Mandir (Desai & Olofsgård, 2018), or 25 years of institution-building by Ibtada (Cognisphere, 2024) have all provided conceptual and practical guidance for subsequent work elsewhere. These exercises show how shifts in norms, capabilities, and governance arrangements emerge only over decades, and they illustrate methods - such as reconstructing historical baselines, tracing trajectories across generations, and listening systematically to alumni and community leaders - that others can adapt. In this way, long-term impact studies do far more than celebrate an organisation's achievements: they offer a template and a set of questions that enable peers to interrogate their own work more critically, and they help move the field towards a deeper, structurally informed understanding of what durable change actually involves.

5.2. The Rural Development Impact Framework (RDIF)

In this study, the long-term impacts of PRADAN's work were examined in two of its oldest intervention regions, Gumla and Dhamtari. The central aim was to reconstruct, as rigorously as possible, the imprint PRADAN has left on these geographies despite the absence of continuous panel datasets or routine longitudinal surveys. To do so, the analysis drew on multiple sources of evidence and levels of observation, rather than relying on a single data stream. Anchored in a realist evaluation sensibility, the study treated impact as the product of context–mechanism–outcome configurations rather than linear input–output chains. In practice, this meant combining quantitative landscape indicators, household-level information, and qualitative process tracing into a syncretic design, and then iteratively testing and refining causal hypotheses about how PRADAN's strategies interacted with distinct institutional environments in Gumla and Dhamtari. Through this layered excavation, it became possible to infer not only

whether change occurred, but how different strands of PRADAN's work contributed to shifts in livelihoods, institutions, and local power relations.

On the basis of these findings, the study developed a Rural Development Impact Framework that systematises these insights into a reusable architecture for assessing long-term rural transformation. In designing this framework, the work consciously extends and reinterprets existing approaches in the literature - notably the sustainable livelihoods framework for the 21st century (Natarajan et al., 2021), earlier formulations of sustainable rural livelihoods (Scoones, 1998), and subsequent sustainable livelihoods approaches (Carney, 2003; van Rijn et al., 2012) - to foreground structural conditions, mechanisms, and temporally extended pathways of change.

The framework in Figure 5.1 is a visual theory of how long-term rural development interventions contribute to systems change by working within a structural field, transforming structures and processes, and ultimately reshaping resilience outcomes. It has three main blocks - Structural Field, Transforming Structures & Processes, and Resilience Matrix - linked by an explicit pathway of systems change.

The structural field

The left-hand block, the structural field, describes the deep context in which any rural programme is embedded.

- Macro pressures include policy shifts, donor priorities, and market fluctuations. These set the outer envelope of what is possible; for example, donor priorities in an era, policy focus, market opportunities, or changing incentives for farmers.
- The historical trajectory encompasses the legacies of colonial rule, feudal control, and patterns of social cohesion or conflict. These legacies shape who holds power, whom people trust, and which institutions are seen as legitimate.
- Institutional density captures whether an area begins with a relatively limited presence of state and civil society institutions, or with a dense ecosystem of government schemes, NPOs, and markets. This distinction matters because the

same NPO strategy will operate differently in contexts where institutions are less developed (requiring a more facilitative or gap-bridging role) versus those with a stronger institutional presence (where it must navigate and leverage existing systems).

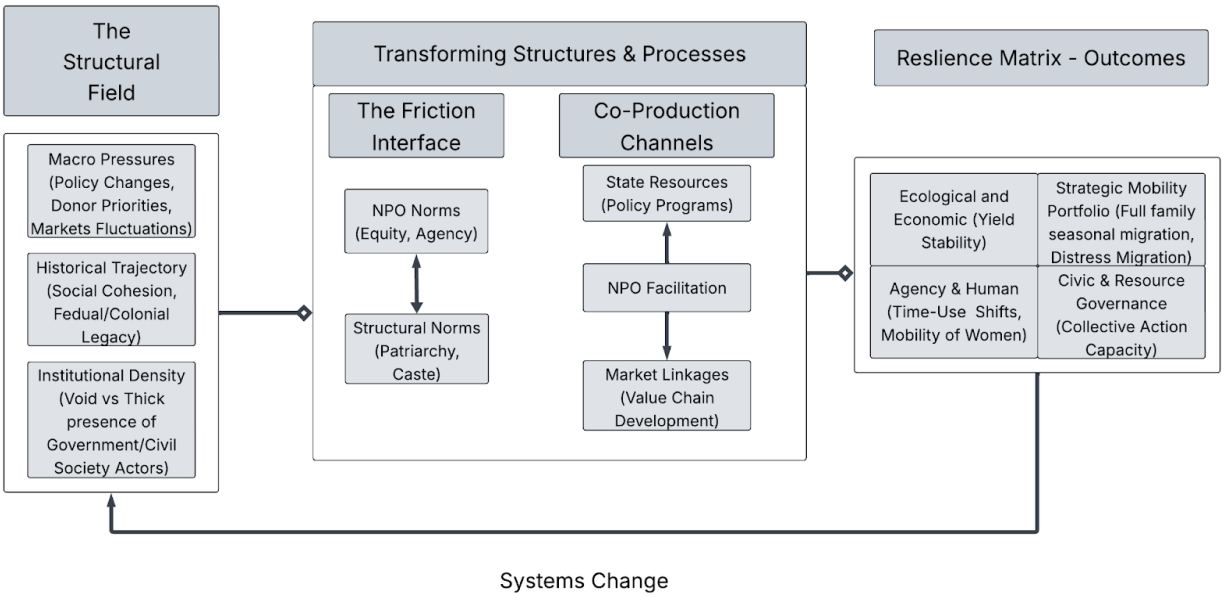


Figure 5.1. Rural Development Impact Framework (RDIF)

Together, these elements define a structural field that is not just background "context" but an active set of forces that shape which mechanisms can fire, how quickly, and for whom. The arrow from this block into the central block indicates that all subsequent "transforming structures and processes" are conditioned by this field, and in turn, any systems change loops back to alter the field over time.

Transforming structures and processes

The middle block, Transforming Structures & Processes, is where interventions interact with the structural field through two main mechanisms: the friction interface and co-production channels.

The friction interface

At the friction interface, NPO norms (equity, agency, participation) meet structural norms (patriarchy, caste hierarchy, clientelism). NPOs introduce new expectations - for example, women's equal participation in SHGs or transparent Gram Sabha processes. These norms collide with entrenched power relations, producing friction: conflict, resistance, negotiation. The framework treats this friction as productive: it is the arena where structural norms are challenged and slowly rewritten. Without friction, interventions tend to be absorbed without changing underlying relations; with managed friction, norms around gender or caste can shift.

Co-production channels

The second mechanism is Co-Production Channels, where NPOs broker and reshape relationships among communities, the state, and markets. State resources (policy programmes) are the formal schemes, entitlements, and budgets that exist on paper. NPO facilitation is the work of translating these programmes into access: building village institutions, preparing claims, navigating administration, and monitoring implementation. Market linkages (value-chain development) capture organised engagement with buyers, input suppliers, and financial services, again mediated by NPO support. These channels show how NPOs move from direct service providers to catalysts for co-production, in which communities, state actors, and private players jointly produce development outcomes. In a space with limited institutional presence, the emphasis may be on creating basic organisations and infrastructure; in a thicket, it is more about convergence and leverage.

Together, the friction interface and co-production channels constitute the engine of transforming structures and processes: they alter who participates, who decides, and how resources flow, thereby preparing the ground for more durable changes in resilience outcomes.

Resilience matrix – outcomes

The right-hand block, the resilience matrix – outcomes, translates systems change into four interlinked outcome domains.

Ecological and economic (yield stability)

This quadrant captures biophysical and livelihood resilience: yield stability, diversification, and the buffering effect of improved water and soil systems. It reflects how infrastructural investments and climate-smart practices, often brokered through co-production channels, reduce vulnerability to shocks.

Agency & human (time-use shifts, mobility of women)

Here, the focus is on individual and collective agency: changes in women's control over time, mobility, aspirations, and decision-making. These outcomes are directly linked to the friction interface - where gender and caste norms are negotiated - and to NPO norms around equity.

Strategic mobility portfolio (full family seasonal migration, distress migration)

This quadrant recognises that mobility is not simply "bad" migration versus "good" staying. Instead, households manage portfolios of seasonal work, education-linked migration, and local livelihoods. A more resilient system is one where migration is strategic rather than distress-driven, reflecting improved capabilities and options.

Civic & resource governance (collective action capacity)

This domain encompasses communities' ability to manage the commons, negotiate with stakeholders, resolve conflicts, and make collective decisions. It expresses the long-term effect of both friction (more inclusive, contested politics) and co-production (routine engagement with administrative systems).

The matrix makes explicit that resilience is multi-dimensional: ecological, economic, human, spatial, and civic capacities must evolve together for genuine systems change.

The framework's logic can be read as a left-to-right generative causal chain with an important feedback loop. Macro pressures, history, and institutional density determine the initial configuration of power, opportunities, and constraints. They shape what kind of friction arises and which co-production strategies are feasible (e.g., "creation and mobilisation" in a void versus "facilitation and leverage" in a thicket). Through friction, NPOs and communities contest and renegotiate structural norms; through co-production, they realign state and market flows. Over time, these mechanisms materialise as changes in yield stability, time-use, mobility patterns, and collective action capacity. The systems change arrow looping back indicates that when resilience outcomes reach a certain threshold - e.g., stronger civic institutions, diversified economies, more educated and mobile women -they begin to shift the structural field itself. Institutional density changes (new organisations), historical trajectories are bent (from chronic exclusion towards inclusion), and even macro pressures may be responded to differently (with greater bargaining power in markets or programmes). In this sense, the framework is not a simple programme logic; it is a realist causal architecture that links deep structure, meso-level mechanisms, and multi-dimensional resilience outcomes over the long term.

In Figure 5.2, we present this framework's analysis in the context of PRADAN's interventions in Gumla and Dhamtari. It shows how the generic categories of structural field, friction interface, co-production channels, and resilience outcomes play out differently in Gumla and Dhamtari, and why, therefore, impact takes distinct forms in each.

In the generic RDIF, the structural field comprises macro pressures, historical trajectories, and institutional density. In the applied diagram, this is specified as

Gumla context - In the early 1990's, when PRADAN first entered Gumla, it was characterised by the evolving presence of the state, weak markets, and predominantly rainfed, subsistence agriculture. Thus, PRADAN enters a landscape with few public institutions, limited infrastructure, and a history of underdevelopment.

