The Fifth International Conference On Creativity And Innovation At/For/From/With Grassroots [ICCIG 5]

NABARD
Supported by NABARD

Gian

SRISTI


IIMA
FIFTH INTERNATIONAL CONFERENCE ON
CREATIVITY & INNOVATION
AT/FOR/FROM/WITH
GRASSROOTS (ICCIG 5) - 2025
Venue: Indian Institute of Management (IIM) Ahmedabad
January 28-30, 2025
Gian
Gianastra
IIMA

The Fifth International Conference On Creativity And Innovation At/For/From/With Grassroots [ICCIG 5]

Acknowledgement

"The financial assistance received from Research and Development Fund of National Bank for Agriculture and Rural Development (NABAR.D) towards publication of journal/ printing of proceedings of the Conference is gratefully acknowledged".

Disclaimer

NABARD does not assume any responsibility for the contents published by "Society for Research and Initiatives for Sustainable Technologies and Institutions(SRISTI), Ahmedabad". NABARD does not hold any responsibility for the facts and figures contained in the report. The views are of the authors alone and should not be purported to be those of NABARD.

Highlights from the Speech of Shri Shaji K.V., Chairman, NABARD at the fifth ICCIG, January 28-30, 2025, GIAN, SRISTI and CMA, IIMA

NABARD works with innovators at the grassroots because India needs innovation first to bring accelerated growth and second to bring equitable growth. The country has a huge rural-urban divide. NABARD is trying to mainstream opportunities in the rural sector to close this gap.

If you look at nationally, almost 30 to 50% of the productivity gap is still there. That can't be solved using (only) chemicals or fertilizers because that is not sustainable. *We need to actually look at the innovative things which our rural communities are/were doing and help them, or maybe tweak them, customize them to the today's problems. We have to get more from less resources.*

Through self help group movement where we actually infused small doses of money into groups of women, get them acquainted with how to handle cash, and other transactions, and then help them to branch out to set up micro enterprises through joint liability groups. And that is how now the women participation labor force is at the respectable level. It was historically very low at around less than 20% In India earlier, now it is in the range of 40-45% which is good, but there is still a lot of gap to be bridged.

Other farmers are being supported through farmer producer organizations. Around 10,000 more farmer producer organizations are being set up. But now the issue is that they have come together and are doing some activities, but then *they need a lot of innovative solutions*. We need to connect these FPOs with innovation. *To scale up any innovation, first of all, there should be an ecosystem for innovation.* And later there should be some support in terms of first grant, loan, and then the equity, and maybe public private partnerships need to be there too.

To have the spirit of entrepreneurship, NABARD as an institution works with a lot of civil society organizations as well.

NAB Ventures is a slightly commercial type of fund where later stage innovations are supported, but now we recognize that early-stage innovations and frugal innovations to be supported. For that, a Fund, viz., "AgriSURE – Agri Fund for Start Ups & Rural Enterprises", to support innovative, technology driven, high-risk, high-impact activities in agriculture and allied areas is announced. It's a 750 crore fund. Where ticket size for each investment may be lesser, but we need to now do a mass support exercise. Small entities need to be given equity support or even debt support, or a mix of grant, loan and equity type of assistance. We are targeting around 100 such small entities, after gaining some experience, we can scale up that. And as of now, you all know, India is having a problem of climate change/ fluctuations affecting the production, and that is where climate actions and climate related innovations need to be there.

With the introduction of monoculture and such other things, we are losing a rich biodiversity heritage. We need to bring back that. And that is where natural farming is gaining importance. We are now adding a climate player to that as a Jiva program. Jiva in Sanskrit means life. So we are now expanding that program as Jiva for organic agriculture is one of our important activity which we need to support. Initially, when we go for organic or natural farming, production may come down slightly, but then once we go deep into that, I think productivity improvement activities will be there, and that is what we are looking at. We need support from the innovative ecosystem over here. I see lot of frugal innovations, small innovations, besides others. We are also associating with some of the Padma Shri awardees innovators. We are now also focusing on geographical indication target, where the specialty of a particular product needs to be recognized properly, and then it has to be protected. Design development and support systems need to be there. Recently, we have conducted a program at the national level as Gramin Bharat Mahotsav at Delhi, inaugurated by the honourable Prime Minister. It focused on GI-tag products, tribal products, rural artisanal products, and also organic products. We intend to replicate that in different cities to get more attention to localised innovations, support branding, marketing and may be onboarding for online market places.

In fact, the ONDC, the open network of digital commerce, which is one of our investee companies, they are trying to onboarding

large number of such innovations besides the farmer producer organizations.

But then the demand needs to be matched with quality supplement and one thing I should tell you that NABARD as an entity, will be actually partnering with such platforms like GIAN that in fact, we intend to have more such partnerships in a larger, dispersed manner, may be every state, because it can't be concentrated in one place. I know their innovations literature shared by Professor Guptaji shared with me, whenever time permitted, I used to read that, and I was hoping that we need to provide such a platform in other parts of the country as well, So, we'll have, we'll be happy to be a player as an ecosystem developer for supporting the innovation ecosystem in the country. And I believe strongly, and as a NABARD Chief, that economic acceleration and growth can be achieved only through innovation. For that, I think we need lot of frugal innovations, a lot of localized innovations, localist solutions for the local problems, and for that, I pledge support of NABARD and I thank the organizers for giving NABARD a chance over here and for inviting me to come back to my alma mater after a long time. Thank you.

PREFACE

Bringing policy makers, scientists, researchers, grassroots innovators, creative artists, innovative teachers, students, civil society organizations and others on a common platform has been the most distinguishing feature of the International Conference on Creativity and Innovation at Grassroots since 1997. There are several insights and institutional initiatives that have emerged from previous ICCIGs.

First ICCIG, 1997, led to the establishment of GIAN (Gujarat grassroots Innovation Augmentation Network) with the help of Gujarat government, Honey Bee Network, SRISTI and IIMA. Purpose was to articulate the golden triangle linking innovator, investor and entrepreneur by reducing the transaction costs of each actor. It has tried to help provide handholding support to the innovators at their door step. The model of GIAN was scaled up into NIF which is now a part of government, and I have stepped down from all responsibilities in the matter.

GIAN also helps organize People's Festival of Innovations every year at IIC New Delhi in cooperation with C-Camp. It provides HBN Creativity and Inclusive Innovation Awards both at national and international level. SRISTI anchors the Gandhian Young Technological Innovation Award (GYTI award), Dr A P J Abdul Kalam ignited mind children creativity and innovation award supported by GIAN and other Honey Bee Network volunteers. It also coordinates Shodhyatras in different parts of the country along with GIAN and HBN.

The inclusive innovation movement highlighting frugal innovations *for* and *from* grassroots has spread all over the world thanks to the volunteers of HBN. In the second ICCIG in 2012, it was realized that heuristics of frugal innovations can be used by even large organizations. This is evident from many international companies trying to learn from HBN experience. It was proposed that there should be an international repository and registry of grassroots innovations and outstanding Traditional knowledge. Why should people disclose their knowledge if we cannot provide them any formal acknowledgement and minimal protection. Way back in 1993, it was proposed to set up INSTAR (International Network of Sustainable Technological Applications and Registration) as a global registry- a goal still to be achieved. In the third ICCIG, 2015 there were many ideas stressed such as focus on finding science underlying farmers' practices, creating FabLab network and creating mobile FabLab for helping grassroots innovators for short duration fabrication. It was also suggested that in various scientific meetings on agricultural, industrial or medical science etc., a session on

people's knowledge may be organized so that scientists get exposure to a rich knowledge system still vibrant at community level and hopefully blend it with high tech science and technology opportunities to serve the society.

The fourth ICCIG reinforced the above ideas but also suggested a few more proposals to implement HBN philosophy of giving voice, visibility and velocity to grassroots creativity and innovations. There are agricultural research and extension centers in every district in the form of KVKs (Krishi Vigyan Kendra) also District Industries centers. But these have not become a platform for showcasing, trial, validation and value addition in grassroots innovations and outstanding TK. Another that picked up momentum in fifth ICCIG also was a need for all India (later, an international) Coordinated Action Research Project on Validation, value addition, Dissemination of Grassroots Innovations. Most international agricultural research centers have also not yet created a dedicated mechanism for cross-pollination of bottom up solution by grassroots communities. Can all Members of Parliament and State Assemblies use pert of constituency development funds for encouraging creative and innovative people in technology, education, institutions, biodiversity and natural resource conservation and cultural

UNDP through its wide network of Acc Labs in 115 countries did make a very bold attempt to triggers solution mapping at grassroots level and mapped more than 3500 innovations from all over the world. HBN and GIAN contributed to building capacity of 91 labs in these countries. Can this be done in a more enduring manner through Global Inclusive Innovation Foundation (GIIF) or Academy of Inclusive Innovation and Knowledge Augmentation (AIIKA) is a question that was discussed in the open house at fifth ICCIG. Several other suggestions have come up in the fifth ICCIG, only some of which are reflected in the abstracts.

Agro-ecological and social-ecological models of connecting natural, social, ethical and intellectual capital will need to be developed

Unlike traditional B2B (Business-to-Business) or B2C (Business-to-Consumer) models, which prioritize sale by large corporations and established brands to local businesses and communities, g2G (grassroots to global) tries to if not reverse, counter-balance the pressures of globalization and reaches the grassroots communities in developed countries as well.

The g2G model rests on the assumption that with economic pressures tightening worldwide and markets becoming more competitive, customers worldwide are actively seeking ultra-frugal solutions. The g2G offers a double-edged sword—on one hand, it helps cut poverty in these regions by fostering local businesses, and on the other, it delivers affordable solutions to global consumers. Affordability must extend beyond consumers

and manufacturing, it must also apply to the environment.

Similarly, the need for risk fund, support from Research and development agencies, marketing and supply chain support need to be provided to the grassroots innovators. There is also a need for a Bank of Unmet Needs in multiple sectors and stages which can trigger the experiments by youth and others in academic and field situations to meet them.

The support from NABARD has been very crucial to accomplish many goals of the fifth ICCIG and facilitate the participation of farmers, self-help groups and other innovators in the conference. The inaugural address by Shri Shaji K V, Chairman, NABARD, added so much energy and hope among the creative participants for many more impactful changes at grassroots level in the years to come.

HBN also appreciates the message of goodwill sent by Shri Bhupendra Patel, Chief Minister, Gujarat government and address by State minister of Small and Medium Industries, Cottage, Khadi and Rural Industries, Civil Aviation, Government of Gujarat Shri Jagdish Vishwakarma, at the plenary session of ICCIG. The support from the Industry department has always been a source of special strength for GIAN and HBN.

Grateful thanks are due to Prof Bakul Dholakia, Chairperson, GIAN board and former Director, IIMA for support and guidance all through the preparation of the conference. We thank all the Board members for their continued support in all endeavors of GIAN.

I am very happy to acknowledge the extraordinary support from Centre for Management in Agriculture and various other departments/areas/centers of the Indian Institute of Management, Ahmedabad, without which the fifth ICCIG could not have been such a success. We must particularly thank Prof Bharat Bhasker, Director, IIMA and all other Deans and Administrative heads for unstinted support for hosting fifth ICCIG at IIMA. Prof Ranjan Ghosh, Chairman, Centre for Management in Agriculture, IIMA, co-organiser of ICCIG deserves my personal appreciation for such a warm cooperation and support for the conference.

I must acknowledge the support of prof Vijaya Sherry Chand who helped in reviewing a very large number of abstracts and papers besides addressing the conference on the theme of educational Innovations. He and FAIR-E also helped us in mobilizing a large representation of Innovative teachers from government schools.

We have to appreciate a very meaningful dance performance by the students of Dr Kalam Innovative School brought a exposure to the cultural diversity of our country.

The volunteers and team members of SRISTI like Chetan Patel, Ramesh Patel, Bhoomi, Sumitra, Alka, Mayur, Ankit, Swasti Dhagat, Zinkal, and numerous others worked day and night to make the conference so meaningful.

The GIAN team led by Dr Anamika Dey, Academic coordinator of fifth ICCIG collaborated with CMA Chair prof Ranjan Ghosh, Manager CMA, Uma Baskaran, Astt Manager, Dipali Chauhan, Audio-visual section, internet and communications, public relations office, and SRISTI team for many months in advance to make the conference possible. GIAN team including Ankit, Kishor, Rageshri, Intikhab, Ravi, Aneeta, Sapna, Deepika, Akshay, Faraz, Dhyanesh, Nadeem, Sabzar, Abhijit, Dorji, Sanjay, Bharat, Mukesh, Ramesh, Praveen, Mehak, Sugandha, Krutik, Unnikrishnan, and many others spared no effort to make the ICCIG a memorable conference for grassroots innovators, scholars, and others.

GIAN also thanks, SIDBI, Next Bharat, Malaysian Innovation Foundation (YIM), CSIR-IICT, ISTIC, Malaysia, LM college of Pharmacy, DOST/GRIND, Philippines, SRISTI Innovations, GIANSTRE, Gharda Chemicals, Schola Campesina etc., for their invaluable support and contribution to the Conference.

I must acknowledge all collaborators of Honey Bee Network including Brig (Retd.) Ganesham Pogula, P Vivekanandan, Sunda Ram verma, Balaram Sahu, Tshering Gyasto Lepcha and numerous others scholars, innovators and policy makers form India and abroad whose contribution made the conference meaningful. International participation from 23 countries enriched the conference immensely. The grateful thanks are due to Grassroots Innovations Assembly for Agro-ecology (GIAA) which brought the largest contingent to the conference.

I will like to specially thank Prashant, Kiran Thete, Sandeep and numerous other research staff/fellows and about fifteen doctoral students of IIMA who did a great job of keeping track of what was discussed in each of the session.

A conference at this scale is a collective task of so many, some may have remained unnamed. But I thank them all for enriching our collective understanding of what knowledge rich, economically poor innovators can do to make our society more creative, collaborative and compassionate.

Anil K Gupta
Founder, Honey Bee Network, SRISTI, GIAN & NIF
Visiting Faculty, IIMA & IITB, Academy Professor, AcSIR

Introduction to the Conference

In collaboration with Centre of Management in Agriculture, Indian Institute of Management, Ahmedabad, Honey Bee Network institutions and several other international and national institutions.

Giving voice, visibility, and velocity to creativity and innovative people at the grassroots has been the key goal of inclusive development. Honey Bee Network has emerged over the last thirty-five years as a committed new social movement in support of knowledge-rich, economically poor people. In order to enrich the ecosystem for inclusive and empathetic innovations, the Fifth ICCIG will pool the insights from the ground and global playfields of ideas, institutions, and initiatives by policymakers and also by local/global communities and networks. The conference invited contributions on inclusive innovations from the grassroots from scholars, activists, policymakers, and innovators themselves.

Honey Bee Network started more than three decades ago to raise the voice of collaboration between formal and informal sectors, respect for local/indigenous knowledge for the conservation of biodiversity and associated knowledge systems, sharing of benefits through ethical supply chains, and rewarding local communities and individual innovators and traditional knowledge holders. Today, the concern for inclusive innovation has become much more widespread but the voice of the knowledge-rich, economically poor people and the youth is still not heard adequately.

We invite scholars, academics, corporate leaders, policy makers, activists, administrators, local community representatives, organizational leaders, various social and cultural networks engaged in the empowerment of local creativity, and public and private initiatives around the world to make society more fair and just in dealing with various creative social segments.

Key Themes

1. Institutional transformation

1.1 Common property resource institutions play a critical role in sustainable natural resource management at all levels of society. The conservation concern has been declining while designing infrastructure projects. How to give voice to perfect strangers and other natural beings is becoming a big challenge for conservationists.

1.2 Public/private, civil society institutions create norms for the exchange of knowledge, information, resources, and ideas across formal and informal sectors. How do we create mutual accountability in the norm-setting processes in both sectors?

1.3 The crafted institutions often fail to build upon existing institutional infrastructure. The political economy of existing institutions needs careful analysis to expand the space and scope for disadvantaged people. The grafted institutions build upon existing norms and values in managing resources and therefore may have higher sustainability. The issue needs to be debated and elaborated.

1.4 Public delivery systems impact the life of almost every citizen world over. The need for transparency and social accountability has triggered a lot of experiments and innovations in public systems. These need to be consolidated so that the change agents involved in these transformations can ally themselves with other creative people.

1.5 New commonly managed repositories/databases of cultural, natural,technological and other creative outputs are scarce. We invite such open database curators to share their experience in crowd sourcing the collective intelligence in making such repositories institution-building experiences.

2. Technological Innovations For/From/Grassroots

2.1 The concepts of deviant research, grassroots innovations, frugal, empathetic or inclusive innovations, and farmers' or workers' innovations were much less recognized 35 years ago when the Honey Bee Network was born. How do we assess the contemporary terminological and conceptual clarity or confusion in these concepts? Can we distinguish innovation 'from' vis-à-vis 'for' grassroots?

2.2 To what extent have various countries recognized the need for redefining the concept of the National Innovation System to include the bridge between formal and informal systems of innovation? Much remains to be done in this regard.

2.3 Can companies and other organizations in the public and private sectors join hands with innovations by youth and the informal sector to create genuine and authentic reciprocity and responsibility in the knowledge exchange?

2.4 What can we learn from the models of benefit sharing emerging through validation and value addition in people's knowledge and creativity? Why have these models remained so underdeveloped in most parts of the world? What are the implications of such asymmetry and lack of accountability between formal and informal systems for the sustenance of grassroots frugal/empathetic innovation systems?

2.5 What lessons can be learnt from various models of inclusive innovation around the world? What are the gaps in the inclusive innovation ecosystem including the investment and entrepreneurial spaces in society?

2.6 What drives people to devise extremely affordable frugal solutions? What is the tolerance limit of a tradeoff between accuracy and affordability (particularly in the post COVID phase when vaccines with much less accuracy were accepted) and how does it affect its accessibility and acceptability?

2.7 What kind of new heuristics are learned from thousands of grassroots green innovations and traditional knowledge examples for innovations in totally unrelated sectors as well as

for other communities? How do we learn from these innovations at four levels: [a] artefactual, [b] analogic, [c] heuristic and [d] gestalt or configurational?

2.8 How do we link corporations and communities in developing the most frugal and affordable sustainable solutions for meeting the unmet needs of society, particularly women farmers and workers, elderly and special needs people?

2.9 Farmers field schools have spawned a lot of bottom up solutions but they remain to be properly mainstreamed. What kind of new platforms are needed to achieve this goal?

Innovations in urban spaces for more accessible, accountable and available social infrastructure

2.10 Given the rural-to-urban migration, a lot of knowledge has moved to urban spaces. The urban markets are often unable to discriminate or valorize such placebased knowledge. Urban renewal through the knowledge of urban 'refugees'/migrant population. Urban regions are becoming concentrated centres of poverty as a result and thus rural and urban renewal through social innovations need to be conceptually and operationally linked.

2.11 Before the erosion of knowledge becomes irreversible, what kind of strategies can be developed for knowledge-based enterprises in urban areas that put special emphasis on the traditional/tacit knowledge of urban workers?

Designing organizations/social networks/open innovation platforms for linking formal and informal sector in reciprocal, respectful and mutually rewarding manner

2.12 Many place-specific problems are evident when we look at the unmet community needs; the ability of the formal system to develop niche-specific solutions is limited. Are there examples of such cooperation between formal and informal systems which leads to sustainable solutions to address unmet needs?

2.12 Blending or bundling of knowledge of formal and informal

systems is crucial for creating open innovation platforms and networks for empowering creative communities

Integrating women's knowledge creativity and innovations in the innovation ecosystem

2.13 The knowledge of women and other workers has been given far less importance so far. How do we expand opportunities for women and worker innovators?

2.14 Which kind of institutional innovations facilitate the uncovering of the creative potential of women?

2.15 Women's knowledge often remains muted out of deference or socio-cultural constraints, uncovering it requires new pedagogies.

3. Natural Resource Management: Community perceptions and innovative response for a sustainable future

3.1 Given the erratic nature of weather induced changes in many parts of the world, the traditional coping strategies are becoming weaker. What kind of institutional and technological interventions are required to increase the capacity of communities to cope with climate risks? Are there innovative models available, which have achieved enhanced resilience?

3.2 Agro-biodiversity has played an important role in improving resilience in the wake of risks. However, consumer preference for traditional varieties has not kept pace with time. What are the strategies that have reversed the erosion of agrobiodiversity and associated knowledge systems?

