

Case Studies from Underserved South Asia: An Initiative to Advance Human Ingenuity in Under-Resourced Contexts

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Abstract

To advance the SDGs' efforts to address the basic needs of underserved populations, such as poverty, hunger, health, education, clean water, and climate action, Project Ingenuity catalyses sustainable social change in marginalized South Asia, targeting extreme poverty and socio-cultural disparities in remote communities. Emphasizing local ingenuity, the initiative leverages frugal humanitarian innovation and views communities as agents of change. By directly transferring resources and empowering local communities, it promotes self-sufficiency fostering impactful solutions that resonate globally. The case studies and learnings explore Project Ingenuity's diverse approaches and methodologies, demonstrating participatory, culturally sensitive solutions for lasting, cost-effective, and locally driven transformation.

Over the past decade, the Sustainable Development Goals (SDGs) have notably advanced initiatives aimed at meeting the fundamental requirements of marginalized communities, including alleviating poverty, hunger, improving health, and enhancing education. Globally, individuals and entities from academia, public, and private sectors are actively contributing towards achieving these goals. Similarly, Project Ingenuity focuses on fostering sustainable social changes within under-resourced communities by harnessing human ingenuity at the margins, primarily in marginalized South Asia. Targeting geographically remote and severely impoverished communities (e.g., those living on less than \$0.50/capita/day), the initiative aims to mitigate extreme poverty and socio-cultural disparities. This essay will explore the contributions and methodologies of Project Ingenuity, drawing from experiences in diverse regions with varying cultures, languages, and environmental conditions.

Human ingenuity and humanitarian innovation

Scholars argue that human ingenuity, perceived as boundless, can drive transformative and sustainable social change in underserved communities (Martínez-Cortina, Garrido and Lopez-Gunn, 2010). Similarly, humanitarian innovations, dedicated to fulfilling basic needs for all (Mazzurco and Jesiek, 2017), aim to address marginalization and structural gaps in economically poor and socio-politically disenfranchised areas (Leydens and Lucena, 2014).

Scholars advocate for collaboration between academics/practitioners and local communities as co-workers/co-researchers to foster mutual learning and advance humanitarian innovation and social transformation (Eseonu and Cortes, 2018). They suggest breaking disciplinary boundaries and decentering science and technology expertise to develop culturally and contextually appropriate solutions

(Nieuwsma and Riley, 2010). Embracement of inter-/trans-disciplinary approaches empowers communities and underserved agencies to lead social change interventions, promoting local ownership and local control over problem-solving processes (Amadei et al., 2009).

Research contexts and challenges

Aligned with Sustainable Development Goals (SDGs 1, 2, 4, 6, 10, and 13), Project Ingenuity targets poverty, healthcare, education, clean water, cultural preservation, and climate action. The initiative has made significant strides in various regions by successfully completing several projects aimed at addressing the multifaceted challenges faced by underserved communities. Empirically speaking, the research initiatives impacted several South Asian communities; this includes (i) improving community health (construction of healthcare units, sanitation infrastructure, pedestrian bridges, and creating access to water); (ii) preserving and promoting culture and heritage (building Indigenous museums, libraries, craft revival centres, low-cost recording studios, along with radio and video channels) as well as (iii) student- and youth-led grassroots innovations to co-create innovative humanitarian solutions. Thus, the research outcomes demonstrated locally grown cost-effective solutions represent an alternative to foster meaningful growth for the world's poor in a variety of ways.

Engaging with diverse communities across various geographic and linguistic landscapes presents numerous challenges for research interventions. These communities are often hard to reach and under-researched, resulting in limited understanding of their local needs and cultural practices. In addition, researchers often experience numerous contextual barriers, including: (i) lack of material access—for example, less access to resources or services and limited

to no technological access and knowhow; (ii) lack of communicative access—for instance, less proficiency in mainstream languages and illiteracy; and (iii) lived realities—e.g., geographical isolation, discrimination, etc. Moreover, issues of trust building and erosion of local knowledge and resources pose additional challenges. Many of the conventional approaches may prove ineffective in addressing these complex obstacles.

Research approaches

Working within impoverished and distant communities requires tailored approaches that respect their context and culture, fostering meaningful and lasting change. The immersive and organic research initiative employs two key strategies:

1. **Frugal Humanitarian Innovation:** This approach leverages science and technology to optimize existing resources and infrastructure, promoting sustainability through the use of locally available materials, energy-efficient designs, and cost-effective processes.
2. **Human Ingenuity:** Challenging conventional views, this initiative sees underserved communities not as passive recipients but as active agents of change, capable of driving meaningful progress.

Moreover, the initiative prioritizes direct resource transfer from donors to communities, ensuring that benefits reach the intended recipients without unnecessary intermediaries.

The approach focuses on solving pressing needs through community-based, dialogic solutions, encouraging hands-on actions, experiments, originality, and imagination, as well as creative and collaborative problem-solving. The initiative emphasizes intercultural competence by integrating diverse knowledge traditions and understanding contextual constraints like linguistic and technological barriers. Through in-situ action research to participatory transformation, the initiative facilitates community-guided problem-solving using local resources and expertise.

Brief case examples

The upcoming sections will feature case examples from two projects: a sanitary infrastructure initiative and a cultural preservation/promotion endeavour. Following concise project introductions, will explore a few insights gained from each.