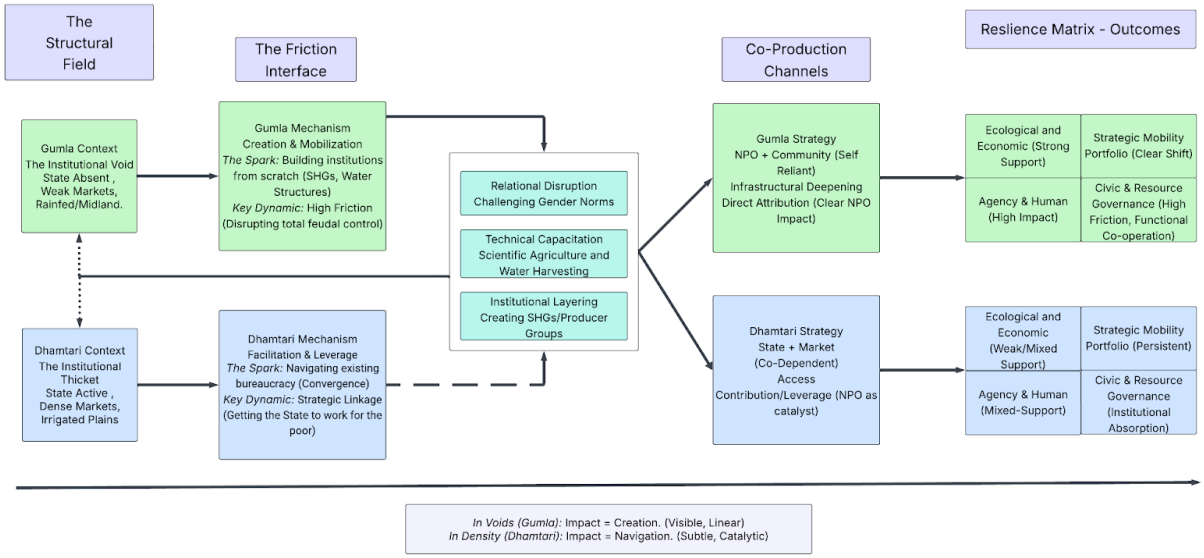


Figure 5.2. Illustrating the Rural Development Impact Framework (RDIF) in Gumla and Dhamtari.

Dhamtari context – On the other hand, in Dhamtari, when PRADAN enters, two large-scale policy programs for rural development are already in full swing: the DAY-NRLM and MGNREGA. State active, dense markets, irrigated plains. Here, multiple line departments, irrigation systems, and private actors are already present; the challenge is not absence but unequal access and administrative complexity. PRADAN has to straddle this at the initiation, which is markedly different from what it had to do in Gumla in the initial years.

This first move operationalises the RDIF's idea of institutional density: Gumla sits toward the "void" end of the spectrum, Dhamtari toward the "thick" end. Because the structural field conditions that determine which mechanisms are feasible, the rest of the diagram essentially answers: *what does PRADAN do with a void, and what does it do with a thicket?*

The central RDIF identifies a friction interface where NPO norms (equity, agency) encounter structural norms (patriarchy, caste), generating productive conflict. In Gumla, we articulate this mechanism as Creation & mobilisation.

- *The spark:* Given the history, PRADAN started by facilitating the creation of institutions - water user associations and later self-help groups and co-operatives.
- *Key dynamic:* High friction, as new village institutions and women's groups disrupt entrenched religious and communal factions. PRADAN had to navigate the fragmented villages very carefully in the initial years, as it was focusing on creating platforms at the community level rather than the household level. In other words, the friction interface here was about creating new organisational forms.

On the other hand, in Dhamtari, the initial mechanism was facilitation & leverage.

- *The spark:* Here, the focus was on navigating existing systems and promoting convergence of schemes.
- *Key dynamic:* Strategic linkage, where PRADAN helped communities coordinate with the state ecosystem. While this dynamic emerged later in Gumla as well, what makes this a qualifying feature for Dhamtari is that the work began with this approach, whereas in Gumla it was incremental, arriving at linkage only after a decade of creation and mobilisation. Here, friction arises around access, targeting, and voice in already-functioning arenas (panchayats, irrigation systems, markets), rather than around the mere existence of institutions.

Thus, the application makes explicit what the generic RDIF implies: the same NPO norms generate different mechanism types depending on structural density - 'creation' in voids, 'navigation' in thickets. We further break down the mechanisms into specific activities undertaken by PRADAN that are sustained over a long period. Between mechanisms and strategies, the diagram inserts a shared box labelled Relational Disruption, Technical Capacitation, and Institutional Layering.

Relational disruption – challenging gender norms:

PRADAN's insistence on women-centred groups, joint decision-making, and public

roles unsettles patriarchal practice in both locations. This is the micro-political core of the friction interface. Foregrounding women as the main actors in development processes, PRADAN's approach creates friction within communities, which, in the long run, enables women to access different types of resources and enhance their mobility. However, this is observable to a large extent in Gumla but only partially in Dhamtari, reflecting the challenges of working in the strategic mode of convergence.

Technical capacitation – scientific agriculture and water harvesting

Introduction of improved agronomy, water-harvesting designs, and planning tools strengthens farmers' capacity to use ecological resources more productively and reliably. This underpins later ecological and economic resilience achieved in Gumla. The initial interventions focused on strengthening water availability for Kharif, as that was the only period when most people were in the village. These interventions, geared toward demonstrating meaningful agricultural surplus generated through scientific practices such as paddy nursery cultivation, helped build initial trust. In Dhamtari, we did not observe this directly. While in some cases we observed that PRADAN had worked directly with households on certain aspects of improving agricultural productivity, it was mostly through improved implementation of existing government programs.

Institutional layering – creating SHGs/producer groups

Institutions are not one-off creations but built in layers - SHGs, VOs, PGs, and federations. This layering increases the thickness of local civic infrastructure, which in turn shapes access to state programmes and markets. In Gumla, this was identified as a core area of work from the beginning, whereas in Dhmatari, DAY-NRLM was complemented by expanding its reach to help achieve the targets.

Thus, overall, we see that while these strategies were adopted in both Gumla and Dhamtari, the extent to which they could be actualised was limited by the structural field. While in Gumla, we see them maturing over the years, in Dhamtari, their reach remains fragmented. Crucially, these three elements are shown to feed into both the

Gumla and Dhamtari strategic fields: they constitute the common mechanism bundle through which PRADAN works, even though the surrounding structural conditions and strategies differ. This reflects the realist idea that mechanisms are portable, but their expression is context-specific. The changes these induce also cause periodic shifts in the structural field, as shown by an arrow connecting them back to the field boxes.

The generic RDIF describes co-production channels - state resources, NPO facilitation, and market linkages - as the routes through which NPOs help communities co-produce development outcomes with external systems. In the applied diagram, this becomes two contrasting strategies.

Gumla strategy – NPO + community (self-reliant)

- Emphasis on infrastructural deepening: building or rehabilitating check dams, lift-irrigation systems, horticultural interventions, and other common infrastructure.
- Characterised as direct attribution, the projects and institutions that exist would be limited without PRADAN.

In RDIF language, PRADAN and the community together temporarily play a gap-bridging role where state and market actors have a limited presence, building a platform that may later be taken over or complemented by them.*Dhamtari strategy – State + market (co-dependent)*

- Emphasis on access and contribution/leverage: PRADAN's role is to aggregate demand, improve design quality, and press for convergence, so that existing public and private resources flow more reliably to marginalised farmers.
- Impact is framed as catalytic rather than directly attributable. This is co-production in the strict sense: the organisation's value lies in reorganising relationships among actors who were already present.

By placing these strategies under the 'Co-Production Channels' header, the diagram ties the abstract RDIF idea directly to field practice, showing that co-production can mean building substitute structures in voids and brokering convergence in thickets.

Finally, the rightmost block of the generic RDIF - Resilience Matrix - Outcomes - is unpacked separately for Gumla and Dhamtari. Each geography has four quadrants: ecological–economic, agency & human, strategic mobility, and civic & resource governance.

In Gumla, the RDIF's resilience matrix comes into focus as a largely affirmative story of impact in an area with emerging institutional density, where PRADAN and village actors have had to create much of the local development architecture from the ground up. On the ecological and economic front, decades of infrastructural deepening - especially the construction and rehabilitation of water-harvesting and lift-irrigation structures - combined with sustained technical capacitation around scientific agriculture have had clear, measurable effects on water availability, cropping intensity, and yield stability. These are not marginal gains: satellite imagery and village-level data point to greener landscapes, more reliable double-cropping, and reduced exposure to intra-season rainfall shocks compared to the starting conditions of largely rainfed, low-productivity agriculture. These material shifts interact closely with changes in the agency and human domain. As new institutions such as self-help groups, water-user collectives, and producer groups have taken root, women's time use, mobility, and voice in decision-making have changed visibly.

The friction interface in Gumla has been intense - PRADAN's equity-oriented norms have repeatedly collided with entrenched feudal and patriarchal arrangements - but much of this friction has been productive, enabling women to move into public spaces, to participate in planning the use of water structures, and to exercise greater control over savings, credit, and livelihood choices. These ecological and agency shifts, in turn, reconfigure household mobility strategies. With a more secure subsistence base and better on-farm returns, migration appears to have become a strategic portfolio choice,

used to accumulate capital, finance education, or diversify income. Families gain greater control over who migrates, when, and under what conditions, and can afford to refuse the most exploitative forms of labour. Finally, the civic and resource governance quadrant reflects the maturation of collective action in this context of high but increasingly managed friction.

New and layered institutions around water, SHGs, and producer organisations have taken charge of maintaining common assets, negotiating access with external agencies, and resolving conflicts internally, often in tense engagement with older village power-holders but with growing procedural confidence and legitimacy. What ties these quadrants together is the RDIF's core claim that, in limited institutional areas such as Gumla, impact is fundamentally about creation: the creation of infrastructure, organisations, and capabilities that did not previously exist, and that now anchor a relatively linear and visible trajectory of change. Because PRADAN's interventions are so tightly coupled to the emergence of these structures - physically in the landscape and institutionally in village life - the chain from mechanism to outcome is relatively clear, allowing the Gumla case to stand as an archetypal instance of "impact = creation" within the broader framework.