Circular economy and green supply chain to support innovations for and from the grassroots.

3.3 Why should society turn to grassroots innovators for frugal designs? As grassroots innovators use second-hand components to a large extent, their innovations are often not recognized in

the formal sector, more so in the legal fraternity as standards for them do not exist. So, what are the steps necessary to "legitimize" these innovations and the impetus they would give to popularize the circular economy?

Biodiversity conservation, benefit sharing, and development of bio-enterprises and ethical supply chain

3.4 Despite deliberations at the intergovernmental panel at WIPO, Convention on Biological Diversity, Desert Conventions, etc., not much seems to have changed. What are the policy directions that can help us move towards a new consensus? Case studies of knowledge-based interface /bio-enterprises between communities and outside organizations are welcome.

3.5 Mapping the biodiversity resources along with the associated knowledge system through students and other groups of youth is very essential since more knowledge (and also resources) is eroding in the current generation than ever before in the history of humankind

3.6 Urban farming, urban biodiversity conservation, providing urban spaces for organic farmers, and several other such connections can be explored

Co-organizers:

ICCIG is being organized by Grassroots Innovations Augmentation Network (GIAN) in partnership with the Centre for Management in Agriculture, CMA, Indian Institute of Management, Ahmedabad; SRISTI, Ahmedabad, Honey Bee Network, and is likely to be supported by NABARD and a few other sponsors

4. **Incubation or linking innovation, enterprise & investment**

4.1 Innovative strategies for using social media, e-commerce, and other platforms to link grassroots to Global [g2G] markets; Help

innovation-based Start-ups to scale up, link them with public procurement and other support systems, expand testing and certification facilities for hard technologies at concessional terms.

4.2 Role of differential risk/angel/early-stage incubation/ patient/nursing capital in scaling start-ups/GRI 5.3. Protection of intellectual property rights of knowledge holders, the evolution of the concept of 'Technology Commons' and open-source technologies.

4.4 The central concern would be to explore how large corporations can join hands with small innovators to reach the consumers/ knowledge producers/innovators at the base of the economic pyramid.

4.5 How do recognition and reward for innovators influence their motivation to collaborate and deal with markets and public institutions collectively?

4.6 Which of the new IP models can do justice to the need for protection and incentives for collaboration?

4.7 Why do we still lack risk funds to support grassroots innovations and enterprises

5. Public Policy

Public policy for empathetic innovation

5.1 Many countries and companies have started open innovation platforms in the recent past but adequate reciprocity towards the knowledge providers remains to be institutionalized. What role can public policy play so that knowledge exchange between the formal and informal sectors can become smoother?

5.2 The role of public, private, and civil society organizations in the development and diffusion of extremely affordable innovations remains fuzzy. Recent studies on the subject have to be critically evaluated to identify future directions.

5.3 The innovations in public governance and delivery systems play an important role in fueling democratic aspirations. How have different countries looked at increasing expectations and declining performance of the formal systems? What are the lessons one can learn from China, Southeast Asia, Africa, Latin America, and European societies that need blending for inclusive development?

6. Educational innovations

6.1 Can innovations in government schools in which the poorer children often study, become the hub of educational policy?
6.2 How do we democratize disadvantaged children's access to high-quality content and mentors?
6.3 Can teachers learn from the students and build upon their curiosity, compassion and empathetic value system?
6.4 The academia-industry-informal sector linkage in higher education is weak, what are the strategies which have worked? Can educational entrepreneurship get more encouragement?
6.5 Can innovations by technological youth become a pivot of frugal engineering, products and services for inclusive development? How can students of higher education search, spread, celebrate innovations and sense the unmet needs of various societies? Start-up movements has shown potential and reviews of transformative experiences will be welcome.
6.6 Innovation in the governance of education need systematic cataloging for promoting lateral learning

7. Cultural Creativity

7.1 How does one prevent the desking of society through large-scale employment programs building upon manual rather than mental labor, ignoring in the process unique cultural and other skills?
7.2 Can entrepreneurial open collaborative platforms be generated

for nurturing folk and grassroots culture and its incorporation in developmental programmes and philosophies?

7.3 The culture of creativity spawns numerous innovations at grassroots without which the engine of economic and social progress would not run. What are the facilitators and inhibitors of cultural creativity in different societies? The culture of resistance provides the fodder for pluralism and diversity. What are the emerging trends in strengthening such resistance in the wake of globalization and massive consumerism?

7.4 While culture occupies such an important space in our consciousness, the governance including the ministry dealing with culture is considered a very low importance position. Nations are built or destroyed depending upon how the cultural core of the society evolves through various struggles.

7.5 Can conscious creativity be shaped by different modes of entertainment that society patronizes?

7.6 How can cultural traditions reinforcing solidarity across classes, ethnicities and religious boundaries be recognised and preserved?

Sr. No.	Title	Page No.
I. Institutional Transformation		41
1	**Empowering Rural Women through Bio-Entrepreneurship: Harnessing Community Knowledge for Conservation, Utilization, and Commercialization, Insights from GIAN-DBT Project Intervention** *Nadeem Ahmed, Sabzar, Abhijeet, Dorji, Sapna Sharma, Anamika Dey and community members, GIAN, Gujarat*	43
2	**"Fostering Innovation and Inclusivity: Opportunities, Challenges and way ahead through Vigyan Ashram's School Innovation Programs** *Kadam, Komal C.; Gaikwad, Kishore S. and Dr. Kulkarni, Yogesh R., Vigyan Ashram, Pune*	44
3	**Farmers' market: connecting farmer to consumer** *Ramesh Patel, Chetan Patel, Hamirbhai, Mukesh Chauhan, Devesh Patel, and other farmers* *SRISTI Innovations, Ahmedabad, Gujarat*	46
4	**Strengthening the Academia – Industry – Informal sector Linkage in Higher Education – FLOW Strategy** *Sayantan Mukherjee and Shankar Venugopal* *Mahindra and Mahindra, Chengalpattu, Tamil Nadu*	47
5	**Policing out of the Box: Exploring Innovative Community Policing Practices for Creative Collaborative Governance through a Multiple Case Studies Approach** *Tanya Ahuja* *Indian Institute of Management, Ahmedabad, Gujarat*	48

6	**Exploring the Dynamics of Grassroots Innovation: A Comprehensive Review** *Adeeba Hoor and Arvind Arahant* *Atal Bihari Vajpayee School of Management and Entrepreneurship, Jawaharlal Nehru University, New Delhi*	49
7	**The Gujarat Organic Farmer Producer Cooperative Society Ltd.** *Anand, Gujarat*	50
8	**Mithivirdi Farmer Producer Company Limited** *Tarsamiya, Bhavnagar, Gujarat*	50
9	**Dham Aravalli SPNF Producer Company Limited** *Meghraj Road, MODASA-383315*	51
10	**Aranya Agriforest Producer Company Limited** *Randesan, Gandhinagar, Gujarat*	52
11	**Madhav Natural Farming Co-operative Society Limited** *Vasudev Dhodhiya, Village- Kasavasana, Ta. Mandal, Ahmedabad, Gujarat*	52
12	**Little Himalayan Co.,** *GIAN, Ahmedabad, Gujarat*	53
II. Technological Innovations For/ From/Grassroots		55
13	**GRIND Program: A Strategy to mainstream GIs From the Margins.** *Dr. Anthony C. Sales, PFT, CESO III, Regional Director, DOST-XI* *Co-Authors: Ms. Mirasol G. Domingo, Assistant Regional Director, TSSD, Ms. Mary Luz B. Advincula-Niere, MBA, GRIND National Focal, TSSD-GRIND*	57

14	**Grassroots Innovations (GI) ,Sustainable Development (SD) and the Innovation Commons – A Search for the Commercial Success of Informal Sector GIs in India** *Anamoy Ranjan , International Management Institute , New Delhi*	58
15	**A Comprehensive Review of Increasing Biological Invasion and Technological Interventions** *Prajith Karakkottil [1,2], Vipan Kumar [1,2], Lalsiemlien Pulamte [1,2]* *[1]CSIR-National Institute of Science Communication and Policy Research, Dr. K.S. Krishnan Marg, New Delhi* *[2]Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, Uttar Pradesh*	59
16	**Effectiveness of Lead user developed Innovations in Agriculture: A study of innovations of Uttar Pradesh** *Akanchha Singh[1] and VLV Kameswari[2]* *[1]Department of Agricultural Extension and Communication, Faculty of Agricultural Sciences, GLA University, Mathura, Uttar Pradesh* *[2]Department of Agricultural Communication, G.B Pant University of Agriculture and Technology, Pantnagar, Uttarakhand*	60
17	**Grassroot Innovation and Use of Technology for Sustainable Water Resource Management by Ajrakh Artisans in Kachchh, Gujarat** *Taniya Vaidya,* *IDC School of Design, Indian Institute of Technology (IIT) Bombay, Maharashtra*	61

18	**RuTAG 2.0: Empowering Indian Agriculture with Rural Technology Solutions** *Anusha Velamuri, S. Senthil Vinayagam, Ravindra Naik, K. Venkateswaran, N. A. Vijay Avinashilingam, Umesh Hudedamani, Sanjiv Kumar, Chandrarekha C, P. Mallesham* *ICAR-National Academy of Agricultural Research Management (NAARM)*	62
19	**Tree Plantation By one Liter Water Technique, Water and Agrobiodiversity Conservation Management** *Sundaram Verma,* *Farmer, Sikar, Rajasthan*	62
20	**Adaptive Innovation for Rainfed Agriculture: APCNF's Pre-Monsoon Dry Sowing with Seed Pelletization** *V Lakshman Naik, Vijay Kumar T, Sandhya Kumari V, & K S Varaprasad* *Rythu Sadhikara Samstha, Andhra Pradesh Community managed Natural Farming, Guntur, Andhra Pradesh*	63
21	**Sustainable Solutions for the Hospitality Industry: Upcycling Tea Waste and Pine Resin to Replace Single-Use Plastics** *Toshit Kumar Ram* *Indian Institute of Technology (IIT) Hyderabad, Telangana*	65

22	**The Role of In-Situ Incubation in Grassroots Innovation: From Idea to Industry – a case of Cotton Stripper** *Mahesh Patel, Mansukhbhai Patel, Sanid Patil, Deep Jyoti Francis* *National Innovation Foundation and Society for Research and Initiatives for Sustainable technologies and Institutions (SRISTI), Grambharti, Gujarat*	67
23	**The Complexities of Regulations and Standards: The Cases of Grassroots Innovations** *Mansukhbhai Jagani, Chetan Patel, Ramesh Patel, Chintan Shinde, Sanid Patil, Govind, Krishnan G R, Deep Jyoti Francis, Mahesh Patel* *National Innovation Foundation and Society for Research and Initiatives for Sustainable technologies and Institutions (SRISTI), Grambharti, Gujarat*	67
24	**Multi-Purpose Food Processing Machines** *Dharambir Khamboj* *Dharambir Food Processing Technology Private Limited, Yamunanagar, Haryana*	68
25	**Farmland Manure Spreader** *Samir Ashikhusain Gani* *Greenland Agro, Banaskantha, Gujarat*	69
26	**Prabhat Versatile Bed** *Alladi Prabhakar, Telangana*	69

27	**Modha Electromechanical attachment for handlooms replacing jacquards** *Sivakumar Modha* *Hyderabad, Telangana*	70
28	**Vineeth Mulberry Cutting and Binding Machine** *Kodimunja Praveen Kumar, Telangana*	71
29	**Modified Wood Based Culturally Accepted Crematorium** *Arjunbhai M. Paghdar, Keshod, Gujarat*	72
30	**Pulley with Stopper** *Amrutbhai Agrawat, Keshod, Junagadh, Gujarat*	72
31	**Gender Disparities in Grassroots Innovation: A Study of Women Innovators in India's Informal Sector** *Anjali C. Lakum[1], Astha Jaiswal[2] and Hemant Kumar[3]* *Online MSW Program, Centre for Distance and Online Education, Parul University, Vadodara, Gujarat* *[2]Department of Science and Technology-Centre for Policy Research (DST-CPR), Department of Studies in Science, Technology, and Innovation Policy, School of Social Science, Central University of Gujarat, Kundhela, Vadodara, Gujarat* *[3]Department of Studies in Science, Technology, and Innovation Policy, School of Social Science, Central University of Gujarat, Kundhela, Vadodara, Gujarat*	73

32	**Dissemination of *Chalakh* (fruit nipper) for drudgery reduction of farmers and its impact in Tamil Nadu** *[1]Parthkumar P Dave, [1]Hardev Choudhary, [2]Ramyasivaselvi M., [2]Maheswaran P* *[1]DST-National Innovation Foundation-India, Gandhinagar, Gujarat* *[2]ICAR-Krishi Vigyan Kendra, CENDECT, Theni, Tamil Nadu*	74
33	**ITK based polyherbal preparation for the management of cabbage aphid, *Brevicoryne brassicae*** (Linn.) *Parthkumar P. Dave, Satya Singh, Hardev Choudhary* *Department of Agriculture, DST-National Innovation Foundation- India, Grambharati, Amarapur, Gujarat*	75
34	**Development of the automated tingi machine: A circular solution for dispensing household essentials in low-income communities** *Elke Kayle Cadangen, GRIND DOST*	77
35	**Farmers Innovation in Agriculture and Allied Sector: Grassroots Insights from Risk-prone Agroecosystems of Rajasthan** *J P Mishra[1], Ranjay K. Singh[2], P.C. Bhatnagar[3], D.K. Singh[4], Deepak Chaturvedi[5], Dayanand[6], S.S. Rathore[7] and P C Regar[8]* *[1]ICAR-Agriculture Technology Application and Research Institute, Jodhpur;* *[2] Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi;* *[3]Krishi Vigyan Kendra, Udaipur,* *[4] Krishi Vigyan Kendra, Baran;* *[5]Krishi Vigyan Kendra, Jaisalmer;* *[6]Krishi Vigyan Kendra, Jhunjhunu;* *[7]Krishi Vigyan Kendra, Jaipur (Rural);* *[8]Krishi Vigyan Kendra, Rajsamand*	78

36	**CareMother- Digital Health Innovations for last mile pregnancy care** *Nikesh Ingle, Shantanu Pathak* *Doto Health, Pune, Maharashtra*	79
37	**Revolutionizing Cervical Cancer Screening: The M-Strip™ Device for Non-Invasive, Private, and Accessible HPV Detection Using Menstrual Blood** *Vaibhav Shitole[1], Rajiv Sharma[2], Somesh Chandra[3]* *[1]IOTA Diagnostic Private Limited, Ahmedabad, Gujarat* *Sterling Accuris Diagnostics, Ahmedabad, Gujarat* *[3]Surgical Oncology and Robotic Surgeon, KD Hospital, Ahmedabad, Gujarat*	80
38	**India's first virtual hand rehabilitation system to train fine finger movements** *Chandan Kumar Jha* *Indian Institute of Technology (IIT), Gandhinagar, Gujarat*	81
39	**Fueling the future by powering up biogas: Microbial electrosynthesis for enhanced methane production** *Moumita Roy* *Delft University of Technology (TU Delft)*	81
40	**Naya Development -Data Annotation Made Ethical** *Eirin Fossberg, Naya Development, Norway*	82

III. Natural Resource Management: Community perceptions and innovative response for a sustainable future		83
41	**Biodiversity Conservation in Craft Economies: Navigating Climate Challenges through Indigenous Knowledge and Ethical Practices** *Surucchi Khubchandani* *Researcher & Sustainability Strategist – Crafts & Curator,* *Creative Dignity 'CraftxClimate' Series*	85
42	**Conservation hilly millet varieties** *Tshering Lepcha , North Sikkim, Sikkim*	86
43	**Traditional Wisdom Meets Modern Science*: In vivo* Evaluation of Pain Relief Oil's Anti-Inflammatory and Analgesic Effects** *Sapna Sharma[1], Anamika Dey[1], Mamta Shah[2], Deepika N P[1], Bissma Yousuf[1], Taja Begum[1], Mohd Saleem Sheikh[1], Zaina Begum[1], Poosha Begum[1], Raja Begum[1], Gullaba Akther[1], Gulam Qadir Chopan[1], Saja Begum[1]* *[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat* *[2]LM College of Pharmacy, Ahmedabad, Gujarat*	87

44	**Value addition in community knowledge: the case of Paindel and other products from the Himalayan region** *Sapna Sharma[1], Mamta Shah[2], Deepika[1], Nadeem[1], Sabzar[1], Anamika Dey[1], and Community Members* *[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat* *[2]LM College of Pharmacy, Ahmedabad, Gujarat*	87
IV. Incubation or linking innovation, enterprise & investment		89
45	**Direct-To-Consumer (D2C) Grassroots Innovations: Digital Platforms For Sustainability And Consumer Behavior Change** *Prof. Preeti Shroff-Mehta* *Medill at Northwestern University, USA* *Pooja Sharma, MICA – Fellow, FPM Program, India, Danko Betzhold, Medill at Northwestern University, UC Berkley, USA., Science Pro Paris – School of Management and Impact*	91
46	**Leather processing and leather products** *Abhinandan Kumar, Senior Principal Scientist, CSIR-CLRI*	92
47	**Participatory Innovation Development to stimulate livelihoods for rural farmers – Case study of Locally Formulated Dairy Goat Meal (LOFO-DA-G-Meal)** *Makonge Righa[1], Mariadho Vincent[2], Martha Opondo[3] and Wanyama Jacob[4]* *[1]World Neighbors East Africa;[2]PROLINNOVA–Kenya;[3]Kenya Agricultural and Livestock Research Organization (KALRO);[4]Eastern and Southern Africa Prolinnova Platform*	93

48	**Mobilizing Grassroots Energy Ideas and Innovations: A Journey Across Gujarat's Sustainable Future** *Intakhab Alam Khan, Ankit Somra, Rageshri Thoriya, Dhyanesh Mistry, Ravikant Kholwal, Faraz Ali Khan* *[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat*	94
49	**Empowering Innovation and Growth: Role of the Accelerator in the Entrepreneurship Ecosystem** *Rowena Kay Mascarenhas, Executive Director at TiE Boston*	96
50	**Social Innovation Through Gandhian Young Technological Innovation (GYTI) Awards** Dr. Swasti Dhagat[1*], Chetan Patel[1], Ramesh Patel[1], Prof. P.V.M. Rao[2] *[1]Society for Research and Initiatives for Sustainable Technologies and Institutions, Grambharti, Gujarat* *[2]Professor, Department of Design & Department of Mechanical Engineering, IIT Delhi, India*	97
V. Public Policy		99
51	**From Everyday Objects to mobile Primary Health Center: Creativity for grassroot healthcare innovation** *PMRF **Md Haseen Akhtar**, Dr. **Janakarajan Ramkumar*** *Department of Design, Indian Institute of Technology Kanpur*	101

52	**Health enhancer for medicinal compound and income generating source for S/T for their better livelihood in some adjacent villages of Odisha** *[1]Babita Kumari and [2]Hitesh Solanki* *[1]Department of Environmental Science, Motilal Nehru College (University of Delhi), New Delhi,* *[2]Department of Botany, Gujarat University, Ahmedabad*	102
53	**University-Community Translational Entrepreneurship Programs Propelling** **Innovation and Creativity for Indigenous and Marginalised Urban Poor in Malaysia** *Doris Padmini Selvaratnam, Faculty of Economics and Management, Universiti Kebangsaan Malaysia*	103
54	**Bridging Grassroots Innovations and Corporate Partnerships Through Collaborative Learning: What worked well in Grassroots Innovations practices & learnings from collaboration with Corporations** *Prathyusha Thammineni* *NextBharat Ventures, Gandhinagar, Gujarat*	104
55	**Scouting Grassroots Innovations: Lessons, Challenges, and Policy Recommendations** *N Sri Akhila, Byreddy Sai Charith Reddy, U Yedukondalu Krishna* *Palle Srujana, Hyderabad, Telangana*	105