Project 1: Low-Cost Recording Studio and Community Media Channel: Amplifying Unheard Voices

In this initiative, a low-cost, modern recording studio was established to empower the 'Bheel' tribe through the 'Bheel Voice' channel—a community-driven radio and video platform. The goal was to share forgotten Indigenous wisdom and cultural expressions with a global audience. By providing training and resources, local students were equipped to use free or inexpensive apps for content creation, including filming, editing, and publishing.

The community studio was built in Alirajpur, India's least literate district, with collaboration from a K–8 school. Positioned atop a hill near the campus, the studio aimed to preserve the Indigenous Bheel language as well as culture and knowledge base, which faced rapid erosion. Recognizing the importance of safeguarding and promoting these traditions, the local community and school advisors joined forces to establish the studio and an online repository. Through extensive training, community members and students were empowered to operate the studio, to a large extent independently.

Project 2: Soak-Pit Installation: Improving Community Hygiene

The Sansi, an 'untouchable' community, considered among the lowest in Rajasthan's social hierarchy, collaborated to enhance cleanliness. Together, we installed 20 soak-pits, addressing (non-sewage) wastewater issues for over 100 families.

This initiative took place in a small town in western Rajasthan, nestled within the Thar desert. In a densely populated and poorly planned Dalit slum, the Sansi community grappled with water-clogging and congestion, leading to health concerns, especially for vulnerable groups. Despite the government's efforts to install underground sewage systems, non-sewage wastewater, stemming from bathing, cooking, and cleaning activities, remained unaddressed. Collaborating with a local college's senior academic, the community devised a plan to implement soak-pit-based sanitation infrastructure to manage non-sewage wastewater effectively.

Learnings from research projects

Alternate use of technology

The Thar Desert, the largest desert in South Asia, boasts a distinctive sandy landscape within the Indian subcontinent. Its porous soil readily absorbs water. However, the unchecked proliferation of concrete and

the absence of adequate drainage systems in the small town led to waterlogging in the densely populated slum area. Traditionally, soak pits have been effectively utilized in the region for sewage water removal. Recognizing this, the villagers devised a modified soak-pit system to address non-sewage water issues. Customized to suit multiple households, the specifications of these soak pits, including depth, were tailored based on the number of users and households. Local community members collaborated to construct and install these modified soak pits, effectively tackling the community hygiene issues.

Access to the Internet, WiFi/signal, and electricity

In a remote village nestled in the Satpura-Vindhya mountain region, ensuring a stable technological environment for our studio posed challenges, particularly regarding internet connectivity and electricity. Despite our efforts, locating a suitable telecom signal within the vicinity of the school proved futile, leading us to explore nearby hilltops where we eventually found a promising signal over half a kilometre away. Addressing the need for uninterrupted power, we implemented a solution comprising solar panels, inverters, and robust batteries to sustain the studio's electricity supply.

Interior design and construction of studio

In tackling the interior design and construction, a significant challenge emerged in ensuring optimal acoustics and audio-visual capabilities within the studio. Moreover, the villagers lacked the expertise needed for such arrangements, including false ceilings, sound-proofing walls, adjustable electrical accessories, and green screens. To address this, we conducted research in nearby cities and towns, gathering insights from various local studios. Collaboratively, we devised contextually relevant action plans and compiled a list of necessary materials. Utilizing online resources and the expertise of senior technicians and masons, we developed a feasible implementation strategy that proved both satisfactory and cost-effective. Importantly, this low-cost infrastructure fostered sustainability by empowering villagers to troubleshoot technical issues through their newfound knowledge and skills.

Community Planning and Conflict Resolution

Soak-pits, intended for multiple families, were carefully planned in the village. Three surveys were conducted to determine their locations and specifications, with some households pushing for larger soak-pits and a closer placement, causing tensions. However, through

dialogue and deliberation, conflicts were successfully resolved.

Construction materials

Field research for Project Ingenuity revealed the rich diversity of architectural practices across South Asia. Structures in various projects showcased unique materials, deviating from conventional brick or concrete. For example, in Arunachal Pradesh, bamboo served as the primary construction material, while the craft revival centre in Ladakh utilized unburnt soil, and the studio in central India employed locally sourced wood and clay-based materials. This contextual approach not only promotes sustainability through traditional techniques but also significantly reduces carbon footprints, aligning with green principles.

Policy recommendations / conclusions

Underserved communities often encounter restricted access to resources and environmental challenges, compelling them to devise innovative solutions for contextual needs. The research initiative supported these communities by facilitating resource mobilization and implementing community-driven solutions, with a focus on promoting human rights and resilience (Bowen and Acciaioli, 2009). These projects viewed communities as active agents of action in the face of adversities, challenging traditional development paradigms and empowering them to shape their own destinies.

In numerous low- and lower-middle-income economies, fiscal limitations and a lack of innovation policies restrict funding and other opportunities for marginalized populations. However, efforts such as Project Ingenuity aim to establish or enhance networks of research for innovation and resilience to catalyse decentralized growth and governance. By mapping out pathways for development, such initiatives enhance existing knowledge and strategies for sustainable social change at the margins, while fostering global-local networks to leverage human ingenuity for the betterment of underserved communities worldwide.

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