In Dhamtari, the resilience matrix looks quite different from that in Gumla because PRADAN starts working within an already dense "institutional thicket" of irrigation systems, markets, and state programs. On the ecological and economic front, baseline canal irrigation and higher agricultural investment mean that gains in yield stability or cropping intensity cannot be straightforwardly tied to PRADAN's presence; the organisation does relatively little direct construction, and outcomes are heterogeneous across villages as multiple departmental schemes and private actors shape land and water use. As a result, ecological and economic change is real but difficult to attribute cleanly, and the evidence offers only weak or mixed support for a strong, PRADAN-specific effect. In the agency and human domains, there are visible shifts in women's confidence, participation in meetings, and comfort in interacting

with officials, but these changes are incremental and uneven, mediated by long-standing institutional cultures in cooperatives, panchayats, and irrigation bodies that continue to privilege male and caste-based authority. The friction interface here is less about building entirely new spaces for women than about slowly widening the cracks in existing ones, so progress is patchy and often fragile.

Strategic mobility patterns likewise show persistence rather than dramatic transformation. Households do diversify their income sources - through better crop planning, access to input and output markets, or participation in producer groups - but the deep drivers of mobility, such as regional labour markets, land distribution, and aspirations linked to non-farm work, remain largely outside PRADAN's direct reach. Migration continues, and while some moves may become somewhat more planned or better supported, there is no clear shift comparable to the Gumla trajectory from distress to strategic migration. In the civic and resource governance quadrant, PRADAN's influence appears most clearly yet also most subtly: instead of creating parallel institutions, the organisation helps communities use and reshape existing ones - gram panchayats, water-user associations, SHG federations - so that planning processes are a little more inclusive, funds better targeted, and rule enforcement somewhat more even-handed. These civic gains are therefore institutionally absorbed: they live inside formal bodies that would exist even without PRADAN, which can improve overall functioning but makes the "PRADAN signature" less visible and harder to isolate analytically.

Taken together, this pattern embodies the complementary RDIF proposition that, in dense contexts like Dhamtari, impact is fundamentally about navigation rather than creation. The organisation's role is catalytic: it helps marginalised groups understand schemes, convene meetings, broker convergence, and negotiate with officials and market actors, shifting who can access which state and market opportunities and how responsive these systems are to local priorities, rather than dramatically altering the stock of physical assets. Impact here is therefore subtle, relational, and distributed

across institutions, and is best read in terms of changed pathways and probabilities rather than large, linear jumps in conventional indicators.

Overall, the generic RDIF and the Gumla–Dhamtari diagrams provide a complete realist storyline for thinking about long-term rural impact. The starting move is to read the structural field rather than jump straight to indicators. This means diagnosing whether a geography is located more towards the institutional void or institutional thicket end of the spectrum, as well as market density and inherited power relations such as caste, patriarchy, and landlordism. In Gumla, limited state and market infrastructure, coupled with a history of feudal control, place it towards the "void" side; in Dhamtari, dense irrigation systems, active line departments, and vibrant markets position it as a "thicket." This initial classification is not a cosmetic label; it sets up different expectations about what kinds of work are necessary and what types of impact are even possible.

Once the structural field has been diagnosed, the second step is to specify the appropriate friction mechanism for that field. In a void, the primary work is creation and mobilisation: facilitating the building of institutions, aggregating dispersed actors, and openly confronting feudal or exclusionary relations. In a thicket, by contrast, the main mechanism is navigation and leverage: navigating administrative complexity, finding entry points into existing schemes, and stitching together alliances that can turn a formally active state into one that is substantively responsive. Naming these mechanisms explicitly prevents a false comparison in which Gumla looks "more successful" simply because the visible artefacts of creation (dams, SHGs, federations) are easier to identify than the relational shifts of navigation.

With the friction mechanism clarified, the framework turns to a common bundle of mechanisms that cuts across both contexts. In Gumla and Dhamtari alike, PRADAN works through relational disruption (especially on gender), technical capacitation (scientific agriculture, water management), and institutional layering (SHGs, producer groups, village organisations). What differs is not these building blocks, but how they

play out in relation to the surrounding field. Tracing this bundle in practice - who is actually being capacitated, where gender norms are being contested, how layers of organisations connect - allows the analysis to move beyond counting groups or training and towards understanding how mechanisms are firing in each setting. This step is achieved by carefully delineating the different stages of program theory that the organisation adopts across a geography over the year. Marking similarities and differences between them and the reasons thereof.

The next move is to characterise the co-production strategy that links communities to the state and markets. In Gumla, the emphasis is on NPO–community infrastructural deepening: the organisation and villagers co-produce tangible assets and institutions that partially substitute for the absence of public systems. In thickets like Dhamtari, the strategy is catalytic convergence and access: helping communities draw down existing policy resources, align multiple departmental schemes, and negotiate better terms with market actors. Framing these as two distinct but legitimate modes of co-production help explain why "less construction" in Dhamtari does not equate to "less impact," but rather to a different kind of impact. Here again, the researcher relies on careful constructions of program theories and breaking them down into specific mechanism strands over the years. An important concern here is delineating short-term (project) outcomes and long-term outcomes. Establishing linkages between mechanisms and changes in the structural field serves as a starting point for this.

Finally, the framework asks us to map the resilience matrix for each context. Ecological–economic, human/agency, mobility, and civic–governance indicators are used to see how the earlier mechanisms and strategies sediment into long-term patterns of resilience, and crucially, to recognise that the matrix will have a different shape in a void and in a thicket. Gumla's matrix shows strong ecological and agency gains, clear shifts in strategic mobility, and high-friction but functional collective action - consistent with the idea that impact there equals creation. Dhamtari's matrix, by contrast, reveals mixed ecological signals, incremental agency gains, persistent

mobility patterns, and civic improvements absorbed into existing institutions - hallmarks of impact as navigation: subtle, catalytic, and relational.

By making this full sequence explicit for Gumla and Dhamtari, the study shows that the RDIF is more than a generic diagram; it operates as a portable causal grammar that can be instantiated differently across places. The same organisation, working with broadly similar values and methods, produces distinct types and patterns of impact because it engages different structural fields, activates different friction mechanisms, and adopts different co-production strategies. This is precisely what a realist, context-sensitive impact framework ought to make visible.

5.3. Methodological framework for studying long-term impact

To analyse the long-term impact, we summarise our approach through a methodological framework presented in Figure 5.3. This framework sets out a sequenced methodology for evaluating long-term, structural impact by moving systematically from history, through theory and evidence, to a synthesised account of systems change. It is organised into five phases that correspond to five analytical moves: historical reconstruction, realist theorisation, mixed-methods evidence gathering, analytical synthesis, and structural outcome mapping. Across these phases, the framework insists that long-term impact cannot be read off from indicators alone; it must be reconstructed as a causal narrative that respects how places, organisations, and mechanisms evolve over time.

The first phase is historical reconstruction, described as taking the *longue durée* seriously. The starting question is not “Did the intervention work?” but “How did this place evolve?” This demands an institutional timeline that charts the region’s history before and during the intervention, including shifts in land relations, state policies, conflicts, infrastructure, and civic organisation. Alongside this, the framework calls for reconstructing the evolution of the organisation’s own theory of change: how its objectives, strategies, and assumptions shifted across programmes and decades. The

goal is to arrive at a clear map of cumulative intent rather than a stack of disconnected project logframes. This historical phase ensures that later claims about impact are grounded in a realistic understanding of both the baseline trajectory and the organisation's changing role within it.

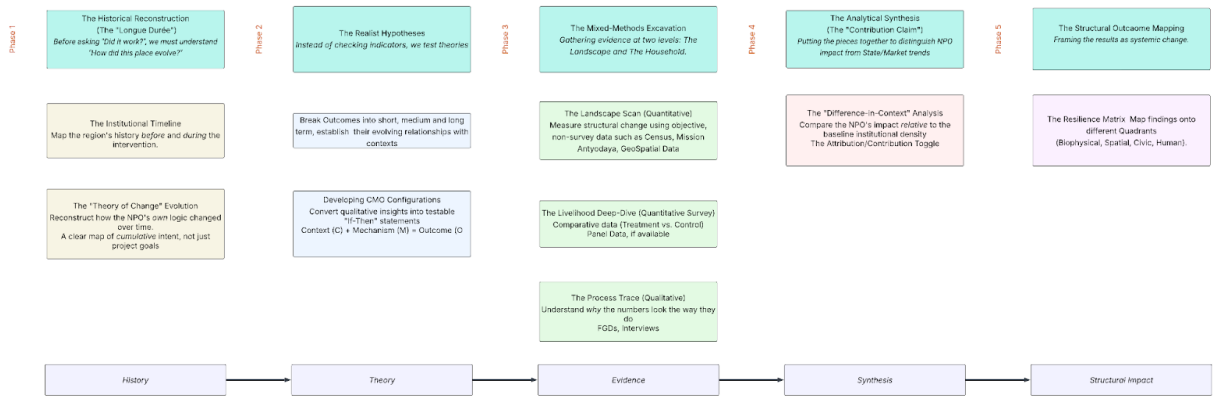


Figure 5.3. Methodological Framework for studying long-term impact in rural development

The second phase develops realist hypotheses. Instead of treating indicators as endpoints to be checked, the framework proposes that evaluators articulate explicit causal propositions about how change is supposed to happen. Outcomes are broken into short-, medium-, and long-term layers, and their hypothesised relationships with different contexts are made explicit. The key device here is the construction of CMO configurations, where C stands for context, M for mechanism, and O for outcome. Qualitative insights from fieldwork, staff reflections, and past studies are translated into "if–then" statements: if a particular configuration of institutions, norms, and resources is present, and the organisation activates certain mechanisms, then specific patterns of change should be observable. These CMO configurations become the backbone of the evaluation, guiding what to look for and where to look, and offering hypotheses that can be tested, refined, or falsified as evidence accumulates.

Phase three is the mixed-methods excavation of evidence at two major levels: the landscape and the household, complemented by process tracing. At the landscape

level, the framework recommends drawing on quantitative, non-survey data such as Census tables, Mission Antyodaya scores, administrative records, and geospatial imagery to track structural changes in demography, infrastructure, ecological conditions, and service access. This provides a system-wide view of how the region has shifted over time, independent of any one project sample. At the household level, a livelihood deep-dive uses carefully designed surveys to compare "treatment" and "control" areas, including panel data where available, in order to observe changes in income sources, assets, time-use, mobility, and participation. To avoid treating numbers as self-interpreting, the framework pairs these quantitative components with qualitative process tracing through focus group discussions and interviews. This qualitative strand asks why the numbers look as they do, probing mechanisms, turning points, and countervailing forces. The three components together create a thick evidentiary base that can speak to both patterns and processes.