VI. Educational Innovations		107
56	**Transforming Rural Primary Education with VR and 3D Technology: A Data-Informed Approach** *Martin Parmar* *Charotar University of Science and Technology, Gujarat*	109
57	**Integrating Technology into Educational Practice** *Sandip Prajapati, Kheda, Gujarat*	109
58	**I like my school** *Raghavbhai Dhanajeebhai Katakiya, Amreli, Gujarat*	110
59	**Improving engagement to regularize attendance** *Kalpesh Chotalia, Jamnagar, Gujarat*	111
60	**Current Training Practices in The Craft Sector** *Shivram Kumar, Jeevan Jolly, Viknesh Surya SS, Sharmistha Banerjee* *Indian Institute of Technology (IIT) Guwahati*	112
61	**Longitudinal Assessment of the Impact of Residential Education Program on Female Empowerment and Sustainable Development: A 20-Year Follow-Up Study** *Ambreen Saleem*[1], Imran Saleem[2], Aamir Hassan[3] [1]*Assistant Professor, Institute of Business Management, GLA University, Mathura, Uttar Pradesh* [2]*Professor, RIEU, University of Buraimi, Al-Buraimi, Oman* [3]*Research Scholar, Department of Commerce, Aligarh Muslim University, Aligarh, Uttar Pradesh*	113
62	**Creating the 21st Century Engineer for Sustainable Development and Social Justice** *John Tharakan, Professor of Chemical Engineering, Howard University, Washington DC, USA*	114

63	**Aligning Teacher-Driven Innovations with NEP Mandates: Insights from Gujarat's Class 1-2 Teachers' Online Forum** *Megha Gajjar and Avinash Bhandari* *FAIR-E Ahmedabad*	115
64	**Teacher-generated ICT Innovations as complements to state ICT interventions and policies** *Megha Gajjar[1], Mehul Prajapati[2], Avinash Bhandari[1]* *[1]FAIRE, Ahmedabad* *[2]Govindpura Anupan Primary School, Mehsana, Gujarat*	116
65	**Online quizzes for learning** *Mehul Prajapati, Mehsana, Gujarat*	117
66	**'Language and literacy through learning out-comes-based, children's songs and games'** *Kirti O. Patel, Bhavnagar, Gujarat*	118
67	**'Numeracy through self-composed songs'** *Lila D. Thakarda, Bhavnagar, Gujarat*	119
68	**Education with Playful Engagment** *Nikita Patel Anand, Gujarat*	120
69	**Masti ki Patasala** *Rakesh Patel***,** *Panachmahal, Gujarat*	121
70	**Fostering Integrity and Community: Innovative Educational Practices in a Tribal School** *Surender Kumar Champa, Himachal Pradesh*	122
71	**Transformative Leadership in Education** *Gurmel Singh, Hoshuiarpur, Punjab*	122
72	**Changing Landscape of Education** Yudhveer Tandon *Champa, Himachal Pradesh*	123

VII. Cultural Creativity		125
73	**Building Resilient Urban Knowledge Communities and Enterprises through Design Education** *Tanishka Kachru, Paras Singh, Deepika Srivastava* *National Institute of Design, Ahmedabad, Gujarat*	127
74	**Transforming Social Innovation into an Education Event Tourist Attraction** *Mohd Latife Shamsuddin[1], Norol Hamiza Zamzuri[1], Sharmila Mohamed Salleh[2], Yayasan Inovasi[2], Jacqueline Koh Siew Len[3]* *[1]Faculty of Business and Management. Universiti Teknologi Mara, Puncak Alam, Selangor* *[2]Level 3-E1A, Enterprise 4, Technology Park Malaysia, Kuala Lumpur* *[3]Faculty of Business and Management, Universiti Teknologi MARA, Kota Kinabalu, Sabah*	128
75	**On boosting innovation and entrepreneurship skills amongst children and young people, with added focus on girls** *Prasanta Dash, Chief, UNICEF Gujarat Office*	128
76	**Gujarat University: The Vikram Sarabhai Children Innovation Centre (VSCIC) & herSTART platform** *Prasanta Dash Chief, UNICEF Gujarat Office*	129
77	**A design intervention on the traditional "Tekeli Pitha" (Kettle steam rice cake) preparation method: Utilizing an entrepreneurial strategy to expand a scalable company of a local grassroots culinary culture.** *Pranjit Sarma 2. Dr. Abhijit Padun- Central Institute of Technology, Kokrajhar Assam.*	130
78	**Entrepreneurial Migrant Society as a Conduit of Social Culture in Folk Life** *Harshit Kumar, Sunil Kumar Rai, Department of Hindi, University of Delhi*	131

79	***Warli Art and culture*** *Vinesh Dilip Dhodi, Palhgar, Maharasthra*	132
80	**Plastic Upcycling and Weaving** *Rajiben Vankar, Bhuj, Gujarat*	132
81	**Pithora painting** *Desingh Rathwa*, *Chotta Udepur, Gujarat*	133
82	**Understanding The Role of Jewellery And Its Traditional Crafting Techniques In The Modern World - Creating Indian Legacy through Intercultural Craftsmanship** *Awani Sankritya, Dr. Ravindra Singh, L.K Das* Department of Design, Delhi Technological University	133
83	**Creativity in Context: The Impact of Cultural Rigidity on Creative Performance** *Ashapurna Das and Apurva Sanaria* *Indian Institute of Management, Bangalore*	134
84	**PUNARAVARTAN : Cultural heritage, material innovations and circularity to achieve sustainability** *Manisha Seth* *eCoexist,Enterprises, The eCoexist Foundation*	135
85	**Rabari embroidery Craft** *Bhavana Rabari, Kutch, Gujarat*	136
86	***Ahir Embroidery, Dharmila Chad*** *Kutch, Gujarat*	136
87	***Mud Mirror Work, Shruti Thacker*** *Kutch, Gujarat*	137
88	**Mata ni Pachhedi, Jagdish Chitara** *Ahmedabad, Gujarat*	137

I. Institutional Transformation

Empowering Rural Women through Bio-Entrepreneurship: Harnessing Community Knowledge for Conservation, Utilization, and Commercialization, Insights from GIAN-DBT Project Intervention

Nadeem Ahmed, Sabzar, Abhijeet, Dorji, Sapna Sharma, Anamika Dey and community members
Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat

This paper reviews the transformative impact of bio-entrepreneurship initiatives based on traditional and community knowledge in enhancing women's economic independence and fostering wealth creation within local communities. It draws insights from the Himalayan regions, particularly West Sikkim and Baramulla, Jammu & Kashmir, as part of a project supported by the Grassroots Innovation Augmentation Network (GIAN) and the Department of Biotechnology (DBT), Government of India (GOI). The project aims to empower women by promoting women-led bio-enterprises rooted in indigenous and community knowledge, thereby enhancing economic independence and community wealth.

This study examines the conservation, utilization, and commercialization of local bio-resources to empower rural communities, particularly women in districts such as Geyzing and Soreng in West Sikkim and Baramulla in Jammu & Kashmir. These regions, rich in biodiversity and traditional knowledge, face economic fragility. Drawing on case studies from West Sikkim, particularly in Geyzing and Soreng, this paper explores (a) how the in-situ value addition of bio-resources, coupled with the dissemination of grassroots innovations and traditional knowledge, has empowered rural communities and enhanced local economies by leveraging the region's biodiversity, and (b) the utilization of nutraceuticals such as Wild Lily Pickle (Nakima), Pumpkin Jam, and fermented foods like Kinema, Gundruk, Sinki, and Churpi, along with community-based recipes using Chimphing and Timbur, to improve food security and promote balanced nutrition, particularly for the rural and urban poor.

In Baramulla district, resource mapping, value addition of local bio-

resources, and traditional knowledge have been carried out with community representatives, ensuring active participation in planning, decision-making, implementation, and monitoring. The conservation, utilization, and commercialization of local bio-resources have been conducted through (a) on-farm validation and in-situ value addition, preventing biodiversity loss and ensuring the sustainable harvesting of wild plants, and (b) capacity-building programs and cooperative farming initiatives, enabling efficient post-harvest management and improved market integration. The creation of value-added products such as herbal teas, wild berry jams, herbal supplements, essential oils, extracts, and nutraceutical recipes has encouraged the efficient use of underutilized bio-resources, reduced waste, and promoted eco-friendly practices. Additionally, training over 150 women farmers has enhanced production efficiency, optimized resource utilization, and contributed to sustainable livelihood generation.

Fostering Innovation and Inclusivity: Opportunities, Challenges and way ahead through Vigyan Ashram's School Innovation Programs

Kadam, Komal C.; Gaikwad, Kishore S. and Dr. Kulkarni, Yogesh R.
Vigyan Ashram, Pune, Maharashtra

This paper discusses various educational programs implemented by Vigyan Ashram in government schools across multiple states. It presents the opportunities and challenges encountered during the implementation of these programs and proposes a roadmap to address these challenges effectively.

Vigyan Ashram is a not-for-profit organization dedicated to the field of education. Its guiding principle, *Development through Education and Education through Development*, reflects its commitment to using technology alongside activity-based learning for inclusive development. The organization follows the philosophy of *Learning by Doing*, integrating theoretical knowledge with practical skills to equip students with 21st-century competencies such as critical thinking, creativity, and empathy.

Vigyan Ashram implements various educational programs, including *Introduction to Basic Technology (IBT)*, *Learning by Doing (LBD)*,

and *Low-Cost Maker Spaces*, which enable students to acquire skills in diverse fields such as agriculture, animal husbandry, energy, environment, engineering, home science, health, and arts & crafts. Additionally, initiatives such as *Strengthening Atal Tinkering Labs (ATL)* provide hands-on exposure to electronics, 3D design and printing, and emerging technologies like robotics, artificial intelligence (AI), and machine learning (ML). These programs have contributed to a reduction in school dropout rates, the development of an entrepreneurial mindset, and an increased exchange of knowledge and experience between students and teachers.

As part of its entrepreneurship development efforts, Vigyan Ashram provides technical mentorship to students and teachers in government and non-funded schools through national programs such as the *School Innovation Marathon (SIM)* and the *Seed the Future Entrepreneurs Program* by Dassault Systèmes, supported by the Atal Innovation Mission. These initiatives help students understand market demands and develop problem-solving skills through design thinking. In the *Seed the Future Entrepreneurs Program 2024*, for instance, students from *Shree Dada Maharaj Natekar Panch-koshadharit Vidyalay* in Chikhali, Maharashtra, designed and developed a manually operated, low-cost, yet highly efficient tool to assist sugarcane-cutting laborers, addressing a real-world challenge.

The success of such innovations is rooted in a culture of creativity, innovation, and empathy. As supported by the theory of multiple intelligences, creativity flourishes through exposure and experience. Vigyan Ashram applies this principle across its programs, including *IBT, LBD, ATL*, and *LCM*. Additionally, it collaborates with industry leaders such as Dassault Systèmes, Tata Technologies, and the Schaeffler Group, as well as academic institutions like Pune University and JNTUs, to bridge the gap between industry, academia, and societal needs.

However, the implementation of these programs presents various challenges. Vigyan Ashram continues to explore solutions to these obstacles, which will be addressed in this paper. Ultimately, the organization plays a vital role in making education accessible across different societal strata by contributing to state and national education policies.

Farmers' market: connecting farmer to consumer

Ramesh Patel, Chetan Patel, Hamirbhai, Mukesh Chauhan, Devesh Patel, and other farmers
SRISTI Innovations, Ahmedabad, Gujarat

The SRISTI Khedut Haat is meticulously organized, coordinated, and promoted by SRISTI Innovation. The organization conducts regular farm verification, farmer training, and continuous guidance on chemical-free farming practices. It also undertakes laboratory research to address farmers' challenges while actively raising consumer awareness and engagement.

To ensure authenticity and quality, SRISTI Prakritik Khedut Haat follows a rigorous selection process for participating farmers. Each farm is verified based on strict organic farming criteria, allowing only those who have consistently adhered to natural farming methods for at least three years to sell their produce.

The initiative primarily supports rural farmers and self-cultivating groups whose livelihoods depend on natural farming. Additionally, any special fruits or farm produce sourced from outside Gujarat undergo thorough verification by SRISTI Innovations and the farmers' group before being approved for sale. At the haat, farmers determine the prices of their vegetables, factoring in quality and transportation costs. Importantly, all payments go directly to the farmers, strengthening the direct producer-consumer connection.

Consumers at the haat have access to pure, chemical-free produce grown in fertile fields, ensuring transparency and trust. This initiative fosters a strong relationship between rural farmers and conscious urban consumers, with markets held every Sunday and Thursday in Ahmedabad.

SRISTI Innovation also welcomes volunteers to contribute their skills and creativity to this movement. Interested individuals can connect via WhatsApp to offer their time and expertise for various activities.

Overall, the SRISTI Khedut Haat not only promotes sustainable agriculture and rural livelihoods but also empowers consumers to

make informed, responsible choices while appreciating the value of natural farming.

Strengthening the Academia – Industry – Informal sector Linkage in Higher Education – FLOW Strategy

Sayantan Mukherjee and Shankar Venugopal
Mahindra and Mahindra, Chengalpattu, Tamil Nadu

This paper addresses two critical challenges: (a) Industry-Academia Disconnect – The gap between academic curricula and industry requirements results in a large pool of graduates who are not industry-ready. (b) Underutilization of Traditional Knowledge – The rich practical wisdom present in the informal sector is not effectively harnessed to drive innovation in industries and communities.
In this context, an "industry-ready graduate" serves as the key outcome for the first problem, while an "innovative product that resonates with consumers" is the desired outcome for the second.

To address these challenges, the paper presents FLOW, an innovative framework designed to bridge the gap between educational institutions and industry needs. This strategy has been applied across multiple sectors to solve complex technical problems and foster innovation.

The FLOW Framework
FLOW consists of three interconnected phases:

Focus – Identifying and defining critical problems with precise scope.
Leap & Orient – Encouraging ideation by setting aside preconceived notions, creating space for novel ideas, and refining these ideas to align with real-world constraints. The process of "leaping" to new concepts and "orienting" them to practical challenges occurs simultaneously.

What's Next – Once a problem is solved, the innovator transitions seamlessly to identifying new challenges, ensuring continuous innovation.

The synergy between these phases ensures a smooth and iterative refinement of ideas, leading to robust solutions.

Through an in-depth analysis of the FLOW methodology, this paper demonstrates how systematic challenge identification and phased, policy-oriented innovation can bridge the industry-academia gap. By implementing FLOW, a structured yet flexible approach, a transformative model for developing industry-ready graduates is proposed. Additionally, the strategy fosters collaboration with the informal sector, integrating traditional knowledge to develop innovative products suited for a VUCA (volatile, uncertain, complex, and ambiguous) professional landscape.

The effectiveness of FLOW is illustrated through two case studies—one from the automotive sector and another from the agritech domain—showcasing its potential to drive meaningful change in industry and education.

Policing out of the Box: Exploring Innovative Community Policing Practices for Creative Collaborative Governance through a Multiple Case Studies Approach

Tanya Ahuja
Indian Institute of Management, Ahmedabad, Gujarat

Democracies around the world are aspiring for citizen-centric, transparent, accountable, responsive,
moral mechanisms in order to bolster people's participation and build trust. The colloquial perception of police, a conspicuous instrument and representative of the State, is one of authority and coercion. In order to ensure smooth enforcement of law and order, several innovations in policing have been conceived around the world.

This paper aims to draw lessons from such innovative community policing initiatives. It asks the question: How do grassroots innovations in policing and community engagement emerge, adapt, and achieve operational viability within resource-constrained, culturally diverse environments? The paper employs Yin's (1970) multiple case study analysis framework for operationalising constructs through a four-

stage process of within case analyses, cross case synthesis, pattern matching and explanation building.

It operationalizes 7 innovative local policing cases from India and abroad through three parameters viz., cultural embedment, resource configuration and collaborative governance. Conceptually, it locates these cases into a framework anchored around the concepts of policing, policy process and contextual distinctiveness, and theorises a novel "Policy Pandora-Box of Wicked Problems," for theoretical replication in policy context beyond that of community policing. While tracing the evolution of innovative reforms in policing since ancient to modern times, through the analysis of best practice cases, it brings out the need for gap filling and policy lesson drawing, and explains what works or does not work where, when, why, how, for whom and so what.

Exploring the Dynamics of Grassroots Innovation: A Comprehensive Review

Adeeba Hoor and Arvind Arahant
Atal Bihari Vajpayee School of Management and Entrepreneurship, Jawaharlal Nehru University, New Delhi

Grassroots innovation (GI), a community-centered approach to innovation, has seen increasing focus for its contribution to sustainable development and social change. This study assesses the growth and thematic trends within GI research by examining 261 articles through bibliometric analysis. Results show that GI research has grown substantially over the past two decades, with notable increases in study volume of studies, interdisciplinarity, and diversity in research methods. Early GI studies primarily explored its role in sustainable development, later expanding to view GI alongside other innovation types, reflecting a more nuanced understanding of its impact. Recent literature emphasizes connections between GI, Social Innovation, and Frugal Innovation. Content analysis revealed six clusters, indicating differences in how GI is perceived in developed versus developing countries, as well as highlighting challenges in dissemination and a need for stronger collaboration across innovation systems. Cluster analysis suggests that while GI is vital for promoting sustainability,

broader success hinges on political support, niche management, and mainstream integration. Civil society is identified as a crucial actor in advancing GI, facilitating grassroots movements, and fostering innovative solutions to local challenges. This study also suggests future research directions, paving the way for further exploration into the potential of GI as a catalyst for innovation in addressing social issues and enhancing community resilience.

The Gujarat Organic Farmer Producer Cooperative Society Ltd.

Anand, Gujarat

Small and marginal farmers in Gujarat face significant challenges, including limited market access, high production costs, and reliance on unsustainable farming practices. Women farmers, in particular, encounter barriers to participation and support in sustainable agriculture initiatives.

This study examines a cooperative model that empowers farmers through biodynamic organic farming and innovative processing techniques. A key technological intervention is Devesh Bhai's self-developed processing machine, which enhances value addition for crops like turmeric, yam, and vegetables by improving efficiency and reducing labor dependency.

The cooperative markets its products under the Satva Organics brand, ensuring authenticity and sustainability. By bringing together small farmers, including 45 women farmers, it fosters a unified platform for organic farming, branding, and national and global market access. This initiative not only promotes sustainable agriculture but also enhances economic resilience and self-sufficiency among smallholder farmers.

Mithivirdi Farmer Producer Company Limited

Tarsamiya, Bhavnagar, Gujarat

Mithivirdi Farmer Producer Company is registered under the Companies Act, 2022, to support the sustainable livelihoods of small,

marginal, and mixed-cropping farmers in the Mithivirdi region of Bhavnagar district. The company was established with the primary aim of reducing input cost, promoting affordable crop production and enabling small farmers to create stable livelihoods.

The company emphasizes reducing reliance on expensive modern inputs and focuses on reviving traditional farming methods and marketing strategies that serve the interest of farmers. In contrast to the costly modern market system, the company promotes the "producer-to-consumer" concept, empowering independent teams.

What began with 25 farmers from 5 villages has now expanded to 550 farmer members across 12 villages. Among them, over 80 farmers have successfully transitioned to fully organic farming and the business has grown to generate monthly sales of 7 lakh rupees.

The company places a strong emphasis on value addition, grading, packaging, and branding for the sale of farm produce. As part of this, products under Vasant Brand such as peanut oil and Assam Classic Tea are now marketed with appropriate licenses. The farmers cultivate organic vegetables, fruits, grains, and legumes on their farms, and as a group, they market these products together. In addition, the company operates a Farmer Services Center that provides chemical-free medicines and supports farmers with government schemes and other related services. Currently, 539 farmers are part of the initiative.

Dham Aravalli SPNF Producer Company Limited

Meghraj Road, Modasa, Gujarat

Dham Aravalli SPNF Producer Company Limited was established in October 2021 with 314 member farmers including 172 shareholders. Under the FPO, a retail store named Aravalli Natural is operational in Modasa, the district headquarters of Aravalli. Since August 2023, the store has been directly selling agricultural produce from farmers in Modasa, Dhansura, and Bayad talukas in Gujarat. By adding value to their natural produce and selling it in small packages, farmers are earning significant profits.

Recently, at Modasa, Dham Aravalli SPNF Producer Company Limited distributed agricultural products to the farmers. A Natural Prakriti Shop was inaugurated at the company premises through the joint efforts of farmers from Modasa, Dhansura, and Bayad talukas where farmers were encouraged to adopt natural farmers. An appeal was

made for a more widespread adoption of natural agriculture so that people could access chemical-free fertilizers and poison-free farm products, promoting healthier lifestyles.

