

GRASSROOTS INNOVATIONS AS CATALYSTS FOR COMMUNITY TRANSFORMATION: A SYSTEMATIC REVIEW

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Abstract—Grassroot innovation is nothing but a community driven solutions that are developed to solve the Socio economic and environmental challenges. On the contrary to the conventional innovation system which are dominated by the formal research and development institutions, Grassroot innovation emanates from necessity, indigenous knowledge and sproblem-solving practices. The study identifies important issues such livelihood enhancement, environmental sustainability, gender empowerment, technological democratization, and ecosystem support mechanisms by drawing on theories like inclusive innovation, frugal innovation, and social innovation. This paper integrates the existing grassroots innovations to inspect its conceptual foundation, thematic dimensions, transformative community impacts, and policy implications. The review underscores the role of grassroots innovations in advancing sustainable development goals by fostering social equity, enhancing economic resilience, and encouraging participatory governance. The paper wraps up by pinpointing research gaps, such as the necessity for quantitative evaluations of impact, cross-country comparative studies, and the incorporation of digital technologies within grassroots initiatives. It is crucial to enhance institutional frameworks and encourage collaboration among multiple stakeholders to scale grassroots innovations as drivers of inclusive and sustainable community change.

Keywords: Innovation, Sustainable, Grassroot, Environment.

INTRODUCTION

Innovation is frequently linked to high-technology sectors and corporate research and development. Nevertheless, grassroots innovations embody a bottom-up methodology, wherein local communities create context-specific solutions to daily challenges. These innovations hold particular importance in developing nations such as India, where limited resources necessitate frugal and sustainable approaches. Grassroots innovation movements have gained traction owing to the growing acknowledgment of indigenous knowledge, local creativity, and community involvement in developmental processes. Organizations like the Honey Bee Network and the National Innovation Foundation (India) have been instrumental in identifying and promoting grassroots innovations. This review seeks to explore the evolution, impact, and policy aspects of grassroots innovations. Grassroots innovations that transform communities are defined as initiatives led by local residents, farmers, artisans, and activists, which arise from the community to address pressing social, economic, and environmental challenges by utilizing local resources, knowledge, and skills. These innovations originate from the grassroots level instead of being enforced from higher authorities, frequently serving as a reaction to unfulfilled needs, poverty, or insufficient infrastructure. Grassroots innovation represents a community-oriented strategy for sustainable development, implemented after a thorough understanding and analysis of the local context. This paper aims to explore the role of grassroots innovation in the advancement of rural India. Grassroots innovators belong to a network that employs a bottom-up strategy, as opposed to a top-down method, to identify solutions for various local issues and promote sustainable development. In contrast to the conventional perspective on green reforms, grassroots innovation encompasses a broader understanding and more expansive concepts for discovering alternative innovative ideas that contribute to sustainability.

OBJECTIVE

1. To examine the conceptual framework of grassroots innovation.
2. To access the impact of grassroots organisations on communities.
3. To discover how grassroots organisation empowers communities.

CONCEPTUALIZING GRASSROOTS INNOVATION

Grassroot Innovation is defined as the innovative solutions that are being formulated by the local communities using their indigenous knowledge, social network and locally available resources to solve socio economic problems. Grassroot innovation are community driven process where the locals develop needful and sustainable solutions for environmental and social problems. Grassroot organisations are the heartbeat for community engagement and social changes. It is a community based approach for socio economic conflicts that a person faces at day-to-day basis. Grassroot innovators are often know as social innovators who are a part of network that is driven by bottom-up approach not by top- down approach for finding solutions for various local problems and ensuring sustainable development. Nowadays these grassroots innovations are in academic and policy debate. It is also well accepted that these innovations play an important role in solving problems, leading to desired socio economic outcome. Grassroot Innovation tells us about the bottom up nature of innovation where the innovation comes from within and by its own means. Grassroot innovation and inclusive innovation are relied upon to create more durable solution for overcoming local problems.