The fourth phase is analytical synthesis, framed as crafting a contribution claim. Here, the evaluator assembles and interrogates the emerging causal story about how and to what extent the organisation has contributed to the observed changes. A central tool is what the framework calls difference-in-context analysis. Rather than relying solely on treatment–control comparisons, it asks how impact varies across areas with varying baseline institutional densities, state presence, or market structures, and whether these differences align with the earlier CMO hypotheses. This contextualised comparison helps disentangle the organisation's influence from broader state or market trends. The framework also introduces an attribution–contribution toggle: in some cases, where the organisation clearly created new institutions or infrastructure, stronger attribution claims may be justified; in others, where it mainly catalysed access to existing systems, more modest contribution language is appropriate. The point is not to force a single causal verdict, but to arrive at a transparent, evidence-based narrative that can withstand scrutiny.

The final phase is structural outcome mapping, in which the results of the synthesis are framed as systemic change rather than as isolated project effects. This is done through a resilience matrix that allocates findings into quadrants such as biophysical, spatial, civic, and human domains. Biophysical outcomes may cover changes in land use, water security, or ecological buffers; spatial outcomes capture mobility patterns and rural–urban linkages; civic outcomes include shifts in collective action capacity and local governance; human outcomes trace changes in agency, aspirations, and time-use. Mapping across these quadrants allows evaluators to see how different strands of change reinforce or compensate for each other, and to identify which dimensions of resilience have deepened and which remain fragile. It also anchors the assessment in a structural register, emphasising that impact is ultimately about altered system trajectories, not just short-term beneficiary gains.

Taken as a whole, the framework encodes a shift from history to theory, from theory to evidence, from evidence to synthesis, and from synthesis to claims about structural impact. It offers not just a set of tools, but a way of thinking about long-term evaluation that respects complexity and context while still demanding explicit causal reasoning and systematic use of data.

5.4. Limitations and Future Work

This study has several limitations that are important to acknowledge, both for interpreting the findings and for guiding future work. A central constraint was the absence of precise information on when PRADAN first entered each programme village. Without reliable village-level start years, it was not possible to construct an 'exposure' variable that captured the duration of intervention, either at the village or household level. This, in turn, limited the ability to compare early-versus late-entry villages systematically, or to estimate dose–response type relationships where years of engagement could be related to differences in ecological, livelihood, or governance outcomes. With time-stamped entry data, future analyses could use the same framework but layer in more explicit temporal contrasts- treating years of intervention

as a key explanatory dimension rather than inferring ‘longer’ or ‘shorter’ engagement from qualitative accounts alone.

A second limitation concerns the research design's resource intensity. The mixed-methods excavation demanded substantial investment in landscape-level secondary data work, primary household surveys, and qualitative fieldwork across dispersed locations. This was necessary to do justice to the long-term, structural questions at the heart of the framework, but it also makes the approach demanding for smaller organisations with limited evaluation budgets. There is a risk that, in practice, only better-resourced NPOs or donor-funded studies will be able to implement the full suite of methods, potentially reproducing inequalities in who gets to produce authoritative impact narratives. For the framework to be genuinely useful across the sector, donors and philanthropic actors will need to recognise that long-term, realist evaluation is intrinsically more expensive than routine monitoring, and should be prepared to underwrite the additional costs of high-quality data collection and analysis, especially for grassroots organisations that cannot absorb these expenses in their core budgets.

These limitations point directly to agendas for future work. First, organisations working with long-term horizons could systematically archive major intervention milestones at the village level, so that subsequent applications of the framework can more rigorously examine how patterns of change vary with the duration and sequencing of engagement. Second, there is scope to experiment with lightweight adaptations of the framework - using fewer survey modules or more purposive sampling - while still retaining its core realist logic, thereby lowering the cost barrier without abandoning conceptual integrity. Finally, donors and organisations operating in agro-ecological and institutional contexts similar to those of Gumla and Dhamtari could adopt this framework as a shared evaluation scaffold. If multiple actors in a region were to apply it, even in slightly simplified form, it would generate a comparative body of evidence on how different strategies interact with similar structural fields. Over time, such

cumulative use would both refine the framework itself and deepen collective learning about what kinds of long-term investments actually shift rural systems, and under what conditions.

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Annexure 1: Illustration of Developing First Order Categories from qualitative data

S.no.	Pg.no.	Quotes	First Order codes
1	1	initially there were no SHGs in the village. In 2008, 4 groups were formed.	4 SHGs formed in 2008
2	1	From my childhood I recall, there were some 50-60 families in the village, today there are 100 families.	Village size has doubled from 50-60 families to 100 now
3	1	Traditionally, we lacked trust among the fellow villagers. We helped each other occasionally, or sometimes even didn't care much. Moreover, there used to be frequent fights among the villagers, for petty reasons and there was a lack of social collectivism. As the SHGs started forming, and the executives of PRADAN started coming to train the SHG didis on smooth functioning of the SHGs in the village, things changed.	Before SHGs formation: Lack of trust, fights, collectivism
3	1	Traditionally, we lacked trust among the fellow villagers. We helped each other occasionally, or sometimes even didn't care much. Moreover, there used to be frequent fights among the villagers, for petty reasons and there was a lack of social collectivism. As the SHGs started forming, and the executives of PRADAN started coming to train the SHG didis on smooth functioning of the SHGs in the village, things changed.	After SHGs were formed: This changed, more trust and solidarity
4	1	It took around 2 years for the didis to understand and smoothly run the SHGs.	It took two years for women to run SHGs smoothly
5	1	P1 (00:06:18): The SHG members had to face some difficulties and backlashes, as the men didn't want their wives to be part of it. They were questioned as to what they were doing, what was the point, who are these people coming to the village so often, what if these people (PRADAN executives) make you collect money, and then run away with all of it etc. This was a collective feeling among the men.	Challenges in setting up SHG: sceptisim about PRADAN professionals among men in the village
6	1	P3 (00:06:44): Yes for around the first 5 years, we had nothing to do. P1 (00:06:49): Even if we were doing it, we didn't wholeheartedly approve of the idea	Men took around 5 years to engage and even then didn't approve of the idea
7	1-2	P4 (00:06:52): back then, we weren't used to speaking in front of 4-5 men. Neither could we sit in front of them. We used to hide by the door mostly. We couldn't go to far places like the banks in the Ghagra block. P5 (00:07:02): Earlier we didn't know about all these things. P4 (00:07:07): Earlier we used to travel a lot less. After being part of the SHGs, we became confident enough to go wherever we needed to.	Before: Low confidence in women to speak or sit in front of men, travel to nearby block
7	1-2	P4 (00:06:52): back then, we weren't used to speaking in front of 4-5 men. Neither could we sit in front of them. We used to hide by the door mostly. We couldn't go to far places like the banks in the Ghagra block. P5 (00:07:02): Earlier we didn't know about all these things. P4 (00:07:07): Earlier we used to travel a lot less. After being part of the SHGs, we became confident enough to go wherever we needed to.	After: women can go wherever needed"
8	2	P4 (00:07:34): No. They questioned the SHGs, they said isn't it being enough whatever we are earning. What would happen by your 10 rupees saving. Or things like, where are you going, why are you wasting your time in these meetings. The group meetings usually take around a couple of hours. In these meetings, we talk about things, do our savings, and maintain the account books. So these things usually take time	Questions asked by men to women: Do we not earn enough?, What value will your 10rs. add?, Why are you wasting time these meetings
9			Activities in the meeting such as savings, maintaining accounts book, other conversations are time taking
10	2	P4 (00:08:06): Yes, mostly the household chores, and some agriculture but on a very small scale, and grew crops like wheat, lentils (black gram), and millets, we didn't focus much on growing vegetables. Some aubergine and potato farming but mostly household consumption centric.	Work before SHGs: Household chores, small scale consumption centric farming

S.No.	Pg. No.	Quotes	1st Order Codes
	1	PRADAN started working here in 2011 [When asked if PRADAN was working in nearby villages too] I don't know about other places, can't say for sure, but PRADAN came here first. Yes, in this region. In Basiya… in Lohri Basiya's village.	PRADAN started working here in 2011.
	1,2	[When asked about of they knew SHGs and how they work] In the beginning, brother, we didn't know anything about it. Nobody in our hamlet had seen a mandal (SHG) before. We had only heard about it from others, but never really seen one. Then they showed us how a mandal works. For example, they showed us a poultry farm somewhere, and explained how people had formed a mandal. After seeing that, they told us that if women join together, learn to read and write, then things will improve. Back in 2011, many of us were illiterate—I myself had studied only up to Thepa (primary school). I didn't know much. But the didi (PRADAN worker) said that forming a mandal is very important. If you don't join, nothing will happen. If you join, you'll learn and benefit. At first we hesitated. We thought: "If money gets collected, what if someone runs away with it? We earn with such difficulty—selling a handful of vegetables for one or two rupees—what if that money is lost?" At that time, even five rupees was a big deal for us. We'd sell some spinach or greens and save one or two rupees. That's how we managed. So we were scared about putting that money into a mandal. But then we were told firmly: "No, you must join. Everyone will join. This is how it works." Slowly, we saw that mandals were indeed forming—even in our village three mandals came up. Then we said, "Okay, if everyone is joining, why shouldn't we?" So we also joined, and once we formed the mandal, we realized it really worked. Everyone knew who was joining, who wasn't. We too became members. Even then, we were anxious: "What if someone runs away with the money?" Because it was so hard to earn even one or two rupees by selling vegetables. Still, we contributed—we deposited ₹15 each. And yes, we worried: "Who is collecting the money? What will happen to it?" That's how we used to talk.	In the beginning, community members did not know anything about SHGs Pradan showed them how a SHG works. A poultry farm was used as an example of SHG activity. The community was told that if women join together and learn, things will improve. In 2011, many community members were illiterate. Some had studied only up to primary school. People had limited awareness or knowledge PRADAN workers emphasised that forming an SHG was very important. They said that without joining, nothing would happen. Joining would lead to learning and benefits Initially, community members hesitated to join. There was fear that if money got collected, someone might run away with it Families earned with difficulty, often by selling small amounts of vegetables. Even five rupees was considered a significant amount. People sold spinach or greens and saved one or two rupees at a time. They were scared to put that money into a mandal PRADAN workers firmly insisted that everyone must join. Gradually, community members observed mandals forming in their village. Three mandals were formed in the village. People decided to join because others were joining After formation, they realised the mandal system worked Anxiety about money being misused or stolen persisted. But members contributed 15 rupees each despite fear
	2	Woman 3: Yes, from the beginning. All together, we formed the groups. Just like when Bhaskar Kumar Kakoti dada came, at that time we all together formed the SHGs. Three SHGs were formed on 6/3/11. Woman 4: Bhaskar and Ashok were the ones who started it. Woman 3: Yes, Bhaskar came first, and then Ashok and Sanjay dada came. They were the ones who fully formed the groups—gave SHG training, did all the auditing, SHG training, bookkeeping training, everything. The dadas gave us all of that. Bikalp: In the beginning, didn't the dadas (husbands) ask at home where you were going? Woman 1: They did ask, bhaiya. Back then, we wouldn't step out of the house without being asked where we were going. Everyone used to ask—our brothers, husbands, even others in the village. They would say, "Where are these women going, what are they doing?" We had to listen to such questions, from family as well as from outsiders. But gradually, as we kept going for training, things started moving. Sometimes the dadas would also take us around for	All the women present during the FGD were part of the first SHGs Three SHGs were formed on 6/3/2011 Bhaskar dada initiated the SHG formation. Ashok and Sanjay dada also supported and joined the SHG formation efforts Pradan provided training which included auditing, SHG functioning and bookkeeping Initially, women were questioned at home whenever they stepped out. Husbands, brothers and other villagers would ask where the women were going. Women faced scrutiny both from family members and outsiders. Over time, participation in training reduced this questioning. Husbands eventually