Aranya Agriforest Producer Company Limited

Randesan, Gandhinagar, Gujarat

Tribal farmers in the Aravalli Hills face significant environmental and economic challenges, including soil degradation, climate change-induced disasters, and restricted market access. Additionally, the erosion of traditional farming practices threatens both their livelihoods and cultural heritage.

This study examines Aranya, an initiative that integrates eco-friendly farming practices, climate-resilient agriculture, and capacity-building efforts to address these challenges. By promoting sustainable techniques such as bio-fertilizers, seed preservation programs, and efficient water management, Aranya enhances agricultural productivity while preserving soil health. The initiative also facilitates market linkages for grains, pulses, spices, and forest products, ensuring fair pricing and financial stability for farmers.

Beyond economic and environmental benefits, Aranya fosters cultural preservation by blending traditional knowledge with modern agricultural advancements. This holistic approach not only strengthens food security and rural economies but also empowers tribal communities with a sustainable and culturally inclusive agricultural model.

Madhav Natural Farming Co-operative Society Limited

Vasudev Dhodhiya, Village- Kasavasana, Ta. Mandal, Ahmedabad, Gujarat

Farmers in the region faced significant challenges with low returns from their produce due to limited local market access and the absence of value addition to their crops. Additionally, the reliance on chemical fertilizers and pesticides resulted in unsustainable farming practices, increased costs, and environmental degradation.

Madhav Organic Farm, under the leadership of Vasudev Bhai, promotes natural farming practices using sustainable methods like *Jeevamrut*, a bio-fertilizer made from cow dung, cow urine, turmeric, and carom seeds. By training farmers in *Jeevamrut* preparation and application, the initiative has reduced dependency on chemical inputs. The farmers collectively focus on value addition, particularly processing chickpeas into dal and flour, improving their income. Products are distributed to Ahmedabad and nearby villages through collaborative operations. This model empowers farmers with sustainable farming solutions, improved market access, and a unified platform for economic growth.

The Little Himalayan Co.

GIAN, Ahmedabad, Gujarat

Rooted in the wisdom of the Himalayas, The Little Himalayan Private Ltd serves as a bridge between ancient traditions and modern innovation. Committed to preserving and honoring age-old knowledge, the company integrates sustainability, creativity, and commercial viability to bring traditional practices into the contemporary world.

The products offered by The Little Himalayan go beyond mere commodities; they are carefully crafted representations of living cultures. Each item reflects generations of collective wisdom, curated to meet the evolving standards of today's consumers while maintaining authenticity and heritage.

Dedicated to conservation and community empowerment, the company actively supports local livelihoods by collaborating with women's groups, sourcing raw materials from them, and facilitating the sale of their products in local markets. It upholds ethical practices by obtaining prior informed consent from communities, ensuring that traditional knowledge is respected while being integrated with modern science and technology.

Through this creative and collaborative approach, The Little Himalayan not only sustains cultural heritage but also fosters a compassionate and responsible value chain, inviting consumers to participate in a movement that honors both people and the planet.

II.Technological Innovations For/From/ Grassroots

GRIND Program: A Strategy to mainstream GIs From the Margins

Dr. Anthony C. Sales[1], Mirasol G. Domingo[2]
[1]PFT, CESO III, Regional Director, DOST-XI;
[2]Assistant Regional Director, TSSD, Ms. Mary Luz B. Advincula-Niere, MBA, GRIND National Focal, TSSD-GRIND

People seldom hear about innovations from the bottom of the pyramid - the Grassroots Innovations (GIs). These innovative products, processes, or technologies, created by people from the informal sector, usually due to necessity, hardship, or challenges, are the focus of the Grassroots Innovations for Inclusive Development (GRIND) program. This pioneering program of the Department of Science and Technology empowers marginalized communities by developing and strengthening their existing GIs implemented in the Philippines through the 4L framework - Learning, Leveraging, Linking, and Legitimizing; and the penta-helix collaboration model to provide science and technology (S&T) and research and development (R&D) interventions.

The prioritized GIs are categorized as (a) heirloom recipes/heritage foods, (b) ethnobotanicals, (c) artisanal/endangered crafts, (d) grassroots innovations addressing health issues and problems relative to pandemics, or (e) GIs addressing the circular economy. GRIND aims to steer progress towards empowering Filipinos to achieve the AmBisyon Natin 2040, which is in line with the Philippine Innovation Act, through inclusive growth and poverty reduction. Out of the 41 Saliklakbay Solutions Mapping and Immersion conducted, 606 GIs were identified, 64 GIs were assisted with S&T packages and capacity building, and 61 GIs were deployed and funded. To bring S&T to the margins, these intervention packages provided to priority GIs have evolved into a strategy of mainstreaming GIs from the margins in Phase I and II of the national scaling up of the GRIND program.

Grassroots Innovations (GI), Sustainable Development (SD) and the Innovation Commons – A Search for the Commercial Success of Informal Sector GIs in India

Anamoy Ranjan,
International Management Institute, New Delhi

Grassroots Innovations (GIs) have had a long history of contributing to the environment. It is only in the last two decades that researchers have tried to understand the mechanisms by which GIs contribute to Sustainable Development (SD), and become stronger. GIs are more democratic and broader based in nature.

Niche theory and Strategic Niche management (SNM) help to guide GIs so that they can diffuse into the mainstream. There is considerable literature from around the world to show that GIs facilitate sustainable development and other individual and community goals. Social Commons, FabLab, Makerspaces and other digital platforms provide examples of how GIs navigate the Innovation Commons to become successful enterprises. Can this form a template for the success of GIs in India?

In India, however, GIs of a technological nature, occur in the informal sector through individual innovators. Occasionally, they may not have their family's support, and may toil away secretly on developing a technological innovation, with severe resource constraints. The long tail of the grassroots innovations poses unique challenges for the design of an Innovation Commons that can ensure entrepreneurial success. This paper reviews current literature, to explore the factors that may contribute to the effective navigation of the Innovation Commons by GIs and their becoming successful enterprises. The evolution of the concept of the Technology Commons, and that of the Regime through the Honey Bee Network institutions- GIAN (Grassroots Innovation Acceleration Network), SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) and GTIAF (Grassroots Technology Innovation Acquisition Fund, set up 2012) are important steps in the strengthening of the Innovation Commons.

While the Indian GI context is different, the review of literature

from around the world has been done to draw useful lessons for our context. Digitalization and the use of ICT, Business Model Innovation, Social Innovation and Support from Actors in the Regime strengthen Innovation Commons. Particularly for individual innovators, the weak Niche – Regime interaction, and the lack of government policy for GIs in all the stages of their journey appear to be important gaps in the Commons. The paper breaks fresh ground by putting forth hypotheses for the strengthening of the Innovation Commons for informal sector GIs in India. These hypotheses may form the basis for future research in this area.

A Comprehensive Review of Increasing Biological Invasion and Technological Interventions

Prajith Karakkottil [1,2], Vipan Kumar [1,2], Lalsiemlien Pulamte [1,2]
[1]CSIR-National Institute of Science Communication and Policy Research, Dr. K.S. Krishnan Marg, New Delhi
[2]Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, Uttar Pradesh

This study explores the role of natural selection and adaptation in the invasion processes of species; while investigating how innovative technologies such as Geographic Information Systems (GIS), remote sensing, Artificial Intelligence, Machine Learning, and advanced genetic tools can enhance detection, monitoring, and management of invasive species. This research aims to strike a balance between the use of these advanced technologies and traditional management strategies by analyzing various case studies that highlight both successes and ongoing challenges. Through this study, the goal is to provide valuable insights into improving invasive species management, emphasizing the importance of addressing safety, ethical concerns, and the need for interdisciplinary collaboration. Ultimately, the study seeks to promote sustainable, technology-driven solutions that can safeguard ecosystems while advocating for collective action among scientists, policymakers, and communities to ensure long-term environmental protection.

This study is centered around two key dimensions: (a) analyzing the effectiveness of technological innovations in invasive species

management, with a focus on cutting-edge tools such as Geographic Information Systems (GIS), remote sensing, Artificial Intelligence (AI), Machine Learning (ML), and genetic technologies for the detection, monitoring, and control of biological invasions; and (b) evaluating the integration of these advanced technological solutions with traditional management strategies, assessing their combined efficacy in controlling invasive species while addressing the associated practical, ethical, and safety considerations.

Effectiveness of Lead user developed Innovations in Agriculture: A study of innovations of Uttar Pradesh

Akanchha Singh[1] and VLV Kameswari[2]
[1]Department of Agricultural Extension and Communication, Faculty of Agricultural Sciences, GLA University, Mathura, Uttar Pradesh
[2]Department of Agricultural Communication, G.B Pant University of Agriculture and Technology, Pantnagar, Uttarakhand

The agriculture sector relies on innovation since it serves as the cornerstone for the sector's growth and development. It has been observed from several studies that innovations developed by research stations are often discontinued at a higher rate. As a result, the attention has shifted to the role of users in the development and spread of innovations. As farmers are the main users of innovations and technologies of agriculture and develop innovations continuously, they can be viewed as lead users in agriculture. A lead user can be defined as a person who faces a need before the rest of the population. They are far ahead of the market trend and hence, satisfy their need by developing innovations.

Uttar Pradesh has been taken as the locale of study because of the rich agricultural scenario of the state. Fifteen innovations from ten districts of Uttar Pradesh were selected through purposive sampling. For every innovation developed by a lead user, ten fellow farmers were selected for perception and three experts from the concerned discipline were selected purposely for the first step validation. The documented innovations are AGM combine harvester, Mobile Sprinkler irrigation system, improved fodder cutter, mini portable biogas plant with purification system, Kabir combine harvester, use of clay pellets for sowing paddy, Captain Basti Combine Harvester,

In-plant germination of sugarcane, modified tractor, marigold oil extraction, introduction of strawberry cultivation in Barabanki, modified trench opener, Vikalp scythe, Kudrat-9 and Baba Vishwanath variety of wheat.

Fellow farmers perceived AGM combined harvester and portable biogas plant as highly effective in comparison to other innovations. As per the experts, portable biogas plant with purification system, marigold oil extraction and scythe were considered as the top three innovations considering overall mean scores. The study underscores the importance of recognizing and verifying farmers' contributions to agricultural innovation and calls for policies that support ongoing farmer-scientist partnerships.

Grassroot Innovation and Use of Technology for Sustainable Water Resource Management by Ajrakh Artisans in Kachchh, Gujarat

Taniya Vaidya,
IDC School of Design, Indian Institute of Technology (IIT) Bombay, Maharashtra

Ajrakh block printing using natural dyes is a water-intensive craft practiced in Kachchh. Gujarat. Earlier river water was used, now the craft depends on ground water. This paper describes how, based on their observation, artisans have made a filtration plant using local, natural material, to filter groundwater for the dyeing processes. As a community, with the use of technology, they have successfully set up and are running a Common Effluent Treatment Plant (CETP) to filter used water. This paper further shows how, based on their experience with the larger effluent treatment plant, the artisans are now experimenting with smaller treatment plants for personal workshops. Thus, the experience of working in tandem with nature has led the artisans to a path of sustainability and conservation of natural resources alongside their design innovations.

RuTAG 2.0: Empowering Indian Agriculture with Rural Technology Solutions

Anusha Velamuri, S. Senthil Vinayagam, Ravindra Naik, K. Venkateswaran, N. A. Vijay Avinashilingam, Umesh Hudedamani, Sanjiv Kumar, Chandrarekha C, P. Mallesham
ICAR-National Academy of Agricultural Research Management (NAARM)

Rural India faces persistent challenges, including fragmented landholdings, climate vulnerability, inadequate infrastructure, and limited access to modern technologies and credit. Grassroots innovations have emerged as a transformative approach to address these issues, promoting sustainable development and economic empowerment. This article explores the role of initiatives like RuTAG 2.0 project, which fosters agripreneurship through targeted technology interventions. Case studies, including low-cost cold storage solutions and electric-powered agricultural equipment, highlight the potential of innovations to reduce post-harvest losses, labor shortages, and environmental impact. However, grassroots innovators face significant barriers, such as resource constraints, limited scalability, and insufficient support networks. This article underscores the need for integrated frameworks that bridge these gaps, ensuring that rural technologies align with end-user needs and contribute to achieving the Sustainable Development Goals (SDGs). Strengthening institutional support and fostering public-private partnerships are pivotal to unlocking the potential of rural innovations for sustainable agricultural growth.

Tree Plantation By one Liter Water Technique, Water and Agrobiodiversity Conservation Management

Sundaram Verma,
Farmer, Sikar, Rajasthan

In the arid and semi-arid regions of Rajasthan, where even drinking water is scarce, tree plantation presents a significant challenge. In such conditions, a tree plantation method requiring only one liter of water offers a viable solution for areas with minimal rainfall. With

an average annual rainfall of 25 to 50 cm, Rajasthan faces frequent droughts and severe water scarcity.

This innovative technique was developed to address these challenges. Various factors, including population growth, rising costs, declining soil fertility, and diminishing water resources, have adversely affected pastoral communities. The implementation of this technique has the potential to enhance food, fruit, fodder, and fuel production while also generating employment opportunities and increasing farmers' incomes.

The method enables the plantation of shade-giving, fodder, timber, medicinal, and select fruit-bearing trees using only one liter of water for their entire lifespan, making it a sustainable approach to afforestation in water-stressed regions.

Principle of one-litre plantation technique: -

When rainwater falls on the ground, after being absorbed by the land according to its absorbing capacity, the remaining water goes to the lower layers of the land by seepage. The water thus absorbed by the land and stored by seepage is dissipated in the following four ways.

1. By evaporation by the sun which occurs effectively 25-30 cm deep.
2. By seepage into the very low layers of the land.
3. By the use of water by weeds.
4. By evaporation by capillary action theory.
   Of the above, if the water loss caused by weeds and capillary action is stopped, then at 30 cm depth or below the ground, there is enough water that is sufficient for the growth of any forest plant.

Adaptive Innovation for Rainfed Agriculture: APCNF's Pre-Monsoon Dry Sowing with Seed Pelletization

V Lakshman Naik, Vijay Kumar T, Sandhya Kumari V, & K S Varaprasad
Rythu Sadhikara Samstha, Andhra Pradesh Community managed Natural Farming, Guntur, Andhra Pradesh

Agriculture faces growing uncertainty due to climate change. The major impact of climate change, is unpredictable rainfall patterns pose significant challenges to rain-fed farming systems. These erratic weather conditions heighten the risk of crop failure, increase input costs due to repeated sowings, and often cause farmers to miss optimal planting windows. Chemical agricultural practices further exacerbate these challenges. Natural farming has emerged as a potential solution to address these crises, providing methods that reduce dependency on chemical inputs and enhance soil health and crop resilience.

"Pre-Monsoon Dry Sowing" (PMDS), an innovation developed by the Andhra Pradesh Community-managed Natural Farming (APCNF) program leverages early rains to optimize rainwater usage. This method involves sowing a variety of seeds (typically 12 to 15 different crops) during the dry pre-monsoon summer months, specifically in April and May. A key adaptive innovation in PMDS is seed pelletization developed and refined by local farmers in collaboration with APCNF. It is a process where seeds are coated or pelletized with natural farming inputs like *Beejamrutham*, *Drava Jeevamrutham*, *Ghana Jeevamrutham*, clay, soil, and water. This enhances the resilience of seeds by ensuring better soil moisture utilization and enhances early seedling vigor, especially during drought periods or insufficient rainfall. Seed pelletization is done for Pre-Monsoon Dry Sown seeds (PMDS), while primary and secondary crop seeds are also pelletized based on need.

PMDS with seed pelletization improves soil structure, conserves soil moisture, and diversifies the soil microbiome, leading to greater productivity in the main cropping season. Ensuring farmers cultivate multiple crops throughout the year, even under rain-fed conditions. Furthermore, it supports farmer livelihoods through additional biomass, which serves as mulch, input preparation, and fodder. Also, generates secondary crops (other millets, vegetables, and pulses) that enhance farmers' health, nutrition, and income.

The widespread adoption of this technique in APCNF is evident, with 102,940 farmers practicing seed pelletization in PMDS, covering 107,364 acres across Andhra Pradesh in the summer of

2024. Farmers claim that these practices boost crop yields and reduce water requirements. However, further scientific evaluation is necessary to quantify the specific contributions of PMDS and the role of seed pelletization to overall climate and pest resilience. As rain-fed agriculture faces increasing challenges, these innovations offer a promising solution for a sustainable and resilient farming system.

Sustainable Solutions for the Hospitality Industry: Upcycling Tea Waste and Pine Resin to Replace Single-Use Plastics

Toshit Kumar Ram
Indian Institute of Technology (IIT) Hyderabad, Telangana

Waste management, particularly within the hospitality industry, has become a significant environmental challenge in urban centers across India. Hotels generate vast amounts of non-biodegradable waste, including single-use plastic products and disposable items, which contribute to the growing waste burden. This study addresses these issues through material experimentation to identify suitable alternatives for single-use plastic products, aiming to minimize waste production. Additionally, the research highlights the significant quantities of tea waste generated by small-scale tea sellers and the hospitality sector in northern India, offering an abundant and untapped raw material for sustainable production.

The research introduces a circular production system where tea waste serves as the primary raw material for manufacturing essential products like toothbrushes and bath sets, while pine resin acts as a natural adhesive. By employing mold-casting techniques, the products achieve durability, reusability, and biodegradability. Experiments confirmed an optimal mixture ratio of tea waste and pine resin (2:1), producing items that are physically similar to plastic but free from harmful emissions, as pine resin emits a pleasant aroma during remelting.

For grassroots communities such as tea vendors and local artisans, the study proposes practical DIY solutions for recycling waste. These include simple mold-casting kits that enable the creation of

small items such as coasters, soap dispensers, or decorative trays, and affordable solar-powered melting units to process pine resin for binding tea waste, reducing energy costs and enhancing eco-friendliness. Mobile waste workshops can train tea vendors and small businesses to upcycle their waste into saleable products, while community-based collection and production groups can collect tea waste and convert it into raw materials for biodegradable items, promoting income generation. Additionally, educational campaigns can empower communities to recognize the value of upcycling waste, fostering a culture of sustainability and resourcefulness.

By combining grassroots solutions with scalable industrial applications, this initiative demonstrates a dual approach to waste management. It enables local communities to recycle their waste into functional products while providing the hotel industry with sustainable alternatives. This study highlights the potential for grassroots innovation to align with broader circular economy principles, contributing to environmental protection and sustainable livelihoods at the local level.

The Role of In-Situ Incubation in Grassroots Innovation: From Idea to Industry – a case of Cotton Stripper

Mahesh Patel, Mansukhbhai Patel, Sanid Patil, Deep Jyoti Francis
National Innovation Foundation and Society for Research and Initiatives for Sustainable technologies and Institutions (SRISTI), Grambharti, Gujarat

Grassroots innovations (GRIs) developed by informal sector innovators are vital drivers of India's economy. Unlike their counterparts in formal settings, grassroots innovators tackle local challenges using available resources and traditional knowledge. These innovations enhance productivity and efficiency while creating livelihood opportunities, fostering sustainability, and promoting inclusive development.

In order to scale GRIs, it is essential to provide recognition and in-situ incubation support throughout the value chain—from scouting and validation to value addition, securing intellectual property rights (IPR) protection, and accessing finance. As the GRIs scale through this

comprehensive approach, they not only address societal needs but also boosts economic growth through local job creation.

This paper highlights the case of the Cotton Stripper, an innovative solution by Shri Mansukhbhai Patel from Gujarat, incubated by GIAN. The case illustrates a successful value chain incubation process, linking the technological innovation with contextualised product development support and innovative financial models like Micro Venture Innovation Fund to build foundation for a robust enterprise. It chronicles the transformative journey of the innovator as he evolved into an entrepreneur, then an angel investor, and ultimately a mentor to others. His innovation has effectively eliminated child and women labour in cotton stripping, significantly reducing farmers' drudgery and generating substantial social benefits. Furthermore, the case underscores the importance of collaborative networks, showcasing linkages with various institutions such as SRISTI, GIAN, NIF, and support from individuals and organizations including DSIR, DST, Government of India.