IMPACT OF GRASSROOT INNOVATION ON COMMUNITITES

Grassroot innovations are commonly driven by local communities to solve specific and immediate problems, which fosters sustainable, cost effective and tailor made solutions. The key impact of grassroots innovation on communities are;

- **Empowerment and Self-Sufficiency:** Communities transition from being passive recipients to proactive innovators, decreasing their dependence on top-down, external, or government-driven solutions.
- **Customized, Cost-Effective Solutions:** Innovations that arise from local contexts tend to be economical, easily embraced, and leverage local materials, making them sustainable and accessible for rural or marginalized communities.
- **Economic and Social Advancement:** Grassroots innovations often generate new job opportunities, enhance agricultural methods, and increase economic prospects for groups like labourers and women.
- **Sustainable Environmental Practices:** Numerous innovations prioritize sustainable methods, such as rainwater harvesting or eco-friendly agriculture, addressing the ecological needs of the community.
- **Inclusion and Social Diversity:** These initiatives frequently foster social diversity and actively involve marginalized groups in the developmental process.
- **Adaptation and Resilience:** Local communities utilize their knowledge to adjust to challenges, including pandemics or environmental changes.

GRASSROOT INNOVATION IN INDIA

India's department of science and technology have taken several initiatives to promote innovation and foster international collaborations. This department has aligned its activities with the National agenda of the government towards Made in India, Digital India, Startup India etc.

Some of the Grassroot Innovations in India are

- **A Multipurpose Axe** - The multipurpose axe is an innovative multi-utility tool. This tool basically has an axe attached to one end of a hollow handle and a nail remover at the other end. The axe can also be converted into a shovel by rotating the blade by 45 degree and can be held in either position through a cotter pin. The hollow tube can also hold other utility accessories like linear saw blade, screw driver, chisel, knife and a filing tool of different shapes, designs and sizes. A hammer has also been provided at the back of the axe blade.
 1. **Innovator:** Mohd. Rafiq Ahangar
 2. **State:** Anantnag, Jammu & Kashmir

- Bicycle Sprayer - A farmer cum artisan with a passion for mechanical innovation developed a bicycle operated sprayer, which is very efficient and affordable by the farmers. The front and rear sprockets of a thrown away bicycle are interchanged and the small sprocket is connected to the piston pump, so as the circular motion is converted to reciprocating motion of the piston and thus the pressure is generated and thus the pesticides are sprayed on the field.
 1. **Innovator:** Mansukhbhai Jagani
 2. **State** – Gujarat
- Double Axle Rotavator - While farming using a regular (single shaft) rotavator, Gurpreet observed that conventional single shaft rotavator needs to be operated in 2-3 passes for efficient pulverization of soil in field. Gurpreet's rotavator uses double rotating shafts for pulverizing the soil in a single pass. It is tractor (min 40hp) PTO powered rotavator, wherein both axles rotate in the same direction, at the same speed resulting in better pulverization of soil in single pass.
 1. **Innovator:** Gurpreet Maan
 2. **State:** Muktsar, Punjab

GRASSROOT ORGANISATION IN COMMUNITY DEVELOPMENT

Grassroot organisation are a group of people pursuing common interest, largely on a volunteer and not for profit basis. Mostly these organisations are formed by activist for social movement. These are linked to local communities and their concerns. Numerous grassroots organizations have been established worldwide since the early 2000s to address the issue of unresponsive governments. By increasing civic engagement and citizen power, they want to bring about change. For underprivileged groups, these interventions are especially crucial. They aim to address the needs of their marginalized populations, including the urban poor, sexual or ethnic minorities, and indigenous people. For larger groups of people, organized civic engagement can also be crucial. For instance, recent years have seen the emergence of vigorous young and middle-class anti-corruption movements in Guatemala. Grassroots organizations possess distinct advantages. Many have been engaged for an extended period in advocating against structural inequality and advancing human rights. They offer a unique perspective on inequities that may be overlooked or accepted as normal from other viewpoints. By sharing their experiences with insufficient services and demanding accountability, they are able to confront the marginalization faced by their communities. Furthermore, grassroots members are ideally situated to engage directly with local and regional governments. According to the 2016 report from the high-level political forum on sustainable development, regional governments "play a crucial role in ensuring the safety, well-being, and livelihoods of communities, including the provision of essential services."

CONCLUSION

Grassroots innovations signify a revolutionary approach rooted in community empowerment, traditional wisdom, and the creation of social value. These innovations stimulate economic upliftment, social equity, and environmental sustainability through interactions at multiple levels among individuals, institutions, and systems. In settings such as India, grassroots innovation is not simply an alternative to conventional development methods—it serves as a vital route toward inclusive and sustainable change. Grassroots innovation influences communities in various economic, social, environmental, institutional, and psychological ways. It fosters development that is inclusive, sustainable, and participatory. Instead of viewing communities solely as beneficiaries, it regards them as innovators and creators of knowledge, serving as a significant force for lasting change.

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