Annexure 2: Illustration of the Development of Second and Third order Categories from first-order codes

Narratives of Change	Village Name	Village Type: Intensive	Village Name	Non-Intensive
Before PRADAN	Shivrajpur, Gumla	Before SHGs formation: Lack of trust, fights, collectivism	Banai Basia, Gumla	NA
		Before: Low confidence in women to speak or sit in front of men, travel to nearby block		
		Work before SHGs: Household chores, small scale consumption centric farming	Kurmiya	Unsure about joining the SHG due to time and money concerns.
		Before: Unaware of crop planning, only wheat cultivation		Before- Villagers and didis initially feared Pradan would charge them for work like land leveling
		Before: sprinkle water on wheat grains, unplanned irrigation		In times of problems, familieshad to dilute rice into rice water to stretch food resources, highlighting past vulnerability
		Before: Migration (locked houses for 6-7 months), bought rice with money earned		Before- Used to survive on minimal oil and two sarees a year.
		Before: Borrowing rice, lack of clothing		
		Before: individual farmers selling produce in markets, prices and timings varied, travelling expenses extra	Kohabahra	Collective resistance for domicile rights.
		Before: Men making all decisions at home		Consistent resistance for 15-20 years.
		Before: Cattles, especially hen used to die due to diseases		Spent time in jail fighting for a cause.
		Before: Open defecation was practiced in all households		Fought against Forest department and government and gained their rights.
		Before: Not much participation of women in Gram Sabhas		Have gained domicile rights, and documents supporting the claims.
				Before 2007, people used to be engaged in bamboo basket making.
	Govindpur	[Before Pradan] At that time, the Paddy we used to grow used to be enough for us to eat.		No agriculture, used to forge from forest.
				This village is of Kamhar caste and the CRP for the village is from Gond trive. There has been historical divison between these sub-groups in the region historically.
	Kashpur	People were mostly engaged in agriculture before.		Gonds have different settlements compared to Kamhars
		Paddy was the major crop in the village.		Earlier, there were inadequcies related to water
		Migration was prevelant, to construxtion sites and brick factories.		Homogenous composition of village by caste
		Income and consumption was on a dily basis.		Before PRADAN, consumption was based on forest produce
		Before PRADAN agriculture, forest produce and migration were the source of income.		Agriculture was monsoon driven, and people with knowledge of agriculture used to do farming.
				Migration was dominant for income generation, but only during moonsoon.

Narratives of Change	Village Name	Non-Intensive
	Kelga	SHG members intervene in domestic disputes when asked, but their ability to mediate is limited because some men reject their involvement, while others respond and reduce harmful behaviour
		Women previously organised anti-alcohol rallies with support from PRADAN, but such actions have declined, and liquor production continues because they lack the collective power to enforce change
		Some women continue brewing liquor due to lack of livelihood options, and even when supported through schemes like Phulo-Jano, alternatives are not sustained and liquor production resumes
		Some women brew liquor due to lack of viable livelihoods, though a few have shifted to alternative income sources (like opening small shops) when financially able to stop brewing
		Clear distinction between Maiya (unconditional personal transfer) and Samooh funds: Maiya is autonomous, non-repayable income that increases individual discretion and reduces need for borrowing, while Samooh funds are collective, repayable credit governed by group rules and accountability, enabling investment but constraining individual autonomy.
	Kisni	The group has about ₹5,000 saved, but audits have not been completed and accounting entries are delayed due to errors in record-keeping
		Some members avoid taking larger bank-linked loans because they fear being unable to repay, leading to hesitation and underutilisation of available credit
		Women do not cultivate rabi crops in their main fields due to water constraints, but they grow seasonal vegetables such as potato, tomato, peas, cauliflower and chilli in small kitchen gardens
		Block Organisation (BO) meetings have stopped occurring, and women say this is because attendance has declined.
	Sunaridehan	prolem of water so don't plant anything else apart from paddy
		main issue is drinking water, village depends on one well which is used when tap water stops
		govt borewell exists but stops working in summer
		poor water quality affected health earlier, despite large dam nearby water not available
		demand raised for drinking water facility but full dam not approved due to forest, forest pond water helpful for crops but not for drinking
		water scarcity limits farming to one crop per year
		problem of water

Narratives of Change	Village Name	Village Type: Intensive
	Patiya	Seasonal cropping includes mango, mustard, chilli, pointed gourd, cauliflower, peas and potatoes, though some seeds fail to germinate.
		Water scarcity was severe earlier, but the village has had reliable water for the last three years through a single functional borewell. Attempts to dig additional bores nearby failed due to rocky terrain, and sufficient water is available only about a kilometre away near the river.
		Electricity supply is unstable during rains; outages take time to be repaired, and villagers—often children—collect money to pay the repair workers.
		Despite having seven women's groups, the village lacks a tractor, making cultivation difficult. Hiring is costly, and not everyone can afford it. A tractor scheme application was discussed, but villagers did not submit the required form in time.
	Ichagutu	Members reported not receiving any farming-related training from PRADAN
		SRI training occurred in the village but participation and uptake were minimal
		PRADAN introduced watershed planning and demonstrated rainwater harvesting, but collective action did not materialise due to limited community mobilisation
		Women understood potential water sources through PRADAN's mapping exercise, but they did not participate directly in the mapping process
		Tomato cultivation declined because of water scarcity and widespread wilt disease in recent years
		but supply of water has since stopped working
		Irrigation relies on well water because the solar system is unreliable and works only with sufficient sunlight
		Water supply is unreliable due to unaddressed leakages that waste water and prevent it from reaching all households
		Women attempt to intervene in household conflicts, but resistance from men and backlash limits their ability to mediate effectively
		Gender norms restrict women from driving vehicles or doing certain tasks, creating social penalties that limit their ability to use newly learned skills
		Lack of irrigation limits farming, and women hope the SHG or PRADAN can help arrange water for agriculture

Narratives of Change	Village Name	Non-PRADAN
Agnostic to PRADAN	Khetli	A nearby perennial river serves as a water source, but its flow reduces in the summer, limiting its use for household and agricultural use
		The village is socially heterogeneous, comprising multiple religious and caste groups
		SHGs are socially mixed rather than organised along caste lines
		The SHG was originally formed in 2012 by a non PRADAN organisation and later integrated into JSLPS in 2018
		Seasonal migration for work to states like Punjab and Himachal was common
		Households continue to combine local MGNREGA work with seasonal migration for income
		Many households prefer private English-medium (ISC) schools, while some children still attend government schools
		Women initially formed small SHGs independently and later joined Arouse for a ₹10,000 subsidy, then integrated into JSLPS in 2018, which expanded access to government schemes and higher loan limits (₹1–10 lakh)
		Although eligible to split into two groups to receive separate subsidies, women chose to remain a single SHG showing collective identity, women's agency in group decisions and the continued influence of household social structures on SHG participation.
		SHG loans are used flexibly for farming, children's education, business needs, food expenses and other household requirements
		Before JSLPS linkage, limited savings restricted borrowing to small amounts (₹1,000–₹2,000), whereas integration into JSLPS enabled access to larger loans
		JSLPS expanded access to loans and information, with staff playing a key role in informing women about available financial services
		Some women are still learning to sign their names, but irregular practice and household workload make it difficult to retain these skills
		Loan repayment can be stressful; delayed repayment increases interest, but SHG members allow flexibility when someone needs more time, relying on trsuts rather than action
		SHG loans are provided whenever funds are available, but can be declined when the group lacks sufficient money
		Members receive occasional trainings which they complete using mobile phones
		Information about agriculture schemes is shared through senior SHG members who attend trainings and

Narratives of Change	Village Name	Non-Intensive
Agnostic to PRADAN	**Dhangoan**	Context: There are 145 houses.
		Context: It is a heterogenous tribal community
		Context: The primary occupation is agriculture
		Context: Seasonal migration is primarily undertaken by men during non kharif periods with some women also migrating.
		The Anganwadi was already present earlier.
		Jharkhand Mukhyamantri Maiyaa Yojana has been introduced in the village in recent years.
		Pradhan Mantri Ujjwala Yojana has been implemented for cylinder distribution.
		A dam had been constructed under MGNREGA to support farming.
		Water supply to each household was provided through the Har Ghar Jal Yojana.
		When individual connections were not available, they use shared household taps
		There is a school up to class 8 was run with only four teachers.
		Agnostic: Earlier deliveries happened at home, but now births take place in hospitals.
		Because of Anganwadis, deliveries moved from home to hospital, pregnant women are reguarly checked at the Anganwadi, and Mamta Vaahan provides free transport and treatment for mothers and children after delivery.
		Har Ghar Jal Yojana started in 2022
		Well digging and Bagwani plantation work were done under MGNREGA, with Bagwani planted in 2017–18 and again in 2024–25.
		Most houses were built under Pradhan Mantri Awaas Yojana, with a few under Abua Awaas Yojana.
		Rice is sold to buyers who come to the village, with prices fluctuating around ₹17–₹20 per kg