The Complexities of Regulations and Standards: The Cases of Grassroots Innovations

Mansukhbhai Jagani, Chetan Patel, Ramesh Patel, Chintan Shinde, Sanid Patil, Govind, Krishnan G R, Deep Jyoti Francis, Mahesh Patel
National Innovation Foundation and Society for Research and Initiatives for Sustainable technologies and Institutions (SRISTI), Grambharti, Gujarat

Regulation and standards (R&S) are tools governments and regulatory bodies use to achieve specific policy goals, such as to promote fair trade, ensure supply of safe and quality products with defined specification in the market. Together, these instruments promote compliance, and enhance the overall functioning of markets and sectors. In India the Bureau of Indian Standards (BIS) has established processes for developing standards and testing norms, which are mainly suitable for manufacturing companies from formal sectors but not ideal for manufacturers from the informal sector. Ultimately, they face challenges in market entry. These grassroots innovations (GRIs) emerging from the informal sector play a crucial role in meeting

the unmet needs of millions and realising more inclusive growth. These innovations are solution-oriented, affordable, and inclusive and therefore the importance of both R&S and GRIs cannot be less emphasised. 'Bullet Santi, a ride-on self-propelled multipurpose toolbar (also locally termed as "Sanedo") for agricultural purposes is an exemplary case which has hugely benefited from regulations. Bullet Santi received aid through regulation, where it was tested as per the nearest available standards by the competent authority which facilitated legalised market entry. This also helped mainstream the innovation through subsidy support by the state government. However, there are several GRIs which are still facing difficulties in entering formal or regular market channels to enter the market. This paper highlights a case of Bullet Santi one of the successful GRI wherein the role of regulations played an important role in regularize the market entry and mainstreaming the innovation. The paper also aims to explore the relationship between standards and regulations in promoting and disseminating grassroots innovations in India.

Multi-Purpose Food Processing Machines

Dharambir Khamboj
Dharambir Food Processing Technology Private Limited,
Yamunanagar, Haryana

The challenge of time-consuming aloe vera processing methods and the high cost of extraction machines led to the development of an innovative, multi-purpose food processing machine. This portable machine operates on a single-phase motor and is designed for the efficient processing of various fruits, herbs, and seeds.

Equipped with a temperature control system and an auto cut-off feature, the machine functions as a large pressure cooker, ensuring precise processing. Additionally, it incorporates a condensation mechanism that facilitates the extraction of essential oils and bioactive compounds from flowers, seeds, and medicinal plants. By offering a cost-effective and versatile solution, this technology enhances productivity and efficiency in small-scale food and herbal processing industries.

Farmland Manure Spreader

Samir Ashikhusain Gani
Greenland Agro, Banaskantha, Gujarat

Manual manure spreading remains a labor-intensive and time-consuming challenge for farmers, particularly those who rely on service providers equipped with tractors, trolleys, and loaders. The traditional method involves collecting manure from dumpsites, forming piles in the field, and then manually spreading it, requiring significant labor and resources.

To address this issue, a farmland manure spreader machine was developed. This trolley-type machine operates using a hydraulic system and is equipped with essential components such as a control valve, panel box, hydraulic motor, oil pump, and gearbox. The machine is designed to be attached to a tractor, with a PTO joint installation facilitating its operation. Additionally, a battery wire and remote-control system enhance ease of use. By mechanizing the manure spreading process, this innovation reduces labor dependency, increases efficiency, and optimizes farm operations.

Prabhat Versatile Bed

Alladi Prabhakar
Telangana

Many elderly and bedridden individuals face challenges in performing daily activities and often depend on caregivers. Limited mobility can hinder timely communication of personal needs, leading to discomfort and distress.

To address this issue, a multipurpose cot has been designed using iron and fiber, featuring safety grills on both sides. The cot incorporates an easy pushback system, allowing patients to independently adjust the sitting angle. It is equipped with a hand shower and washbasin that can be operated without assistance. Additionally, a built-in commode with a flush and P-Trap system is integrated into the design,

connecting to a drainage pipeline or chamber for convenience. More than 5,000 units of this innovative cot have been sold across India, and a second patent has recently been granted. With support from Palle Srujana and the Telangana State Innovation Cell, efforts are ongoing to expand marketing opportunities for this product.

Furthermore, a farmland manure spreader machine has been developed to facilitate efficient fertilizer application. This trolley-type machine operates on a hydraulic system, featuring a control valve, panel box, hydraulic motor, oil pump, gearbox, and other components. To function, the machine is attached to a tractor, with a PTO joint installed. A battery-powered system with remote control ensures user-friendly operation, optimizing the distribution of manure across agricultural fields.

Modha Electromechanical attachment for handlooms replacing jacquards

Sivakumar Modha
Hyderabad, Telangana

The traditional punch card-based Jacquard mechanism in weaving factories presents significant challenges due to its complexity and inefficiency. Each pattern or motif design requires thousands of manually punched cards, which are intricately laced together to function with the loom. This process is highly time-consuming and labor-intensive for weavers. Additionally, punch cards have a limited lifespan of two to three years, making frequent replacements necessary. Design modifications further necessitate the creation of new punch cards, adding to the inefficiency and cost.
To address these challenges, an electronic Jacquard machine, known as the Modha Device, has been developed after years of research. This innovative device eliminates the need for traditional punch cards by enabling patterns and designs to be woven into fabric using a battery-operated mechanism. A pen drive containing image files is connected to the machine, which is integrated with the loom, allowing seamless and efficient design implementation. This technology not only enhances productivity but also simplifies the

weaving process, reducing manual effort while improving design flexibility and sustainability.

Vineeth Mulberry Cutting and Binding Machine

Kodimunja Praveen Kumar
Telangana

Sericulture requires precise and timely feeding of silkworms with mulberry leaves, a process often hindered by erratic and unreliable labor availability. This challenge has led many mulberry farmers to consider shutting down their operations. To address this issue, a farm automation innovation has been developed, designed to integrate seamlessly into the rural agricultural system.

This technology, attachable to a tractor, automates the entire mulberry harvesting process. Since mulberry plants are pruned monthly to promote regrowth and sustain a 15-year lifespan, the innovation streamlines pruning, discarding damaged leaves, re-pruning, collecting foliage, and bundling it for sericulture. The system operates using a PTO-to-pulley drive, requiring minimal maintenance—grease and oiling every six months—with easily replaceable blades and belts available locally. Farmers can manage repairs independently at an annual maintenance cost of approximately ₹5000. The device efficiently prunes mulberry plants at adjustable heights ranging from 3 inches to 3 feet from the ground.

Additionally, a technological advancement in textile weaving has been introduced through the Modha Device, an electronic Jacquard system. After years of research, this device was developed to enable battery-operated weaving of intricate patterns and designs. A pen drive with image files can be connected to the machine, which is integrated into a loom, allowing for automated weaving of customized patterns. This innovation significantly enhances efficiency and design flexibility in the weaving process, making it more accessible for artisans and textile manufacturers.

Modified Wood Based Culturally Accepted Crematorium

Arjunbhai M. Paghdar
Keshod, Gujarat

Traditional cremation requires approximately 400 kg of wood per body, leading to the annual consumption of millions of tons of wood in India. This extensive use of firewood contributes to deforestation and environmental degradation. To address this issue, an innovative biomass gasification-based cremation process has been developed, significantly reducing wood consumption while maintaining the integrity of traditional Hindu rituals.

The cremation structure is designed in a closed, mummy-shaped chamber built with refractory bricks to minimize heat loss and optimize fuel efficiency. Doors are strategically placed at the front and rear ends to facilitate religious rites. The top cover is lined with cera-wool, capable of withstanding high temperatures, ensuring thermal insulation. The system incorporates blowers and nozzles to regulate airflow and accelerate the cremation process. Additionally, charcoal and caustic soda filters are integrated to purify emissions, while a chimney facilitates controlled air exhaust. This innovative approach offers a sustainable, eco-friendly alternative to conventional cremation practices.

Pulley with Stopper

Amrutbhai Agrawat
Keshod, Junagadh, Gujarat

In rural villages, water is primarily drawn from wells for domestic use, often relying on the traditional pulley system, which is physically demanding and inefficient. Erratic rainfall, the installation of submersible pumps, and excessive borewell drilling in arid regions have further lowered the water table, exacerbating the challenges of water retrieval. Recognizing the critical role of pulleys in the daily lives of rural women, the Society for Research and Initiatives in Sustainable Technologies and Institutions (SRISTI) organized a workshop for artisans to scientifically redesign the pulley system.

During the brainstorming session, an innovative solution was developed—the pulley with a stopper. This improved design enhances safety by incorporating a ratchet mechanism that prevents the rope from slipping back into the well, reducing the risk of injury and physical strain. Costing under Rs. 500 per unit, the pulley remains affordable and accessible to rural communities. Installed experimentally in several villages across Gujarat, the innovation received positive feedback for its effectiveness. In recognition of this contribution, the innovation was awarded the Gujarat Government's Sardar Krishi Puruskar.

Gender Disparities in Grassroots Innovation: A Study of Women Innovators in India's Informal Sector

Anjali C. Lakum[1], Astha Jaiswal[2] and Hemant Kumar[3]

Online MSW Program, Centre for Distance and Online Education, Parul University, Vadodara, Gujarat
[2]Department of Science and Technology-Centre for Policy Research (DST-CPR), Department of Studies in Science, Technology, and Innovation Policy, School of Social Science, Central University of Gujarat, Kundhela, Vadodara, Gujarat
[3]Department of Studies in Science, Technology, and Innovation Policy, School of Social Science, Central University of Gujarat, Kundhela, Vadodara, Gujarat

Women in India's informal sector play a crucial yet often overlooked role as grassroots innovators. Despite initiatives by organizations such as the National Innovation Foundation (NIF), the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), and the Honey Bee Network, gender disparities persist in grassroots innovation. Women innovators face systemic barriers, including limited access to resources, institutional support, and recognition, restricting their participation in the innovation ecosystem.

The informal sector constitutes 93% of India's workforce, with

women making up more than half of this demographic. However, their contributions, often centered in fields such as herbal medicine, childcare, handicrafts, and household technologies, remain undervalued. While grassroots innovation networks support marginalized communities, a significant gender gap persists in financial aid and patent filings. For example, between 2001 and 2019, women innovators received only 36 out of 468 NIF awards, and less than 1% of the Micro Venture Innovation Fund (MVIF) was allocated to female-led innovations.

To address these disparities, targeted policy interventions are necessary. Financial schemes tailored for women-led innovations, intellectual property assistance, and community-based platforms for mentorship and collaboration could enhance their visibility. Digital platforms can further support networking and knowledge-sharing. Gender-sensitization programs in rural communities may also help dismantle socio-cultural barriers.

A gender-inclusive approach to grassroots innovation is essential for sustainable development. Recognizing and supporting women's contributions in traditionally undervalued sectors can transform India's informal innovation landscape, ensuring a more equitable and inclusive ecosystem.

Dissemination of *Chalakh* (fruit nipper) for drudgery reduction of farmers and its impact in Tamil Nadu

[1]Parthkumar P Dave, [1]Hardev Choudhary, [2]Ramyasivaselvi M., [2]Maheswaran P
[1]DST-National Innovation Foundation-India, Gandhinagar, Gujarat
[2]ICAR-Krishi Vigyan Kendra, CENDECT, Theni, Tamil Nadu

To address post-harvest losses and labor-intensive agricultural practices, an innovative tool called Chalakh (fruit nipper) was developed by Shri Madev Shrikrishna Mahajan from Ratnagiri, Maharashtra, and incubated by the DST-National Innovation Foundation-India (NIF).

This lightweight, user-friendly tool reduces labor, harvesting time, and fruit damage, making it suitable for both men and women of all age groups. A dissemination and impact assessment study were conducted in Tamil Nadu, involving 25 farmers from 12 villages across eight blocks of Theni district, demonstrating the tool's effectiveness in improving agricultural efficiency.

As part of the study, method demonstrations and training sessions were organized to help farmers adopt the Chalakh tool for harvesting mango, sapota, lemon, guava, and pandal vegetables. Local media and vernacular publications were utilized for wider outreach. Conventional harvesting tools have a capacity of 110 to 122 fruits per hour but cause significant post-harvest losses (15-20%), tree branch breakage, and physical strain on workers. In contrast, the Chalakh tool demonstrated superior performance, harvesting 92 to 110 kg of mangoes per hour with a small net (4-5 fruit capacity) and 138 to 176 kg per hour with a larger net (6-8 fruit capacity). Fruit damage was reduced to less than 1%, a significant improvement over traditional method.

Farmers appreciated the Chalakh tool for its ability to cut fruit stalks cleanly without damaging the fruit or surrounding branches, requiring minimal effort. It was particularly beneficial for small farmers and home gardens, reducing drudgery while ensuring high-quality harvests. As a result, 97 small farmers across 13 districts in Tamil Nadu have widely adopted this technology, integrating it into their agricultural practices.

ITK based polyherbal preparation for the management of cabbage aphid, *Brevicoryne brassicae* (Linn.)

Parthkumar P. Dave, Satya Singh, Hardev Choudhary
DST-National Innovation Foundation-India, Gandhinagar, Gujarat

Ensuring the quality and abundance of food, feed, and fiber through effective, economical, and environmentally friendly pest management strategies are the challenges faced by the agriculture sector. The impact of pests is magnified by climate change, leading to their resurgence in new regions and posing significant threats to food and

nutritional security, warranting sustainable control strategies. The National Innovation Foundation–India (NIF), an autonomous institute of the Department of Science and Technology (DST), GoI, hosts one of the largest databases of open source technologies covering over 350,000 technological ideas, innovations, and outstanding traditional knowledge (TK) practices (not all unique or distinct) from across the country. NIF also provides comprehensive incubation support to grassroots innovators (GRIs) and outstanding traditional knowledge holders, facilitating the scaling up of their innovations.

To promote eco-friendly and cost-effective pest management, the agriculture department developed a value-added herbal preparation by pooling the best bioresources based on outstanding traditional knowledge for insect control. The preparation was prepared from the extracts and oils of *Ipomea fistulosa*, *Pongamia pinnata*, *Vitex negundo*, *Azadirachta indica*, *Annona squamosa.* It was tested *against* cabbage aphid, *Brevicoryne brassicae* (Linn.), a major sucking pest of cabbage at 13 farmers' fields during the *Rabi* 2021-22 at Delvad village, Gandhinagar Gujarat. The data revealed the polyherbal preparation significantly reduced the aphid population with 10.59%, 29.08%, 55.20% 67.08 % and 60.58 % reduction in the aphid population at 1st, 3rd, 5th, 7th and 10th day after the spray. A gradual decrease in aphid population up to 7th day of spray was followed by a slight increase in the population after the 10th day, indicating diminishing effect of preparation. A total 47.19% reduction of aphid population over control check (water) was recorded. These findings highlighted the potential of plant-based value added polyherbal preparation as a sustainable eco-friendly alternative for managing *Brevicoryne brassicae* (Linn.) in cabbage crops. This also equips farmers with open-source technologies based on outstanding traditional knowledge, empowering them to utilize local biodiversity and resources, minimize chemical usage, reduce cultivation costs, and enhance sustainable agricultural practices.

Development of the automated tingi machine: A circular solution for dispensing household essentials in low-income communities

Elke Kayle Cadangen,
GRIND DOST

Plastic pollution, particularly the widespread reliance on sachets, poses a critical environmental challenge, especially in communities where single-use packaging is prevalent due to affordability and convenience. The Automated Tingi Machine (ATM) was developed as a practical response to this issue, integrating circular economy principles into a solar-powered micro-refillery model. Designed to dispense small quantities of essentials like shampoo and dishwashing liquid into reusable containers, the ATM eliminates the need for sachets, offering a sustainable alternative. Field trials conducted during a public fair along Session Road in Baguio City and subsequent testing at the Tingi Station physical store provided valuable insights into the ATM's functionality and user acceptance.

Results from these trials demonstrated the ATM's potential to significantly reduce plastic waste while fostering behavioural shifts among consumers. The machine's technological components, including an Arduino Mega controller, ultrasonic sensors, and a coin selector, ensured precise dispensing and operational reliability. Challenges such as supply chain logistics, user unfamiliarity, and infrastructure adjustments were identified, highlighting areas for further refinement. Collaborative efforts with local governments, strategic partnerships with suppliers, and community education campaigns are recommended to overcome these barriers and maximize the machine's impact.

The ATM exemplifies how technology can be leveraged to align sustainability with economic inclusivity, making it accessible to underserved communities. Future research should focus on enhancing the ATM's usability, refining its cost structure, and scaling the model to broader contexts. Ultimately, the Automated Tingi Machine serves as a replicable solution for advancing circular economy practices and reducing environmental degradation caused by single-use plastics.

Farmers Innovation in Agriculture and Allied Sector: Grassroots Insights from Risk-prone Agroecosystems of Rajasthan

J P Mishra[1], Ranjay K. Singh[2], P.C. Bhatnagar[3], D.K. Singh[4], Deepak Chaturvedi[5], Dayanand[6], S.S. Rathore[7] and P C Regar[8]
[1]ICAR-Agriculture Technology Application and Research Institute, Jodhpur;
[2] Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi;
[3]Krishi Vigyan Kendra, Udaipur,
[4] Krishi Vigyan Kendra, Baran;
[5]Krishi Vigyan Kendra, Jaisalmer;
[6]Krishi Vigyan Kendra, Jhunjhunu;
[7]Krishi Vigyan Kendra, Jaipur (Rural);
[8]Krishi Vigyan Kendra, Rajsamand

Agriculture serves as the foundation of livelihood, civilization, culture, and heritage in India, a country that encompasses 15 prominent climates and 46 out of 60 global soil types. With one of the world's largest populations and the seventh-largest geographical area, spanning 328 million hectares, India's agriculture and allied sectors have demonstrated remarkable growth post-independence. Despite challenges such as weather limitations, soil and water constraints, increasing climatic uncertainties, and threats from pests and pathogens, this growth has significantly contributed to national food security and improved nutrition outcomes. While technological advancements have played a crucial role in enhancing agricultural productivity, grassroots innovations have been instrumental in the sustainable management of natural resources, diversification, and crop and livestock health, particularly in risk-prone agroecosystems like Rajasthan.

The efforts of Krishi Vigyan Kendras (KVKs) in promoting grassroots innovations have had a significant impact on transforming India from a food-deficit nation to a surplus one. Through frontier extension initiatives, KVKs have helped farmers mitigate livelihood risks by integrating local and formal knowledge systems. For example, in water-stressed areas of the Shekhawati and Marwar regions, farmers use solar-powered pumps to lift water harvested in diggies from

polyhouse tops for vegetable cultivation. Similarly, brinjal ratooning in the Hadouti region, custard apple processing in tribal communities of Mewar, and the conservation of Chatri roses showcase how grassroots creativity blends with scientific knowledge for sustainable agricultural practices. KVKs have collaborated with these farmers to scale up these innovations, such as combining traditional agronomic practices with efficient water management tools and mulching techniques in Jaipur rural district. Likewise, the integration of local and modern water conservation methods in Shekhawati has expanded the sowing area, improved yields, and increased annual incomes.

To further explore and document these grassroots insights, a session is being proposed with the participation of six Krishi Vigyan Kendras, aiming to highlight the role of community-driven agricultural innovations in sustaining natural resources and mitigating livelihood risks.

CareMother- Digital Health Innovations for last mile pregnancy care

Nikesh Ingle, Shantanu Pathak
Doto Health, Pune, Maharashtra

Globally, maternal and neonatal health has deteriorated, worsened by the COVID-19 pandemic and compounded by climate-related challenges. Neonatal deaths, particularly in the first two weeks of life, are closely linked to the quality of antenatal care, with significant mortality stemming from prematurity, infections, and birth asphyxia. In regions such as Northeast India, unreliable electricity and climate-induced disruptions further complicate access to care, leaving vulnerable populations without essential health services and at increased risk from tropical diseases.

CareMother addresses these challenges by implementing solar-powered diagnostic solutions to improve maternal health care in high-risk pregnancies. Their approach includes solar-powered point-of-care diagnostic kits, which allow for uninterrupted services in areas lacking reliable electricity. Additionally, their FetoMax device offers portable, wireless monitoring for fetal health and labor, enabling early

detection of complications. This technology is designed to support healthcare workers in remote areas, ensuring effective monitoring and communication between mothers, healthcare providers, and health authorities.

Through partnerships with organizations like Selco Foundation, PATH and Piramal Swasthya, CareMother is actively enhancing maternal health services across India and beyond. Their initiatives include deploying fetal monitoring in primary health centers and utilizing boat clinics to reach remote populations. Collaborative research with institutions like Oxford University and IIT Bombay aims to assess the impacts of climate and environmental factors on maternal and fetal health, ultimately striving to save over 100,000 lives annually by improving early detection and care for high-risk pregnancies.

Revolutionizing Cervical Cancer Screening: The M-Strip™ Device for Non-Invasive, Private, and Accessible HPV Detection Using Menstrual Blood

Vaibhav Shitole[1], Rajiv Sharma[2], Somesh Chandra[3]
[1]IOTA Diagnostic Private Limited, Ahmedabad, Gujarat
Sterling Accuris Diagnostics, Ahmedabad, Gujarat
[3]Surgical Oncology and Robotic Surgeon, KD Hospital, Ahmedabad, Gujarat

Cervical cancer, primarily caused by persistent HPV (Human Papillomavirus) infections, is the fourth most common cancer in women, resulting in approximately 350,000 deaths annually worldwide. While early detection can lead to effective treatment and cure. However, low participation in regular screenings, often due to social stigma, accessibility issues, and the discomfort of traditional diagnostic methods, exacerbates the risk of undiagnosed cancer.

As such, increasing screening uptake is critical to reducing mortality rates. To address these barriers, we developed the M-Strip™ device, an innovative approach for cervical cancer screening that detects HPV through molecular testing using menstrual blood sampled in a dried matrix form. This non-invasive, pain-free, and discreet method allows women to collect menstrual blood using the M-Strip™ placed on a

sanitary pad, which is then stored in a special case and sent to a lab for analysis. The M-Strip™ offers a convenient, private, and accessible solution for routine cervical cancer and STD screenings, with the potential to transform women's health by improving early detection and screening participation.

India's first virtual hand rehabilitation system to train fine finger movements

Chandan Kumar Jha
Indian Institute of Technology (IIT), Gandhinagar, Gujarat

This study introduces an innovative smart virtual rehabilitation system designed to enhance hand therapy for individuals recovering from injuries, strokes, or conditions affecting hand mobility. The system features a glove that tracks hand and finger movements, providing real-time feedback to both patients and therapists. By integrating engaging virtual reality exercises, it transforms therapy into an interactive and motivating experience.

With a user-friendly design and an intuitive dashboard, therapists can efficiently monitor progress and customize treatment plans. Already gaining traction among clinicians across India, this system is revolutionizing hand rehabilitation by delivering high-quality, data-driven therapy.

Fueling the future by powering up biogas: Microbial electrosynthesis for enhanced methane production

Moumita Roy
Delft University of Technology (TU Delft)

The research focused on developing a microbial consortium with enhanced electrogenic activity to improve methane production through microbial electrosynthesis. This innovation has significant societal benefits, including improved waste management and bioenergy production by upgrading biogas for more efficient energy

use. It also contributes to greenhouse gas reduction by repurposing CO_2 emissions into valuable products, supporting a circular economy. Additionally, the process fosters economic growth by enabling the production of value-added chemicals like acetic acid, driving bio-based industries and job creation. Furthermore, biogas systems promote rural development by utilizing agricultural and animal waste for energy generation, enhancing local economies and livelihoods.

Naya Development -Data Annotation Made Ethical

Eirin Fossberg
Naya Development, Norway

Naya is a company founded by Eirin that specializes in data annotation, playing a crucial role in the artificial intelligence (AI) and machine learning (ML) ecosystem. Recognizing the potential of India's rural workforce, Naya employs and trains women from villages, equipping them with the skills needed to perform precise data labeling and annotation tasks. This initiative not only provides a stable source of income to these women but also fosters financial independence, empowering them within their households and communities.

By engaging rural women in digital work, Naya has contributed to significant social changes. With a steady income, many women have been able to support their families, improve their living standards, and ensure that their children receive an education. The company's efforts have led to increased school enrollments, breaking cycles of poverty and limited opportunities in these communities. Through its model, Naya not only bridges the technological gap between urban and rural India but also showcases how inclusive employment can drive economic and social transformation.

III. Natural Resource Management: Community perceptions and innovative response for a sustainable future

Biodiversity Conservation in Craft Economies: Navigating Climate Challenges through Indigenous Knowledge and Ethical Practices

Surucchi Khubchandani
Researcher & Sustainability Strategist – Crafts & Curator,
Creative Dignity 'CraftxClimate' Series

This paper argues that the relationship between biodiversity and traditional crafts within indigenous communities is a longstanding interaction that significantly contributes to the conservation of bio-regions. The ongoing climate crisis poses substantial threats to these communities, as evidenced by recent extreme weather events. Despite these challenges, the communities demonstrate remarkable resilience. For instance, erratic weather patterns in Kachchh have affected the quality of wool for weavers. Nevertheless, many indigenous artisans and social innovators actively work to conserve their regions and maintain environmental balance. This paper examines three case studies: the forest region of Assam, the wool value chain in Ladakh, and the eastern Himalayas of Arunachal Pradesh and illustrates how a combination of indigenous practices and place-based economic models, initiated by local stakeholders, can enhance economic and ecological sustainability while preserving cultural heritage. The study focuses on the mechanism of ecosystem creation as a means to activate this combination across the three regions. For these studied enterprises, organisation set-up goes beyond simply producing goods; it encompasses self-organization, upskilling opportunities, and resource rights for its primary stakeholders. It is pertinent to note that the organizations being studied are run by local entrepreneurs who reside in these regions alongside the communities. They have fostered an 'emergent strategy'[i] organically over time to organize community practices in response to changing circumstances. They fall within the MSME category of the Ministry of Micro, Small and Medium Enterprises, and are small in size and operation. These three enterprises have recognized global opportunities to build an evidence-based value chain that translates their climate- and community-positive credentials into the global sustainability language, such as Environmental, Social, and Governance (ESG) criteria. Technological adaptation is a work in progress, though there is recognition that this approach facilitates readiness for the 'Digital Product Passport,' which

is part of the new Ecodesign for Sustainable Products Regulation (ESPR) in the European Union.

Ultimately, the paper underscores the need for policy directions that prioritise marginalized communities, facilitate consultation with indigenous leaders, and incentivize sustainable practices.

Conservation hilly millet varieties

Tshering Lepcha
North Sikkim, Sikkim

In Lum Village, Dzongu, North Sikkim, significant efforts have been made to preserve traditional farming practices. Over the past two decades, eight varieties of millet have been cultivated, and a crucial seed bank has been established to conserve indigenous and traditional crop diversity. Since 2014, sustainable agriculture and grassroots innovations have been actively promoted through the role of Shodhyatra Coordinator, contributing to the strengthening of community resilience in Sikkim.

In the field of technology, an innovative pulley system with a stopper was developed to enhance safety in drawing water from wells. A ratchet mechanism was incorporated to prevent rope movement towards the well, reducing injuries and physical strain. These pulleys, each costing under Rs. 500, were installed experimentally in several villages across Gujarat and received positive feedback. The innovation was recognized with the Gujarat Government's Sardar Krishi Puruskar, highlighting its affordability and practical impact in rural areas.

Traditional Wisdom Meets Modern Science*: In vivo* Evaluation of Pain Relief Oil's Anti-Inflammatory and Analgesic Effects

Sapna Sharma[1], Anamika Dey[1], Mamta Shah[2], Deepika N P[1], Bissma Yousuf[1], Taja Begum[1], Mohd Saleem Sheikh[1], Zaina Begum[1], Poosha Begum[1], Raja Begum[1], Gullaba Akther[1], Gulam Qadir Chopan[1], Saja Begum[1]

[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat

[2]LM College of Pharmacy, Ahmedabad, Gujarat

Local communities in the Baramulla area of Jammu and Kashmir have traditionally used Himalayan plants, including those from the Cotula, Taraxacum, Fumaria, and Trigonella genera, to treat pain and inflammation. However, no pharmacologically active marketed formulation based on their knowledge has been developed to date.

A formulation, Paindel Oil, was developed using these Himalayan plants, and its anti-inflammatory and analgesic properties were evaluated. The oil was tested against carrageenan-induced paw edema and formalin-induced analgesia in in vivo models. GC-MS analysis identified 23 phytoconstituents in Paindel Oil. Compared to a standard drug, the treatment demonstrated significant anti-inflammatory and analgesic activity in in vivo studies.

Value addition in community knowledge: the case of Paindel and other products from the Himalayan region

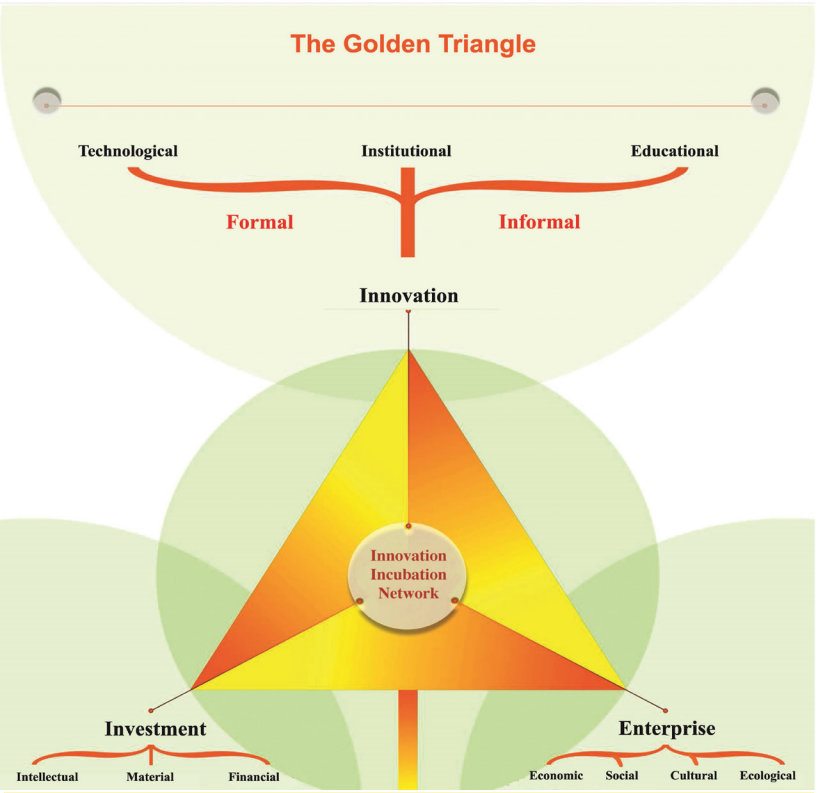
Sapna Sharma[1], Mamta Shah[2], Deepika[1], Nadeem[1], Sabzar[1], Anamika Dey[1], and Community Members

[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat

[2]LM College of Pharmacy, Ahmedabad, Gujarat

The intersection of traditional knowledge and innovation is increasingly recognized as a vital driver for sustainable development, particularly in regions with rich cultural heritage. This study explores the

transformative potential of value addition to community knowledge, emphasizing its role in preserving traditional practices, enhancing livelihoods, and fostering sustainable growth. It specifically examines how informal and formal collective knowledge systems contribute to knowledge management practices, enabling innovation and competitive advantages through efficient sharing and collaboration.
Using case studies from Himalayan districts—including Baramulla in the Union Territory of Jammu and Kashmir and Soreng and Geyzing in West Sikkim—this paper delves into the development and commercialization of knowledge-based value-added products, such as Paindel, products based on wild Himalayan Raspberry, Cherry pepper (Dalle) Chilli oil and products based on wild edible vegetables and herbs. The findings highlight the synergies between collective knowledge systems and intellectual and social capital, underscoring their importance in driving regional development while safeguarding indigenous traditions. This work offers insights into the potential of leveraging community knowledge for sustainable economic activities, providing a replicable framework for similar ecosystems worldwide.



IV. Incubation or linking innovation, enterprise & investment

Direct-To-Consumer (D2C) Grassroots Innovations: Digital Platforms for Sustainability And Consumer Behavior Change

Prof. Preeti Shroff-Mehta[1], Pooja Sharma[2]
[1]Professor, Medill at Northwestern University, USA
[2]MICA – Fellow, FPM Program, India, Danko Betzhold , Medill at Northwestern University, UC Berkley, USA., Science Pro Paris – School of Management and Impact

Sustainability Innovations at the grassroots level are human centered, economically viable, culturally relevant and eco-friendly. In the Indian context, these indigenous enterprises and historic innovations face constraints for scaling-up due to the lack of global market exposure and capacity constraints (supply side); and lack of global consumer awareness (demand side). The emerging digital media and e-commerce platforms are unveiling significant opportunities for grassroots innovators to broaden their horizons globally. This proposed paper will highlight, 'what are digital and e-commerce platforms doing to engage global consumers and bring about 'sustainable behavior change' among consumers/supply chain actors, in the context of grassroots innovations products?'

Successful grassroots to global innovations from India (such as Jaipur Rugs, EcoKaari, Phool, Bare Necessities, Honey Bee Network, Desi Hangover) are analyzed from consumer behavior and global demand perspective - to present digital platforms and social media communications strategies for innovators and stakeholders to foster local and global sustainability-oriented behavior change. The theory of planned behavior and Nudge model are used for the present study as they help frame, and explain behavior change in culturally rooted attitudes, subjective norms and perceived behavioural controls.

Leather processing and leather products

Abhinandan Kumar
Senior Principal Scientist, CSIR-CLRI

Leather processing and leather products making have been a significant activity in rural areas at micro and small enterprise level. We have rural clusters scattered in the states like Rajasthan, Karnataka, Gujarat, Maharashtra etc. where vegetable tanned leathers are made by traditional methods and converted into varying products mostly for local consumption. These products are ethnic and unique in design and art. This activity, since ages, has been a part of self-supporting village economy. A section of people is involved in collection of fallen animals, recovery of hides and skins, tanning and conversion into rural utility items. Such a practice survived for generations and the time-tested skills are built and passed on to subsequent generations. Even today, such activities in the rural areas create employment for the rural people in the non-farming sector.

CSIR-Central Leather Research Institute since its beginning has been hand holding these artisans in various clusters in Rajasthan, Gujarat, Punjab, Maharashtra and Karnataka. Improvements in the traditional tanning process through appropriate technological interventions were made to improve quality, increase yield and reduce processing time etc.

Technological support has been provided in setting up Carcass Utilization Centres in various parts of the country to recover hides, meat meal, bone meal, tallow etc. from the fallen animals. CSIR-CLRI has developed transportable devices for lifting and flaying carcasses to prevent deterioration in hide quality and ensure economical utilization of fallen animals in rural areas.

Participation of women in micro and small enterprises is also of significance. Keeping this in mind, special training programmes were designed by CSIR-CLRI for rural women and they have been imparted training in leather goods making so that they may utilize their leisure time and add to their family income through the acquired skill.

Participatory Innovation Development to stimulate livelihoods for rural farmers – Case study of Locally Formulated Dairy Goat Meal (LOFODA-G-Meal)

Makonge Righa[1], Mariadho Vincent[2], Martha Opondo[3] and Wanyama Jacob[4]
[1]World Neighbors East Africa
[2]PROLINNOVA–Kenya
[3]Kenya Agricultural and Livestock Research Organization (KALRO)
[4]Eastern and Southern Africa Prolinnova Platform

Farmers' innovations receive little to no recognition. The assumption of most actors in agricultural research and development (ARD) is that farmers have limited capacity to innovate or actively engage in experimentation. However, farmers have for centuries been carrying out experiments, albeit informally to address their day-to-day challenges.

Participatory Innovation Development (PID) recognizes and uses local innovations as entry points for knowledge co-creation, bringing together local and scientific knowledge on an equal level. PID is inspired by the farmers' own aspirations and desired outcomes, and is a process through which farmers together with other ARD actors jointly investigate ways to scale local innovation to improve communities' livelihoods.

An example of a local innovation process is the Locally Formulated Dairy Goat Meal (LOFODA-G-Meal), an innovation by Joe Ouko, a small-scale farmer in Kenya. Faced with challenges of inadequate fodder – especially during dry periods – for his dairy goats, he formulated the meal using locally available fodder resources. His innovation discourages the destructive harvesting of vegetation through the 'cut-and-carry' approach, where farmers indiscriminately cut trees and shrubs for fodder. Joe and his fellow farmers use sustainable practices such as pruning and regeneration of woody species and forms of agroforestry that promote conservation and diversification of biodiversity. In addition, through farmer-led joint research (i.e. PID) with ARD actors, Joe and his former colleagues have discovered and integrated other types of fodder vegetation to improve the quality of the goat feed. The PID process also contributed to creating a social

enterprise led by Joe, selling the feed to other farmers in the locality. The enterprise aims at transforming the lives of the community while conserving the environment. The innovator, in collaboration with partners including various government departments, is working towards meeting the certification standards and business regulatory requirements, which lead to its classification and a commercial product. The dairy goat meal is stimulating the scaling of dairy goat farming, which can improve the livelihoods of farmers – especially of women and the youth who comprise the majority smallholder farmers – and can contribute to conserving the environment and to building community resilience to climate change.

Mobilizing Grassroots Energy Ideas and Innovations: A Journey Across Gujarat's Sustainable Future

Intakhab Alam Khan, Ankit Somra, Rageshri Thoriya, Dhyanesh Mistry, Ravikant Kholwal, Faraz Ali Khan
[1]Gujarat Grassroots Innovations Augmentation Network (GIAN), Ahmedabad, Gujarat

In the era of climate change, the need for sustainable and reliable technologies has grown increasingly urgent. Gujarat, India is always at the forefront of promoting clean energy technologies backed by strong government support. Initiatives always focus on high-end solutions, often overlooking the potential of innovations from and for the grassroots.

The projects highlighted in this paper were designed to bridge this gap by leveraging the creativity of students from colleges and universities and the ingenuity of grassroots innovators. It showcases the energy innovations and ideas uncovered during an extensive exploration of Gujarat, India. Two flagship projects, Gujarat Energy Innovation Awards 2024 and Gujarat Energy Idea Awards 2024 were launched, supported by Gujarat Power Corporation Limited (GPCL) and Gujarat Energy Transmission Corporation Limited (GETCO) respectively. These projects aim to identify, recognize, and support exceptional grassroots ideas and innovations in the field of energy conservation, augmentation, generation, storage, and distribution. By providing financial rewards and incubation opportunities, they

foster transformative ideas that drive sustainable energy solutions and empower innovators at the grassroots level, fostering broader participation and transforming ideas into impactful innovations. The focus was identifying, nurturing, and implementing sustainable and affordable solutions to address critical energy challenges.

During the visit a total of 21 workshops were held in educational institutions and rural communities across Gujarat, involving approximately 3,000. In addition to fostering creativity, these workshops focused on workable answers to pressing energy-related issues. The 700+ entries showcased various innovation categories, including renewable energy, waste management, farm machinery, and smart irrigation systems. Among the notable contributions, Mr. Amit Kumar highlighted the growing issue of solar waste accumulation and the lack of awareness surrounding photovoltaic (PV) recycling. His initiative proposes an innovative solution for solar panel recycling, positioning it as a proactive response to the environmental challenge posed by decommissioned panels. A college student Mr. Vasoya Aman also identified the inefficiencies of manually operating an air pump in biogas systems, which led to system discontinuation. His idea involved installing a compressor below the digester to circulate gas, prevent slurry sedimentation, and enhance productivity, while a gas holder tank would improve storage and efficiency. A comprehensive evaluation framework was developed to identify and shortlist 10 exceptional ideas and innovations for state-level recognition and further incubation support. The projects fostered a culture of innovation and sustainability by creating platforms for students, grassroots innovators, and small enterprises to collaborate on real-world energy challenges. The projects contributed significantly to Gujarat's renewable energy landscape by bridging the gap between high-end technological advancements and grassroots-level innovations. The project reinforced the importance of inclusivity and affordability in sustainable development by empowering communities and students. As Gujarat continues its journey toward energy security and climate resilience, the lessons and outcomes from these programs set a benchmark for fostering innovation, collaboration, and long-term sustainability.

Empowering Innovation and Growth: Role of the Accelerator in the Entrepreneurship Ecosystem

Rowena Kay Mascarenhas
Executive Director at TiE Boston

Innovation has long been a cornerstone of entrepreneurial success, shaping economies and transforming societies worldwide. From the advent of the light bulb to the era of sustained powered flight, American innovation has historically played a pivotal role in catalyzing entrepreneurial activity. Today, startups—defined as enterprises leveraging innovative, technology-enabled solutions with the potential for scalability—are critical drivers of global economic growth. Yet, innovation does not automatically translate into entrepreneurship. Novice entrepreneurs face significant barriers in turning groundbreaking ideas into viable products, often struggling with limited access to guidance, mentorship, and resources.