Narratives of Change	Village Name	Non-Intensive
Because of PRADAN	**Banai Basia, Gumla**	Pradan began work in 2011
		Although women felt SHGs would be beneficial, initial guidance and support came via PRADAN and CRP Christina.
		People like Christina didi, Pratima and Ashok were mentioned as present during SHG formation.
	Kurmiya	Started informally with a notebook and Bhaiya from Pradan guided on recordkeeping and accounting.
		Experimented with savings amounts to meet the needs.
		Gradually, learned to ask the Panchayat to get some work done/ whatever is needed in the community.
		Initial suspicion about saving money collectively, but gradually gained clarity that the money would remain with the group and be available in times of need
		Pradan professional gave detailed guidance and training on farming and MNREGA. SHG members began demanding and executing local works like roads and ponds
		Improved land and reduced financial vulnerability were seen as key benefits. Earlier, women relied on high-interest loans and put up their jwellery. But SHG support helped them avoid such risks
		SHG provided low-interest loans that women used forvarious reasons like farming, marriage, shopping and business
		Participation in the SHG reduced hesitation and built confidence to speak, introduce oneself and communicate openly with others. It also improved interpersonal relationships in the village.
		Participation in SHG led to major changes in lifestyle, eating habits and increased confidence in managing things independently
		SHG enabled women to take up preparing Mid day meals for the local school and fish farming locally, leading to household-level changes in lifestyle, diet, and self-sufficiency without needing to leave home
		SHG meetings follow a structured process with attendance, contributions, fines, and recordkeeping. Household responsibilities are adjusted to ensure participation, even if it causes minor disruptions at home. Like men make

Narratives of Change	Village Name	Village Type: Intensive
Because of PRADAN	**Shivrajpur, Gumla**	4 SHGs formed in 2008
		After SHGs were formed: This changed, more trust and solidarity
		Activities in the meeting such as savings, maintaining accounts book, other conversations are time taking
		After: growing crops at large scale, selling
		As SHGs started running smoothly, PRADAN shifted to Agri. "HYV seeds, manures, pesticides, cropping patterns, mostly vegetables"
		After: Diversification of crop (started with tomato in kharif season) with risk, one crop at a time, market setup at village level
		Investment: 500 rs each, Profits earned from tomato cultivation:5000-10000 rs each
		Monthly visits arranged by PRADAN: first visit in Tirsiri in Ghargra block (for DHG functioning), Shipringa in Gumla (for SHGs + planned farming), helped with knowledge transfer, motivation, influencing men
		After: transplant the seeds with SRI technique. No issues with more agri work along with usual
		After: Migration reduced, especially of didis and children. A few go in summers from bigger families but not the entire household. Reason: Increased production due to imporvement in farming
		After: Sufficient grains even for animals, eating fresh food, some can access private schools
		After: wholesalers contact from field visits arranged by PRADAN, they come and collect the produce and give fixed price. This way is helpful. For one crop SHG women themselves pooled toegther produce and sold nearby at same rate for entire produce.
		Women collected money to sit for SHG meetings on their own, started with 5 rupees/week, it has gone up to 10-20 rupees now.
		For SHG group that saves 10 rs/week, each member has around 7000-8000 individual savings
		Loans of 2000-3000 rs taken from SHG used mainly for farming and sometimes for medical emergency. In agriculture, the loans are for seeds, manure, pest control and not for cattles and goats. With more savings, loans also being taken up to setup shops, buy auto rickshaws, marriages, attend to medical needs.

Narratives of Change	Village Name	Non-PRADAN			
Before PRADAN	**Kasarwahi**	Initially, men of the village helped mobilise women during SHG formation and addressed early concerns			
	Ghotiyadadar	No. of houses in village is 18			Demography
		A few pucca houses, Awas yojna is picking up currently			SHG
	Tati	A household pipeline network was introduced recently. The main water tower was constructed in 2021 and pipelines were extended in 2023			Activities under SHG
		The settlement is socially fragmented. Earlier residents lived together in one hamlet, but newer households later split off to form a separate hamlet. The current hamlets are religiously mixed, with			Agriculture
		Households cultivate a range of Kharif crops including paddy, wheat, maize, finger millet and gourds			Non-Agriculture Livelihood
		Seasonal migration continues. More people now migrate to cities such as Mumbai and Delhi for work despite improvements in local services. Migrants typically return home for the Kharif season.			Water
		The earlier SHG became inactive due to internal conflict over an unresolved dispute involving a borrowed money that was not returned. Some members withdrew in protest, and the group collapsed.			Migration
	Khetli	Before SHG formation, women were isolated and had limited awareness			Social Cohesion
	Longa	Respondents farm and also migrate for work. Some run small shops, others go to brick kilns or to cities			Govt Schemes
		Earlier there was no water in the village. Farming depended only on the rains. They grew rice but could			Gender
		Earler women could not step out. Husbands did not allow it. There was no capital for farming. Their houses were made of khapra, and children suffered from the smoke inside the home.			
		Early hesitation toward SHG membership and women questioned the purpose of weekly savings due to low literacy and lack of prior exposure			
		Lack of borewell and irrigation infrastructure limits agricultural expansion.			
		Applications for solar irrigation systems have been submitted, but approvals have been pending for 8–9 months, leaving households without access to solar-based irrigation.			
		The hamlet has expanded over the past year, with number of households increasing to around 500.			
		Farmers report limited benefit from loan waiver schemes. Although Kisan Credit Card loans were reportedly waived once around 2020–21, only some households received the benefit, and information about eligibility and actual waiver outcomes is unclear			

Narratives of Change	Village Name	Non-Intensive
Before PRADAN	**Banai Basia, Gumla**	NA
	Kurmiya	Unsure about joining the SHG due to time and money concerns.
		Before- Villagers and didis initially feared Pradan would charge them for work like land leveling
		In times of problems, familieshad to dilute rice into rice water to stretch food resources, highlighting past vulnerability
		Before- Used to survive on minimal oil and two sarees a year.
	Kohabahra	Collective resistance for domicile rights.
		Consistent resistance for 15-20 years.
		Spent time in jail fighting for a cause.
		Fought against Forest department and government and gained their rights.
		Have gained domicile rights, and documents supporting the claims.
		Before 2007, people used to be engaged in bamboo basket making.
		No agriculture, used to forge from forest.
		This village is of Kamhar caste and the CRP for the village is from Gond trive. There has been historical divison between these sub-groups in the region historically.
		Gonds have different settlements compared to Kamhars
		Earlier, there were inadequcies related to water
		Homogenous composition of village by caste

Narratives of Change	Village Name	Village Type: Intensive
Before PRADAN	**Shivrajpur, Gumla**	Before SHGs formation: Lack of trust, fights, collectivism
		Before: Low confidence in women to speak or sit in front of men, travel to nearby block
		Work before SHGs: Household chores, small scale consumption centric farming
		Before: Unaware of crop planning, only wheat cultivation
		Before: sprinkle water on wheat grains, unplanned irrigation
		Before: Migration (locked houses for 6-7 months), bought rice with money earned
		Before: Borrowing rice, lack of clothing
		Before: individual farmers selling produce in markets, prices and timings varied, travelling expenses extra
		Before: Men making all decisions at home
		Before: Cattles, especially hen used to die due to diseases
		Before: Open defecation was practiced in all households
		Before: Not much participation of women in Gram Sabhas
	Govindpur	[Before Pradan] At that time, the Paddy we used to grow used to be enough for us to eat.
	Kashpur	People were mostly engaged in agriculture before.
		Paddy was the major crop in the village.
		Migration was prevelant, to construxtion sites and brick factories.

Annexure 3: Detailed Annual Report Analysis

Period	Strategic Focus	Development Approach and Interventions	Institutional Innovations	Partnerships and Collaborations	Power Dynamics and Gender	Evolution of Donor Relationships	Tentative Theory of Change
2004-06	Foundational Scaling & Consolidation	Livelihood interventions focused on agriculture, poultry, and microenterprises. SHG formation as the primary entry point for the economic empowerment of women	Interventions were mostly thematically isolated, focusing on specific livelihood activities like poultry, agriculture, and water management. (PRADAN, 2005, p. 2) SHGs for financial inclusion	Initial partnerships were mostly with local governments and NPOs. The focus was on scaling interventions and resource mobilisation from government schemes and corporate donors. (PRADAN, 2005, p. 4)	Gender empowerment was a central theme, but women's participation was mainly focused on financial inclusion. The power dynamics were such that PRADAN facilitated change, but communities were not yet fully in control of their development	Donor relationships were primarily transactional, focusing on funding for specific programs like livelihoods and agriculture. (PRADAN, 2005, p. 4).	Focused on grassroots mobilisation through Self-Help Groups (SHGs), emphasising economic empowerment of women through livelihood programs like agriculture and microenterprises (PRADAN, 2005, pp. 2-4)

		Interventions were designed to directly impact livelihoods by focusing on sectoral activities such as agriculture, livestock, and microenterprises. (PRADAN, 2005, p. 3) Participatory development was in its nascent stage, where PRADAN facilitated the initial steps, but communities were not yet fully leading these processes.	Early focus on sectoral livelihoods (agriculture, microenterprise) (PRADAN, 2005, p. 2-4)		(PRADAN, 2005, p.3)		The strategy was to empower communities by building financial systems, which would later be scaled through government support.