Accelerators play a crucial role in addressing the challenges faced by startups, by offering structured programming that provide startups with access to mentorship, funding networks, and tailored support to accelerate growth. Globally, entrepreneurial ecosystems vary widely in their maturity and resource availability. While regions like Silicon Valley and London dominate innovation rankings, Boston stands out as a critical hub, ranked 4th in the USA and 5th worldwide for startups and innovation. Boston's unique blend of world-class universities, robust venture capital networks, and diverse talent pool makes it a fertile ground for entrepreneurial growth. However, even in Boston, gaps exist between the resources available to startups and the tools they need to scale effectively.

This paper examines the role of accelerators in bridging these gaps, with a focus on TiE ScaleUp, a Seed to Series A accelerator program empowering entrepreneurs in Boston across all sectors. Participants have to demonstrate a minimum of $500,000 in annual revenue and an entry level fundraise of $2 million. The 3Cs of Curriculum, Coaching, and Community, are the program pillars that ensure a high-impact cohort ready to scale. The discussion highlights how an accelerator fosters innovation by nurturing the local ecosystem, offering actionable insights for practitioners and policymakers aiming to drive scalable entrepreneurship.

Social Innovation Through Gandhian Young Technological Innovation (GYTI) Awards

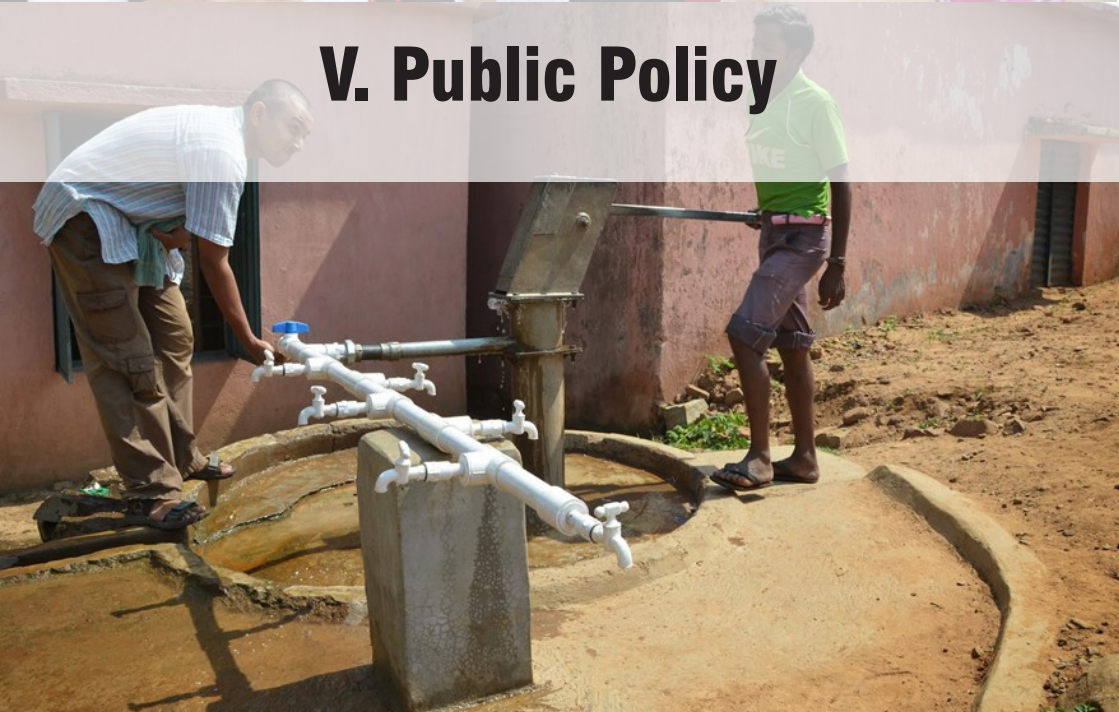
Dr. Swasti Dhagat[1*], Chetan Patel[1], Ramesh Patel[1], Prof. P.V.M. Rao[2]
[1]Society for Research and Initiatives for Sustainable Technologies and Institutions, Grambharti, Gujarat
[2]Professor, Department of Design & Department of Mechanical Engineering, IIT Delhi, India

The Gandhian Young Technological Innovation (GYTI) Awards celebrate the ingenuity and creativity of young innovators tackling pressing societal challenges through science, technology, and engineering. Organized annually by Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), a Honey Bee Network (HBN) institution in collaboration with HBN volunteers and hundreds of other academic institutions, the awards serve as a platform for recognizing groundbreaking solutions across diverse fields, including healthcare, agriculture, energy, and the environment. GYTI fosters a spirit of innovation by providing mentorship, financial support, and public recognition to student innovators, empowering them to scale their ideas and create meaningful societal impacts.

With a focus on promoting affordability, sustainability, and societal relevance, the awards have resulted in over 200 recognized innovations, 250 granted patents, and the establishment of 100+ startups, showcasing the transformative potential of social innovation. Initiatives such as Iota Diagnostic and Florigin Technology demonstrate the tangible impact of GYTI, driving advancements in biotechnology, agriculture, and healthcare while addressing unmet needs.

This review highlights the GYTI framework's ability to nurture entrepreneurship and connect grassroots knowledge with formal systems. By fostering inclusivity and benefit-sharing, GYTI strengthens India's innovation ecosystem, contributing to a self-reliant, sustainable future. The ethos of the Honey Bee Network underpins these efforts, emphasizing cross-pollination of ideas and equitable recognition for contributors, inspiring the next generation of leaders to create impactful and equitable solutions for societal progress.

V. Public Policy



From Everyday Objects to mobile Primary Health Center: Creativity for grassroot healthcare innovation

Md Haseen Akhtar, Janakarajan Ramkumar
Department of Design, Indian Institute of Technology Kanpur

Deployable structures offer innovative solutions across various domains, with significant potential for improving healthcare delivery in resource-constrained settings. This study presents a rigorous analysis of fifteen deployable systems, ranging from everyday objects to specialized architectural designs, to inform the development of mobile Primary Health Centres (mPHCs). Employing a mixed-methods approach, we utilized the SCAMPER (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse) technique for idea generation and conducted statistical analyses to evaluate systems on deployability, collapsibility, and feasibility. Our findings reveal a strong positive correlation between collapsibility and feasibility scores ($r_s = 0.9040$, $p < 0.001$), indicating that highly collapsible systems are generally perceived as more practical for real-world applications. Chi-square analysis confirmed a significant association between these characteristics ($\chi^2(4) = 15.18$, $p < 0.01$). Interestingly, one-way ANOVA showed no statistically significant differences in overall performance across everyday objects, household items, and specialized systems ($F(2,12) = 0.649$, $p > 0.05$), suggesting that innovative solutions can emerge from diverse sources. This study contributes to the field by providing a robust framework for evaluating deployable systems and offering insights into their potential applications in healthcare. The results underscore the importance of prioritizing collapsibility in design and encourage an interdisciplinary approach to developing mobile healthcare solutions. These findings have significant implications for designing adaptable, efficient, and context-appropriate mPHCs, potentially revolutionizing healthcare delivery in underserved areas.

Health enhancer for medicinal compound and income generating source for S/T for their better livelihood in some adjacent villages of Odisha

[1]Babita Kumari and [2]Hitesh Solanki
[1]Department of Environmental Science, Motilal Nehru College (University of Delhi), New Delhi,
[2]Department of Botany, Gujarat University, Ahmedabad

Honey is produced by honeybees from the nectar of flowers or secretions from plant tissues. The collected honey samples in this study were sourced from regions cultivated with tulsi, bael, neem, coconut, amla, and sunflower. Bees gather and modify these materials with their specific enzymes before storing them in honeycombs for maturation. This study aimed to characterize the nutritional quality of honey, emphasizing its bioactive components, including sugars, enzymes, lactones, wax, pigments, vitamins, amino acids, minerals, organic acids, and pollen.

Environmental factors influencing the quantity and quality of honey were also analyzed. Cluster analysis was conducted to assess the nature and concentration of bioactive components in selected hotspot regions. The chemical composition of honey varied depending on the plant species cultivated near the beekeeping sites. The primary objective of this study was to identify and evaluate the medicinal bioactive components in herbal honey, assessing their therapeutic potential against various health disorders.

Additionally, efforts were made to train SC/ST communities in the adjacent regions of Barunei Hills, Khordha District, Odisha, on beekeeping and honey production. This initiative aimed to promote sustainable livelihoods by leveraging the medicinal and commercial value of herbal honey. By integrating scientific evaluation with traditional knowledge, this study seeks to enhance the economic prospects of local communities while preserving the ecological benefits of beekeeping.

University-Community Translational Entrepreneurship Programs Propelling Innovation and Creativity for Indigenous and Marginalised Urban Poor in Malaysia

Doris Padmini Selvaratnam
Faculty of Economics and Management, Universiti Kebangsaan Malaysia

Indigenous and Marginalised Urban Poor in Malaysia face numerous challenges to move forward in life. Their adversity and challenges are due to socioeconomic disadvantages, education, talent, and skills mismatch with mainstream economic activities and geographical challenges. Nevertheless, the Malaysian government has outlined development policies and strategies to help them through educational and economic activities. The Ministry of Higher Education has introduced Entrepreneurship as a core subject for all university students and also the University for Society (SULAM) program to encourage embedding community programs as part of course evaluation. These platforms open the window to implement translation entrepreneurship programs for the community. This paper will focus on the indigenous community at Kampung Kachau and Sungai Buah and marginalised urban poor at Pangsapuri Enggang and undergraduate students. This section of the community has been given attention by the courses conducted at the Faculty of Economics and Management, University Kebangsaan Malaysia. The indigenous and marginalised urban poor have been guided in entrepreneurial activities to help enhance their cultural resilience and sustainable livelihood. Findings show that given the motivation and opportunity, indigenous and marginalised urban poor can innovate to create their own business and move towards a sustainable livelihood. The policy implication of the study points to the importance of allowing the showcasing of one's own ideas, and promotion and digital marketing are vital to ensure the sustainability and growth of these entrepreneurial ventures. The university-community translational entrepreneurship programme has demonstrated the potential to unlock the innovative and entrepreneurial spirit of Malaysia's urban poor and marginalised communities.

Bridging Grassroots Innovations and Corporate Partnerships Through Collaborative Learning: What worked well in Grassroots Innovations practices & learnings from collaboration with Corporations

Prathyusha Thammineni
NextBharat Ventures, Gandhinagar, Gujarat

While building an inclusive innovation ecosystem to provide institutional support, multi-stakeholder partnerships and resources are necessary for spawning and scaling grassroots innovations. During the journey of creative minds to market, the sustainability of these partnerships depends on the mutual willingness to learn from each other and build on each partner's capacity.

During the one-year pilot project with seven grassroots innovators from different geographical regions in India, an attempt was made to create an ecosystem where corporate leaders, academia, civil society, market actors can support grassroots innovators to further disseminate their innovations. The details of the pilot are presented as "Scaling Grassroots Innovations: Insights from Pilot Interventions in Indian Villages" at the 10th International Conference on Research into Design, IIT Hyderabad, India, 8-10 January 2025. Such collaboration between formal and informal systems is uncommon. There is a gap between corporations and grassroots innovators in terms of scale & scope of operations, scope of supply chain, distribution, efficient manufacturing systems and sustainable businesses. This gives rise to challenges in the diffusion of the grassroots innovations.

This study examines the insights gained from a pilot experiment aimed at designing and implementing a sustainable ecosystem for grassroots businesses. It identifies replicable heuristics that grassroots enterprises can adopt, including marketing strategies, co-creation approaches, methods for overcoming resistance to change, circular economy principles, and preventive marketing models. Additionally, the study explores the integration of formal-sector practices into grassroots businesses while highlighting frugal problem-solving methods that corporations can learn from grassroots innovators. By bridging these knowledge exchanges, the research aims to enhance the resilience and adaptability of grassroots enterprises within evolving market dynamics.

Scouting Grassroots Innovations: Lessons, Challenges, and Policy Recommendations

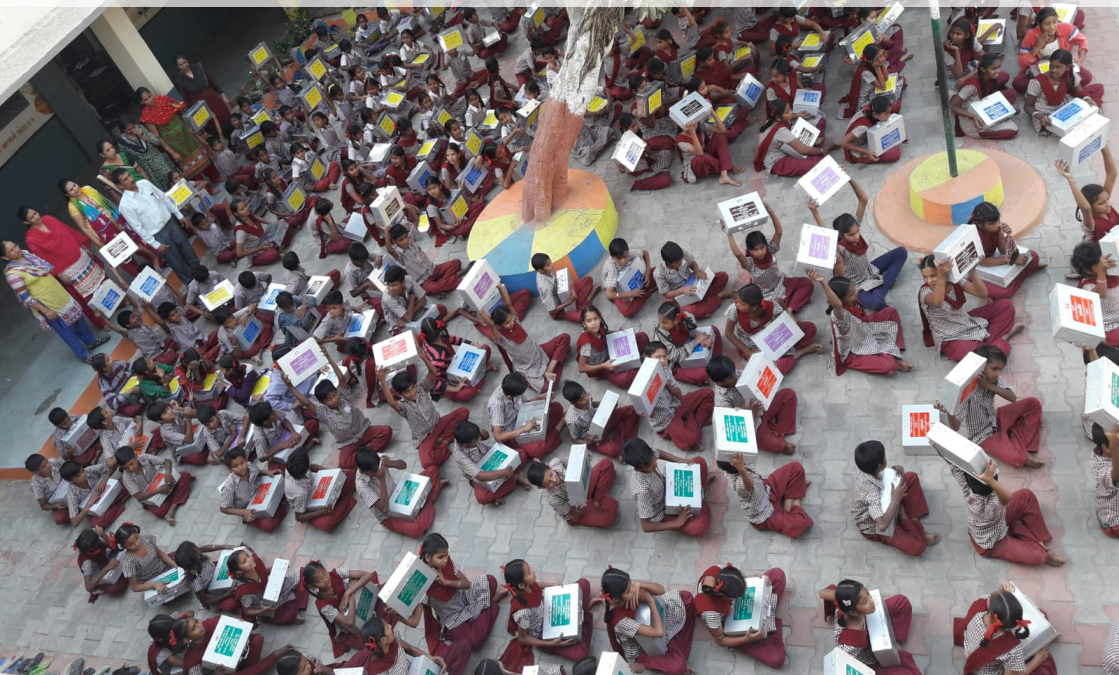
N Sri Akhila, Byreddy Sai Charith Reddy, U Yedukondalu Krishna
Palle Srujana, Hyderabad, Telangana

Scouting is the first and most crucial step in discovering grassroots innovations and traditional knowledge. There is no fixed method for scouting in the informal sector, but through years of experience, organizations like the Honey Bee Network and Palle Srujana, a volunteer-driven organization supporting grassroots innovations in Telangana and Andhra Pradesh, have developed various approaches.

This paper explores two key scouting methods: Proactive and Reactive scouting, highlighting the challenges involved based on Palle Srujana's experience through examples. It also provides insights into volunteer-led and employee-led scouting approaches. Additionally, we will discuss the essential qualities of a scout and their role in the journey of grassroots innovations.

The study presents policy recommendations to institutionalize scouting as a dedicated and continuous process within formal systems. It highlights the crucial role of grassroots innovations in national development and advocates for a hybrid model that integrates volunteerism with structured systemization. This approach aims to effectively nurture, support, and sustain grassroots innovations, ensuring their long-term impact and scalability.

VI. Educational Innovations



Transforming Rural Primary Education with VR and 3D Technology: A Data-Informed Approach

Martin Parmar
Charotar University of Science and Technology, Gujarat

This work leverages advanced integration of Virtual Reality (VR) and 3D technology, utilizing Unity 3D and Blender, to transform primary education in rural areas. It aims to enhance student engagement and comprehension by replacing traditional learning tools with interactive, immersive 3D content, particularly in foundational subjects such as English and Mathematics. Key phases include a comprehensive analysis of existing teaching methods, iterative software development aligned with VR use, hardware installation in primary schools, and structured teacher training to facilitate seamless adoption of the technology. The study adapts instructional content to students' cognitive needs through real-time assessments and feedback mechanisms, promoting adaptive, personalized learning pathways. Implementing VR in this educational context not only aims to reduce dropout rates but also fosters teamwork, critical thinking, and problem-solving skills through technology-enhanced experiential learning. Additionally, this work trains educators in innovative teaching methods, complementing traditional educational practices and supporting sustainable educational development. The adaptability and scalability of this model underscore its potential for broader implementation, positioning it as a replicable framework for enhancing rural education through technology-driven, data-informed instructional strategies.

Integrating Technology into Educational Practice

Sandip Prajapati
Kheda, Gujarat

Since March 2010, Mr. Sandip has been actively involved in teaching, but the COVID-19-induced lockdown presented unprecedented challenges in education. Teachers were suddenly required to adapt to online learning, and government-led ICT training programs were introduced to support this transition. The National Education Policy (NEP) 2020 emphasized the role of technology in education,

advocating for digital learning tools, online platforms, and e-resources. Guidelines were also issued for online assessments, digital quizzes, and alternative learning resources for students without access to digital devices. However, the successful implementation of these policies largely depended on individual teachers' motivation and willingness to learn new technological skills.

Recognizing the severe disruption in education, especially for students affected by the digital divide, one educator took proactive steps to integrate technology into teaching. Several initiatives were introduced, including online classes via Microsoft Teams and WhatsApp groups. To support students without digital access, street-corner classes were conducted following COVID-19 safety guidelines. Interactive digital e-books and flipbooks for Class 6-8 were created, benefiting over 85,000 students and teachers. Online quizzes were developed and shared through WhatsApp, with offline versions made available for students without smartphones. Additionally, a YouTube channel and an educational blog were launched, reaching over 444,000 users.

To further enhance accessibility, QR codes were generated for various subjects, enabling offline learning, and 850 interactive quizzes were developed for both online and offline use. The integration of ICT tools has since transformed teaching methodologies, fostering a lasting culture of technological adoption and continuous professional development.

I like my school

Raghavbhai Dhanajeebhai Katakiya
Amreli, Gujarat

Titled I Like My School, this initiative tackled the challenge of low student attendance, with only about 25% of children attending regularly. The lack of effective anganwadi preparation further hindered their transition to formal schooling.

The approach incorporated Activity-Based Learning (ABL) principles and playway methods used in anganwadi education. It aligned with NEP-2020 and the NIPUN Bharat Mission, which emphasize

foundational learning through structured, activity-based teaching. Simple tracking tools were also introduced to monitor children's progress, reinforcing child-centric education.
A portfolio of over 1,000 games and 2,000 activities was developed, including rhymes, nursery math songs, and interactive exercises. Many activities utilized eco-friendly waste materials like coconut shells, mango seeds, and almond shells to create toys and learning aids. Digital slates, colorful objects, and traditional local games were also integrated to make learning more engaging.

These materials were shared through WhatsApp and Facebook groups, significantly reducing absenteeism. Most students achieved their learning competencies, showing increased enthusiasm and self-confidence. Learning became an enjoyable experience rather than a task, and peer collaboration improved. This initiative serves as a model of an effective ABL environment, demonstrating how creative and engaging methods can enhance early education.

One interesting game borrows the idea of an archery target (concentric circles, with the central and smallest circle getting the highest number of points). The target is a set of five concentric circles, with the innermost circle carrying the number '5' (five points). The other circles, moving outwards, have the following values written in them: 4, 3, 2 and 1. Students stand in a large circle, around the target. Each is given five pebbles. One by one, the children throw their five pebbles, aiming each time for the central circle (5 points). Any stones landing outside the target are ignored; the child gets points according to the circles on which her pebbles land. The child with the highest total points at the end of the game wins. Number identification, sequencing of numbers, addition, and the idea of zero (for the stones landing outside the target) are the learning elements of this game. A variant of the game has the children aiming for the target blindfolded.