Period	Strategic Focus	Development Approach and Interventions	Institutional Innovations	Partnerships and Collaborations	Power Dynamics and Gender	Evolution of Donor Relationships	Tentative Theory of Change
2007-08	Visioning Future Growth	Launch of Vision 2015 framework Shift from service delivery to community-led models. Emphasis on gender equity and livelihood convergence	Expansion of SHG federations Community mobilisation and gender mainstreaming within SHGs (PRADAN, 2007, p. 3)	PRADAN expanded its partnerships to include multi-stakeholder collaborations involving government bodies, international donors, and academic institutions. This enabled PRADAN to leverage resources for larger-scale interventions	Women's role in governance and decision-making expanded. PRADAN began to empower women to take leadership roles within SHGs and in local governance (PRADAN, 2009, p. 5)	PRADAN's donor relationships matured into long-term partnerships. International donors and government collaborations began to support scalable solutions, particularly in the fields of livelihoods and rural development (PRADAN, 2009, p. 6).	The implementation strategy evolved to incorporate community-led models. PRADAN emphasised reducing dependency on external aid by training local leaders (CSPs) and forming SHG federations to manage livelihoods collectively (PRADAN, 2009, p. 5). At this stage, PRADAN's approach was diversified to include water resources
2008-09	"Community Taking Charge" Era	Community self-reliance: local leadership through CSPs	SHG federations as governance bodies				

		Focus on integrated natural resource management (INRM) and family-based livelihood planning.	Expansion into multi-sectoral livelihood interventions (PRADAN, 2009, p. 6)	(PRADAN, 2009, p. 6)			management and integrated natural resource management (INRM) to strengthen agricultural resilience.
2009-10	Innovative Models & Strategic Partnerships	Partnership-based model to scale interventions Expanded to include water, livelihoods, and health interventions Strengthened SHG governance and local participation Intervention design increasingly adopted integrated approaches.	Formal partnerships with government bodies, NPOs, and corporate donors Leadership development programs and policy advocacy (PRADAN, 2010, p. 4)				

		PRADAN began integrating gender equality and governance into livelihoods, ensuring that women not only participated in the economic processes but also took leadership roles (PRADAN, 2009, p. 6). Participatory development was deepened, with SHGs evolving into federations that took more control over decision-making	Thematic areas began to converge, especially with the introduction of INRM models that integrated water, agriculture, and livelihoods. Additionally, gender began to be integrated across thematic interventions, making gender a cross-cutting theme in all interventions. (PRADAN, 2009, p. 5)				

Period	Strategic Focus	Development Approach and Interventions	Institutional Innovations	Partnerships and Collaborations	Power Dynamics and Gender	Evolution of Donor Relationships	Tentative Theory of Change
2011-15	Institution Building & Systematisation	Transition to community-led development: SHGs take ownership of livelihoods, education, and health programs Scaling up SHG federations to facilitate governance and asset management The intervention design moved from sectoral livelihood	Multi-stakeholder partnerships: collaboration with NRLM, state governments, and corporate CSR initiatives Institutional strengthening for long-term sustainability (PRADAN, 2013-14, p. 7) By this time, intervention themes like livelihoods,	Partnerships with both state and corporate partners grew significantly, particularly through NRLM, where PRADAN helped scale up livelihood interventions and capacity building (PRADAN, 2013-14, p. 7)	Gender became more prominent with women-led decision-making in livelihoods, governance, and local development. PRADAN also began to address gender-based violence and social inequality at the community level (PRADAN, 2013-14, p. 6).	Donor relationships evolved into multi-year partnerships, particularly for systemic change. PRADAN worked with both government departments and corporate donors on large-scale programs like NRLM (PRADAN, 2013-14, p. 7).	The strategy shifted towards institutionalising community-led models and strategic partnerships. The focus was on scaling integrated interventions that addressed not only livelihoods but also health, sanitation, and education (PRADAN, 2013-14, p. 6).

		programs to holistic community development, including health, education, and nutrition. PRADAN embraced a more participatory model in which SHG members were engaged in local governance and policy advocacy (PRADAN, 2013-14, p. 7)	education, health, and governance were fully integrated into community-driven models, aligning with PRADAN's broader mission of holistic community development (PRADAN, 2013-14, p. 7).				During this period, a shift from direct intervention to partnership-based scaling was evident.

Period	Strategic Focus	Development Approach and Interventions	Institutional Innovations	Partnerships and Collaborations	Power Dynamics and Gender	Evolution of Donor Relationships	Tentative Theory of Change
2015-20	Large-Scale Outreach & Governance	Comprehensive Livelihoods Approach: integrating market linkages, health, nutrition, and sanitation Focus on gender equality and women's participation in local governance. The design of interventions was centred around regenerative agriculture, climate-resilient practices, and	Integration of digital tools for monitoring and data-driven decision-making Strengthened partnerships with government and international donors for systemic change (PRADAN, 2020, p. 9) The thematic separation between livelihoods, gender, and climate resilience	PRADAN's partnerships with donors, state governments, and corporate entities became more institutionalised. PRADAN collaborated with major donors, including the Azim Premji Foundation, UNICEF, and the Bill & Melinda Gates Foundation, on climate adaptation and livelihood empowerment projects. This period marked the	The power dynamics shifted towards women's leadership. SHG federations and FPOs led the governance of livelihood programs, and women took on decision-making roles not only in livelihood interventions but also in local governance, such as	Donor relationships matured, with multi-year partnerships becoming the norm. Philanthropies like the Bill & Melinda Gates Foundation and the IKEA Foundation provided long-term funding for regenerative agriculture, climate resilience, and women's economic empowerment.	PRADAN's Theory of Change evolved to focus on scalable, systemic change, with an emphasis on community-led interventions and multi-stakeholder partnerships. The theory was built on the assumption that marginalised communities, particularly women, can be empowered through

		value chain development. PRADAN expanded its efforts in agriculture, focusing on smallholder farming and emphasising market linkages for women farmers. Interventions in water conservation and agroecology helped create sustainable livelihoods (PRADAN, 2019-20, p. 14). PRADAN's participatory approach deepened as women's	was less pronounced, with a focus on integrating these themes. Agriculture, water management, and gender equality were now interconnected, with a focus on eco-social empowerment through market access and value chain interventions (PRADAN, 2020, p. 12)	start of deeper collaborations with NRLM (National Rural Livelihoods Mission) (PRADAN, 2019-20, p. 15)	Panchayats (PRADAN, 2019-20, p. 14).	Corporate partnerships grew with companies like Hindustan Unilever and Mahindra & Mahindra (PRADAN, 2019-20, p. 15)	economic, social, and environmental interventions, which can lead to long-term transformation (PRADAN, 2019-20, p. 10) During this period, PRADAN implemented its strategy through Development Clusters (DCs), which served as geographical units for implementing multi-sectoral programs. The emphasis was on sustainability and women's empowerment

		collectives (e.g., SHGs, FPOs) gained increasing power in local decision-making. Community-led governance systems emerged, with women acting as leaders in managing livelihood resources and social capital (PRADAN, 2019-20, p. 10)					through SHGs, FPOs, and climate-resilient farming practices. By targeting local governance structures like Panchayats, PRADAN aimed to shift decision-making to community-driven models (PRADAN, 2020, p. 12)

Period	Strategic Focus	Development Approach and Interventions	Institutional Innovations	Partnerships and Collaborations	Power Dynamics and Gender	Evolution of Donor Relationships	Tentative Theory of Change
2020-22	COVID-19 Response & Adaptation	Rapid shift to community-driven disaster response, focusing on COVID-19 relief, livelihood recovery, and health systems Focus on women's economic empowerment and digital engagement. PRADAN focused on climate-smart agriculture, eco-friendly livelihoods, and value-chain	Expanded partnerships for COVID relief and livelihood recovery Use of digital platforms (e.g., Zoom, IVRS) for training and community engagement (PRADAN, 2022, p. 12) PRADAN continued to integrate climate	The COVID-19 response saw deeper collaborations with donors, corporations, and NPOs. PRADAN worked closely with NRLM, UNICEF, IKEA Foundation, and others to provide relief and livelihood recovery during the crisis (PRADAN, 2020, p. 14)	Women became decision-makers in both COVID-19 relief efforts and livelihood recovery programs, with SHGs and FPOs playing a leading role (PRADAN, 2020, p. 14) PRADAN emphasised female leadership in	Donor relationships were marked by the need for flexibility and long-term partnerships in response to the pandemic. PRADAN worked with philanthropies such as the Bill & Melinda Gates Foundation, the IKEA Foundation, and UNICEF, focusing on livelihood recovery and health interventions (PRADAN, 2020, p. 14).	PRADAN's Theory of Change in response to COVID-19 was focused on rapid adaptation and livelihood recovery. The core idea was that community resilience in rural areas could be built through digital tools, women-led collectives, and agriculture diversification (PRADAN, 2020, p. 13)

		models for women. It accelerated Agroecological practices and rainwater-harvesting interventions to help communities cope with climate impacts while ensuring sustainable livelihoods (PRADAN, 2020, p. 14). Participatory approaches continued to grow, with SHG federations playing a key role in livelihood recovery and community engagement during the	resilience, gender equity, and livelihood diversification into its interventions. The thematic separation was blurred, with a focus on systemic change through eco-social interventions and market linkages (PRADAN, 2020, p. 13)		livelihoods, digital financial inclusion, and climate resilience (PRADAN, 2020, p. 14)		Digital transformation became central to PRADAN's strategy, using online training, digital financial literacy, and remote livelihood support. The strategy also emphasised resilience in smallholder livelihoods and market linkages (PRADAN, 2020, p. 13)

		pandemic response. Women-led collectives took the lead in managing resources and organising community relief efforts (PRADAN, 2020, p. 13)					
2022-24	Perspective Plan 2030 & Scaling Impact	Collaborative systems change to scale impact for 50 million people by 2030 - Focus on gender equality, sustainable agriculture, and climate action. Deepening sectoral focus on	Perspective Plan 2030 for large-scale social change Collaborative partnerships with government, private sector, and civil society (PRADAN, 2023-24, p. 19)	Strategic partnerships with philanthropies, corporations, and government agencies are central to scaling interventions. Notable collaborations include those with the IKEA Foundation, Bill &	SHG federations are now recognised as crucial change agents in driving community-led change (PRADAN, 2023-24, p. 12)	Donor relationships are more institutionalised, with long-term, impact-driven partnerships. The organisation has aligned its goals with the Sustainable Development Goals (SDGs) and is working with both international	PRADAN's Theory of Change focuses on achieving 50 million beneficiaries by 2030 and scaling climate-smart agriculture, gender equity, and community-driven change. The approach is systemic, involving

		regenerative agriculture, water management, and women's leadership Interventions now focus heavily on regenerative agriculture, market linkages for smallholder farmers, and sustainable farming systems. Climate resilience remains central, with a focus on ecosystem support, soil health, and water management (PRADAN, 2023-24, p. 12).	Thematic separation is now focused on integrating agriculture, health, climate change, and women's empowerment in holistic intervention models. Sustainable livelihoods are linked with climate resilience and gender initiatives, making interventions more	Melinda Gates Foundation, and NRLM for climate adaptation and livelihood programs (PRADAN, 2023-24, p. 19)	There is a concerted effort to ensure women's active participation in local governance, market linkages, and climate resilience (PRADAN, 2023-24, p. 12)	agencies and private sector partners to scale livelihood programs and climate resilience interventions (PRADAN, 2023-24, p. 19)	multi-level collaborations with state governments, corporations, and NPOs (PRADAN, 2023-24, p. 19). Scaling through Development Clusters is the focus, with agriculture, livelihoods, and climate resilience as key priorities. PRADAN plans to expand the FPO Resource Centre and value chain development through partnerships with donors and state agencies

		PRADAN's participatory development models have reached new heights with women-led collectives leading livelihood projects, eco-social interventions, and local governance. These federations continue to act as key decision-makers in their communities (PRADAN, 2023-24, p. 19)	interconnected (PRADAN, 2023-24, p. 12)				(PRADAN, 2023-24, p. 19)

Annexure 4: Evolution of Interventions in GUMLA (Jharkhand)

Year	Intervention Focus	Details
2004-05	SHG Formation	PRADAN initiated its work in Gumla by forming Self-Help Groups (SHGs), starting with Sipringa in Raidih block. The focus was on building basic financial literacy and savings habits among rural women, marking the first step toward building institutions.
2006-07	Resource Development	Water resource development was introduced, enabling improved irrigation access and helping farmers transition to more reliable farming practices. SHGs were strengthened and expanded into new villages, increasing outreach.
2008-09	Livelihood Diversification	The diversification of livelihoods began with the promotion of agriculture-based microenterprises. The introduction of the Baari-Bagaan model integrated horticulture (fruit trees), vegetables, and agroforestry to meet food, income, and environmental needs.
2010-11	Institutional Strengthening	SHGs were federated into cluster associations and informal federations, helping women access bank credit and participate in livelihood planning. Focus was placed on building leadership within community institutions.
2011-12	Agriculture & Gender Inclusion	Agriculture interventions scaled significantly. System of Rice Intensification (SRI) techniques doubled paddy yields. SHGs successfully mobilised funds (₹15 lakh) from the District Plan for irrigation infrastructure. This period also saw the beginning of PRADAN's gender inclusion efforts and women's political participation.

2013-14	Livestock-Based Livelihoods	Goat rearing and veterinary training via SHGs; improved income for women in Kamal Mahila Mandal. Goat rearing emerged as a key livelihood intervention. Community members were trained as local veterinarians (barefoot vets), creating rural service delivery models. SHG women collectively generated over ₹1 lakh in goat sales.
2015-16	Water Harvesting & Nutrition	Small irrigation structures and kitchen gardens were introduced for food security. Nutrition-sensitive interventions were introduced. Kitchen gardens were promoted to address seasonal hunger, and small irrigation structures supported year-round cultivation.
2017-18	Integrated Natural Resource Management (INRM)	Deepened convergence with government; poultry and goatery scaled. PRADAN operationalised the Integrated Natural Resource Management (INRM) approach at scale. Asset creation through convergence with schemes like MGNREGA became a regular practice.
2018-19	Climate Smart Agriculture	Since 2016, PRADAN's solar initiative in Jharkhand has improved livelihoods, irrigation, and access to clean water across 25 villages. With six micro-grids, solar pumps, and piped water systems, it reduced costs, raised incomes, and empowered communities. The project benefits 5,263 people and aligns with six key Sustainable Development Goals.
2020-21	COVID-19 Relief	Community kitchens, food support, PPE distribution, and migrant relief work through SHGs. COVID-19 response efforts included setting up community kitchens, distributing rations and PPE kits, and supporting returnee migrants. SHGs played a central role in community mobilisation and delivery.

2021-22	Food Security & Digital Inclusion	The focus shifted to stabilising livelihoods and restoring food security through kitchen gardens, goatery, and digital transactions. SHGs continued to function as platforms for convergence and economic resilience.
2023-24	Regenerative Farming & Enterprise	Ongoing focus on nature-aligned agriculture, SHG-run microenterprises, and sustainable development. PRADAN has moved towards regenerative farming practices and is actively supporting SHG-led microenterprises. The emphasis is now on scale and sustainability, with women's collectives driving local economic transformation.

Annexure 5: Evolution of Interventions in DHAMTARI (Chattisgarh)

Year	Intervention Focus	Details
2005-06	Entry via DPRP	PRADAN entered Dhamtari through a formal partnership with the Chhattisgarh Government to implement the World Bank-supported District Poverty Reduction Project (DPRP) in the Kurud block. The work began with household surveys, poverty profiling, and SHG formation.
2006-07	SHG and Livelihood Expansion	Early livelihood-planning exercises and sector-specific interventions (likely in agriculture and goat rearing) were introduced. Emphasis was on identifying poor households and building grassroots institutions. Early asset-building efforts were introduced.
2013-14	Livelihood & Governance	PRADAN re-engaged more strategically, with efforts focusing on strengthening convergence between SHGs and local government schemes, especially around governance and planning.
2019-20	MGNREGA Convergence	MGNREGA was used for structured asset creation, with SHGs involved in identifying work priorities. This helped integrate wage work with long-term asset development, such as land bunding and farm ponds.
2021-22	Women's Nutrition & Enterprise	Nutrition-sensitive interventions, such as kitchen gardens and backyard livestock, were promoted. This year also saw increased attention to women's leadership in local institutions and economic activities.
2023-24	Livelihood Deepening	PRADAN's work in Dhamtari has moved toward deepening existing livelihoods. The focus is on improving productivity, enabling women's enterprises, and leveraging SHG platforms to integrate with public programs and financial services.

Annexure 6: Duration of PRADAN Exposure and Agricultural Productivity

Empirical Specification

To examine the relationship between PRADAN exposure (duration of presence of PRADAN) and agricultural productivity, we estimate the following specification:

$$\log(NDVI_{pm}) = \beta_0 + \sum_{k=1}^{3} \beta_k Exposure_{vk} + \gamma NGO\_Presence_{vt} + \sum_{k=1}^{3} \delta_k (Exposure_{vk} \times NGO\_Presence_{vt}) + \theta X_{pm} + \alpha_v + \lambda_m + \varepsilon_{pm} \quad (1)$$

where log(*NDVI*$_{pm}$) represents the logarithm of the Normalised Difference Vegetation Index (NDVI) for plot *p* in month *m*, which serves as a proxy for agricultural productivity.

The key explanatory variable, *Exposure*$_{vk}$, captures the duration of PRADAN presence in the village *v* in which plot *p* is located. Villages are categorised into four groups based on the number of years PRADAN has been present: no exposure, low exposure (1–5 years), medium exposure (6–19 years), and high exposure (20–29 years). Villages with no PRADAN exposure serve as the reference category in the empirical specification. The coefficients $\beta_{k,}$ therefore, capture baseline differences in agricultural productivity across villages with varying durations of PRADAN exposure relative to villages with no prior PRADAN presence.

$NPO\ presence_{vt}$ is a binary indicator that equals one if PRADAN is active in village v in year t. The coefficient γ measures the marginal effect of NPO presence in low-exposure villages. To examine whether the effect of NPO presence varies with exposure duration, we interact the NPO presence variable with the exposure categories. The interaction coefficients δ_k capture how the effect of NPO presence differs in low-, medium-, and high-exposure villages relative to villages with no PRADAN exposure, which serve as the reference category.

X_{vmt} is a vector of time-varying environmental controls, including rainfall and maximum temperature, both of which are important determinants of vegetation growth. The specification includes village fixed effects (α_v), which control for time-invariant characteristics of villages such as soil quality, geography, and agroecological conditions, and month fixed effects (λ_m), which account for seasonal variation in vegetation.

The analysis is restricted to the months August–October (capturing the peak kharif growing season) and January–March (capturing the rabi growing season) over the period 2017–2024. Standard errors are clustered at the village–month–year level to account for potential spatial and temporal correlation in the error terms.

Duration of PRADAN exposure matters for productivity gains

Table 1 presents the relationship between PRADAN exposure duration and agricultural productivity measured using the logarithm of NDVI. Villages with no PRADAN exposure serve as the reference category. The results show that villages with longer exposure to PRADAN exhibit significantly higher baseline agricultural productivity: low-exposure villages have 1.2% higher NDVI, medium-exposure villages 4.7% higher NDVI, and high-exposure villages 9.3% higher NDVI relative to villages with no exposure. The coefficient on NPO presence indicates that when PRADAN becomes active in previously unexposed villages, NDVI increases by approximately 1.6%. However, the interaction terms reveal that the

marginal productivity gains from NPO presence decline as exposure duration increases. The estimated NPO effect falls to about 1.3% in low-exposure villages, 0.5% in medium-exposure villages, and becomes negative in high-exposure villages. These results suggest diminishing marginal returns to prolonged NPO engagement: while long-exposed villages remain more productive overall, additional NPO presence generates progressively smaller productivity gains in mature intervention areas.

The declining marginal productivity gains associated with additional years of PRADAN presence likely reflect a saturation effect in the adoption of agricultural practices. Over time, the agricultural techniques and interventions introduced by PRADAN are gradually adopted by farmers, and knowledge diffusion within the village leads to widespread uptake of these practices. Once most households have incorporated these improvements, the scope for further productivity gains from continued NPO engagement diminishes. These findings suggest three possible implications for program strategy. First, once agricultural productivity gains reach a saturation point, PRADAN may consider shifting its focus toward other dimensions of household welfare, such as livelihood diversification, financial inclusion, or social development. Second, the organisation could expand its engagement within the village by targeting households that were not previously covered by the intervention. Third, PRADAN may consider reallocating resources toward new villages where the potential for productivity improvements remains high.

Table1: Outcome Variable is Productivity Measured by log(NDVI)

VARIABLES	Duration of Exposure
NPO Presence	0.016*** (0.003)
Low Exposure	0.012** (0.005)
Medium Exposure	0.047*** (0.005)
High Exposure	0.093*** (0.007)
Low Exposure#NPO Presence	-0.003 (0.005)
Medium _Exposure#NPO Presence	-0.011*** (0.004)
High Exposure#NPO Presence	-0.026*** (0.004)
Rainfall	0.000*** (0.000)
Temperature	-0.005*** (0.001)
Observations	19,236
R-squared	0.733
Village Fixed Effects	Yes
Month Fixed Effects	Yes
Clustering	Yes

Notes: Low exposure (1–5 years), medium exposure (6–19 years), and high exposure (20–29 years), with villages with no NPO exposure serving as the reference category.