Improving engagement to regularize attendance

Kalpesh Chotalia
Jamnagar, Gujarat

A key challenge in the classroom was the irregular attendance of

students, many of whom came from economically disadvantaged backgrounds. These constraints significantly impacted their learning, requiring a solution that would allow them to catch up at their own pace.
To address this issue, a specialized software program was developed to help students practice basic math. Acquiring the necessary technical skills, the educator designed the software to operate on school computers, enabling individualized practice. The program automatically generated new problems and provided instant feedback on student performance. It included multiple modules covering numeracy, number sequencing, arithmetic operations, decimals and fractions, cursive writing, and basic English spelling.

The software was made accessible to other educators through a blog, WhatsApp, and Telegram, ensuring wider scalability. A simple and user-friendly design was prioritized, and peer learning was encouraged by having proficient students assist those who needed additional support.

Student progress was monitored through performance data stored on the computers, allowing targeted interventions when necessary. Regular users of the software demonstrated significant improvements in their math skills, and attendance rates increased as students became more engaged in learning. The opportunity to use technology in education contributed to a rise in confidence and academic performance. Over time, computers became an integral part of the school routine, fostering a positive shift in students' perceptions of technology as a valuable educational tool.

Current Training Practices in The Craft Sector

Shivram Kumar, Jeevan Jolly, Viknesh Surya SS, Sharmistha Banerjee
Indian Institute of Technology (IIT) Guwahati

Current training practices in the craft sector often lack coherence, failing to fully leverage artisans' capabilities due to their ad-hoc nature and varying instructor expertise. This inconsistency frequently results in a one-size-fits-all curriculum, which does not account for the diversity among artisans and their crafts. Prior research, however,

suggests the importance of specialized courses tailored to different artisan groups and craft types. To address the limitations of the generic training approach, this study identifies three critical areas for instructors to focus on: stakeholder identification, stakeholder analysis, and market analysis. A thematic analysis of existing tools for these tasks was conducted, leading to the emergence of need statements specific to craft education. The findings underscore the importance of a structured approach in artisan education, equipping instructors with tools that facilitate targeted and impactful teaching strategies. The study further maps these need statements to existing tools, which were adapted to better serve the context of artisan training. This research introduces a structured framework for instructors, enabling them to gain a comprehensive understanding of individual artisans' needs and capabilities, thereby fostering a more effective learning environment. The framework aims to enhance the quality of artisan training, ensuring the preservation and advancement of crafts through improved skill development and innovation. This initiative marks a significant step forward in increasing the effectiveness of artisan education, contributing to both individual growth and the sustainability of craft traditions

Longitudinal Assessment of the Impact of Residential Education Program on Female Empowerment and Sustainable Development: A 20-Year Follow-Up Study

Ambreen Saleem[1], Imran Saleem[2], Aamir Hassan[3]
[1]*Assistant Professor, Institute of Business Management, GLA University, Mathura, Uttar Pradesh*
[2]*Professor, RIEU, University of Buraimi, Al-Buraimi, Oman*
[3]*Research Scholar, Department of Commerce, Aligarh Muslim University, Aligarh, Uttar Pradesh*

Women's quality education and empowerment are essentially needed preconditions for sustainable development globally. To ensure sustainable development, developing countries like India need to promote quality women's education and women's participation.

Many previous researches highlight that if both genders do not participate and women empowerment is not the essential component of sustainable development strategies and education, they usually

fail to meet their objectives. Recognizing education as a catalyst for change, SDG 4 underscores the need for comprehensive educational initiatives that not only provide basic literacy but also foster critical thinking, environmental consciousness, and gender sensitivity.

Moreover, SDG 5 acknowledges the interconnectedness of gender equality with broader development objectives. By promoting women's empowerment across all sectors, including education, health, and economic opportunities, SDG 5 aims to dismantle systemic barriers that inhibit women's full participation in society. This research underscores the transformative potential of education in empowering women to become agents of change in their communities.

This study has analyzed the goals, scope, and programs of the selected NGO in providing quality education in 2001-2003 and also attempts to measure the impact of such education on continuity of education, eco-feminism, and women's empowerment along with its educational impact on the family tree.

The proposed research project aims to examine the relevance of a gender perspective in societies where women, particularly homemakers, are primarily engaged in household responsibilities and childcare. In many developing and less-developed countries, these women often face limited access to quality education and equitable healthcare. To explore this issue, an educational initiative providing quality education to girls from underprivileged backgrounds in remote areas of India has been identified. Specifically, the study focuses on *Pahla-Kadam* (First Step), a one-year residential education camp implemented by the NGO Parijat. This initiative is analyzed using a case study approach to assess its long-term impact. A longitudinal study has been conducted to evaluate the effects of the program, measuring its outcomes after a 20-year interval.

Creating the 21st Century Engineer for Sustainable Development and Social Justice

John Tharakan
Professor, Chemical Engineering, Howard University,
Washington DC, USA

Engineering educators have an ethical responsibility to cultivate critical and innovative thinkers capable of addressing complex global challenges. Future engineering graduates must develop technologies, products, and processes aligned with sustainable development goals. This necessitates a paradigm shift in engineering education, moving beyond traditional lecture-based instruction and limited assessment methods such as exams and problem sets.

This study explores strategies for modernizing engineering curricula to equip students with transformative thinking and problem-solving skills. It highlights the integration of pedagogical approaches such as project-based learning (PBL), service learning (SL), and open-ended design (OED) thinking. Additionally, it emphasizes the importance of incorporating ethics and social justice considerations into engineering education.

The study demonstrates how PBL can be embedded into courses, how educational technology can be leveraged to create OED challenges that foster creativity and critical thinking, and how SL can be effectively integrated into curricula. By adopting these approaches, engineering programs can ensure that graduates are not only technically proficient but also socially responsible innovators, prepared to contribute meaningfully to sustainable development.

Aligning Teacher-Driven Innovations with NEP Mandates: Insights from Gujarat's Class 1-2 Teachers' Online Forum

Megha Gajjar and Avinash Bhandari
FAIR-E Ahmedabad

As part of a large-scale professional development program for teachers of Class 1-2 in Gujarat government's schools (2019-20) conducted by Indian Institute of Management Ahmedabad (IIMA), a Facebook discussion forum had been created to share teacher-generated or teacher-adapted innovations. After IIMA's involvement ended, the forum has been functioning independently for more than four years. The forum has about 29,000 members, and on any given day, about

15% are active, with about 17 experiences being shared every day, each eliciting on average 10 comments and 119 simple reactions. This translates to about 58 visits per annum per member to read, share or comment. The discussions take place in the context of the need to improve Activity-Based Learning pedagogy of Class 1-2 and integrate its curriculum with pre-school (specifically anganwadi) education under the new National Education Policy's mandate to have an integrated curriculum for age group 3 to 8 (the pre-school and Class 1-2). This study seeks to learn about the following from seven most-active forum members (identified from Facebook analytics data): How are the innovations and experiments they are sharing aligned with the broader policy changes being introduced by the government in age group 3-8? While the case studies are still to be fully analyzed, initial indications are that the innovations are responding more to the deficiencies of the anganwadi system. Serious improvement of the educational aspects of the anganwadi system will help Class 1-2 teachers focus their innovative efforts more on the foundational learning competencies specified for ages 6 to 8.

Teacher-generated ICT Innovations as complements to state ICT interventions and policies

Megha Gajjar[1], Mehul Prajapati[2], Avinash Bhandari[1]
[1]FAIRE, Ahmedabad
[2]School teacher, Govindpura Anupan Primary School, Mehsana, Gujarat

Problem-solving educational innovations of government school teachers can not only inspire other teachers, but they can also be used by administrators as inputs for formal professional development programs. This paper is based on the work of a group of ten teachers supported by the second author, designed to develop classroom innovations in response to both local problems and difficulties, and state policies that sought to promote ICT in school education. Innovation is defined as a problem-solving response to an identified need or problem, that has been developed using one's own innovative and entrepreneurial behavior, and has shown positive results in line with the teacher's objectives. Case studies of the ten teachers provided the data. The analysis of the work shows that innovative

teachers must highlight the linkages of their problem-solving responses with the expectations of the administration and state policy, so that insights from teacher-driven grassroots educational innovations can be incorporated into wider program and policies.

Online quizzes for learning

Mehul Prajapati
Mehsana, Gujarat

Mehul Prajapati has been teaching since December 2001, and has, over the years, used technology in a variety of ways to engage with his students, most of whom were from families employed in agriculture or casual labour. One of his early innovations illustrates the importance of introducing technology to students in a simple manner. He was teaching social science to class 6-8, on the topic 'Revolutionaries' and realized that the students did not know who a revolutionary was; nor did they have any background about the revolutionaries listed in the book. Through a book, he accessed photos and written material on 92 revolutionaries, printed these and pasted them on a set of brochures; tasking every student with preparing a speech for the revolutionary they were assigned to. Mehul Prajapati got the speeches recorded on his phone and uploaded the videos on his YouTube channel. The video was shown to the students whose confidence started increasing after watching their own videos.

Mehul Prajapati prepared quizzes, and converted these into QR codes which were arranged according to textbook chapters and given to students for ease of access. Performance can be monitored, and students are directed to relevant audio-visual material based on the mistakes made. In places where the government has provided for smart classrooms, the students play the quizzes online on a big screen with the help of a projector and get immediate feedback. Mehul Prajapati uses the results for a comprehensive evaluation of students, and prepares reports on the academic progress of the students based on it.

In an effort to motivate other teachers to incorporate fun and gamification in learning, Mehul shares his work with a large number of teachers through a blog (http://mehuloza.blogspot.

com/) and a YouTube channel (https://www.youtube.com/@DIGITALEDUCATIONWITHMEHUL). He has been recognized for his work by the Indian Institute of Management, Ahmedabad. Linking his work with the NEP 2020's emphasis on Computational Thinking and the integration of technology in education.

Language and literacy through learning outcomes-based, children's songs and games

Kirti O. Patel
Bhavnagar, Gujarat

Children transitioning from a home environment to a school environment often show a lack of interest and engagement, and irregular attendance. Teachers have to find their own creative ways to maintain learning continuity and to engage them. Kirti Patel felt that though the principles of ABL had been in practice for many years, there is now a greater openness to using local innovations if they helped in achieving learning outcomes.

Kirti Patel resorted to composing original songs and rhymes based on specific learning outcomes, making her lessons engaging. Children found they could relate to these songs. Kirti Patel published a song collection (*Kirti no Kalarav*), which was distributed to schools and uploaded on YouTube to ensure accessibility. She did not have the resources to publish this book, but the District Primary Education Officer provided the needed funding and distribution support. There were technical challenges in creating and sharing online content, but she was able to learn (through YouTube videos) about video creation, sharing, etc. She also designed learning games for alphabet recognition, mathematical competencies, and word reading.

Her assessments have shown clear improvement in the achievement of the specified learning outcomes, enhanced participation in prayer meetings, increased curiosity and active engagement, and more peer collaboration and teamwork.

Kirti Patel has created a set of songs based on seasons and festivals, with the corresponding subject matter. One song, 'Saslabhai's cycle is going, going…' calls for children to dress up as rabbits and go around on children's cycles; other songs pull in other animals. The activity is designed to help children become familiar with common animals.

Numeracy through self-composed songs

Lila D. Thakarda
Bhavnagar, Gujarat

The early childhood education curriculum recognizes that children, by the end of Class-2 (age 8), have to develop an understanding of certain mathematical concepts and recognize quantities, shapes, and measures. However, if pre-schooling does not deal with the lower-level competencies, it is bound to create difficulties. Lila Thakarda recognized this problem when her students struggled to express numbers in words and lacked knowledge of number recognition and operations. Regular teacher training did not provide the creative tools required to make numeracy development engaging. Lila Thakarda was aware that the NEP-2020 encouraged the integration of arts in education, and so she felt that her skills in song writing could help.

Lila Thakarda composed songs, rhymes, and stories to teach number recognition, counting, and concepts like addition and subtraction. She produced videos, uploaded them on YouTube ensuring that others could access her work.

Her regular assessments helped make necessary modifications to songs and the process of teaching. The attendance regularized, and close to 98% could be counted as regular. The classroom environment, she feels, illustrates what an ABL environment should look like.

She feels that her work can be converted into effective professional development modules on integrating music, storytelling, and play-based learning in numeracy education.

Lila Thakarda has a set of ten songs; each focusing on one of the numbers from 1 to 10. The songs draw on various festivals in which number counting is involved. The songs are also sung during various activities and in the children's assembly.

Education with Playful Engagment

Nikita Patel
Anand, Gujarat

Faced with a significant gap between children's pre-existing knowledge upon entering Class 1 and the expected competencies by age six, an educator implemented a three-pronged strategy. Locally available, low-cost materials such as small pebbles were used to create flashcards, puppets, and number games. Interactive games and stories were developed to engage students, while cartoons and other visual elements were incorporated to capture their attention. Traditional lessons were replaced with activity-based learning methods, encouraging peer interaction through group activities and integrating singing, acting, and drawing into the daily schedule.

Several challenges were encountered, including limited parental involvement in children's learning, a lack of resources preventing the purchase of readymade teaching materials, and time constraints for implementing additional innovative activities. To address these, collaboration with fellow teachers and community members was sought to source materials and ideas, utilizing recyclable, low-cost resources. As student engagement, attendance, and academic performance improved, the approach became easier to sustain. Cognitive skills outlined in the syllabus, such as literacy and numeracy, were closely monitored, leading to noticeable improvements in reading, writing, and numerical abilities. Additionally, participation in group activities enhanced students' self-expression and confidence. The success of these methods led to their adoption by teachers in neighboring schools, further amplified through social media engagement.

.

Many of the learning aids Nikita Patel made depend on grooves cut into various materials, in the shapes of the letters of the alphabet,

numbers and various geometrical shapes. Children are given wooden sticks as pencils, to trace the letters using the grooves as guidelines. They are also taught to use their fingers. The idea itself is not new, but it is usually used with regular chalk pencils and grooves pressed into slates, to help children learn to write. Here, the activity is seen as a pre-writing preparation. As Nikita notes, even if the children do not master a particular letter quickly, they will start recognizing it.

Masti ki Patasala

Rakesh Patel
Panachmahal, Gujarat

Democracy is more than a system of governance; it is a way of life that fosters collective thinking, critical inquiry, and creative problem-solving. A truly democratic society is one that remains sensitive to its challenges and actively seeks solutions—a vision encapsulated in the phrase *Sarve Bhavantu Sukhinah* (May all be happy). The foundation for such a society begins in schools, where young minds are nurtured to think independently and work collaboratively. With this belief, *Masti Ki Pathshala* was established, prioritizing children over subjects, recognizing that academic disciplines exist for the students, not the other way around.

At *Masti Ki Pathshala*, students take the lead in managing both academic and administrative affairs, from organizing classrooms to planning festivals. This participatory approach, named *Nagarik Ughadatar*, empowers students to govern their learning environment, work as a team, and solve problems through planning, execution, and reflection. The school places special emphasis on brain-based learning, innovative teaching methods that make education engaging, and life-centered learning. Technology is also integrated to enhance the learning experience. To extend this vision beyond a single institution, the initiative has reached thousands of schools through a blog, the *Bioscope* magazine, social media, and direct interactions, ensuring that education remains a joyful and meaningful experience for every child.

Fostering Integrity and Community: Innovative Educational Practices in a Tribal School

Surender Kumar
Champa, Himachal Pradesh

Surender Kumar, an innovative educator from the tribal region of Pangi in Himachal Pradesh, has introduced numerous transformative initiatives to enhance the school environment. His efforts include establishing an "Honesty Shop" to instill trust and integrity among students and organizing vibrant celebrations of national days to foster civic responsibility and patriotism. Under his leadership, the school has earned the prestigious Best School Management Committee (SMC) Award for four consecutive years. Demonstrating meticulous planning, he has developed a comprehensive school calendar to streamline academic and extracurricular activities. Additionally, by celebrating students' birthdays within the school, he has created a warm, inclusive atmosphere that nurtures a strong sense of community and belonging.

Transformative Leadership in Education

Gurmel Singh
Hoshuiarpur, Punjab

Gurmel Singh, a distinguished educator from Punjab and recipient of the esteemed State Teacher Award, exemplifies visionary leadership in the field of education. As the District Smart School Coordinator in Hoshiarpur, he has spearheaded transformative initiatives that have significantly enriched the learning environment for students across the district. Mr. Singh's commitment to providing a holistic education is evident in his numerous accomplishments. He spearheaded the installation of a submersible pump to ensure access to clean and safe drinking water for all students and staff, prioritizing their health and well-being. Recognizing the importance of experiential learning, Mr. Singh has been instrumental in organizing enriching summer camps that provide students with diverse opportunities for growth

and exploration. Furthermore, he has fostered a love for reading by establishing dedicated library corners within each classroom, encouraging a culture of intellectual curiosity and lifelong learning. A testament to his innovative spirit, Mr. Singh established the district's first educational park, a unique outdoor learning space that provides students with hands-on experiences in nature and promotes a deeper connection with their environment. Through these and many other impactful initiatives, Gurmel Singh has not only transformed his own school but has also inspired and guided other schools within the district towards achieving excellence in education.

Changing Landscape of Education

Yudhveer Tandon
Champa, Himachal Pradesh

Yudhveer Tandon, a resident of Himachal Pradesh, is a recipient of the esteemed National and State Teacher Awards for his pioneering work in education and community development.

Mr. Tandon has spearheaded numerous innovative initiatives, including the establishment of a "Children's Constitution," the implementation of effective waste management and composting programs, the formation of a "Child Cabinet" to empower young voices, and the creation of "Curiosity Boxes" to foster a love for learning. He has also actively promoted sustainable living through the construction of kitchen gardens, herbal gardens, and flower gardens. A testament to his dedication to educational excellence, Mr. Tandon has contributed to a book titled Changing Landscape of Education" (बदलती तस्वीर शिक्षा की), as a chief editor. This interactive book serves as a valuable resource, documenting zero-investment innovations and best practices implemented in the Chamba district. Each innovation is further enriched by the inclusion of QR codes, providing readers with easy access to detailed information and inspiring further exploration.

VII. Cultural Creativity

Building Resilient Urban Knowledge Communities and Enterprises through Design Education

Tanishka Kachru, Paras Singh, Deepika Srivastava
National Institute of Design, Ahmedabad, Gujarat

Design education, through its focus on grassroots upliftment, human-centered, and interdisciplinary approaches, empowers the creation of knowledge-based urban enterprises that integrate traditional and tacit knowledge within environmentally, culturally and socially sustainable economic models. The Terra Carta - a mandate that places sustainability at the core of the private sector - was introduced in 2021 by HRH King Charles III as part of the Sustainable Markets' Initiative. It emphasizes the importance of integrating nature, people, and the planet into global value creation. The Terra Carta Design Lab recognizes the role art and design has in helping to address the climate crisis. This paper derives from the solutions developed by students and recent graduates of National Institute of Design, Ahmedabad as part of this competition that address urban challenges across diverse sectors such as sustainable construction, fashion, waste management, energy efficiency, and sanitation. It identifies three key strategies - (i) creating integrated solutions for environmental and social challenges, that emphasize justice and fairness (ii) embracing traditional wisdom and indigenous knowledge systems through practices of decentralization and localization. This ensures contextual relevance and cultural appropriateness of the solutions, increasing the chances of success and sustainability; (iii) implementation of community-based approaches that foster local ownership, leadership, and economic viability, essential for sustainable and impactful grassroots innovation. The solutions presented are low-cost, low-tech, with high-impact potential. Guided by India's resourcefulness, wealth of indigenous knowledge systems, availability of local materials, they also present frameworks to address similar urban challenges at a global level, especially in countries of the Global South, while emphasizing co-creation and transdisciplinary collaboration.

Transforming Social Innovation into an Education Event Tourist Attraction

Mohd Latife Shamsuddin[1], Norol Hamiza Zamzuri[1], Sharmila Mohamed Salleh[2], Yayasan Inovasi[2], Jacqueline Koh Siew Len[3]
[1]Faculty of Business and Management. Universiti Teknologi Mara, Puncak Alam, Selangor
[2]Level 3-E1A, Enterprise 4, Technology Park Malaysia, Kuala Lumpur
[3]Faculty of Business and Management, Universiti Teknologi MARA, Kota Kinabalu, Sabah

Social innovation (SI) is an innovation intervention process based on resolving community issues to ensure community social wellbeing is being properly addressed. This study explored the meaning of SI by including elements of Social, Technology, and Innovation in a newly developed SI model. This model involved understanding SI; necessitated resource and stakeholder commitment and cooperation to resolve challenges, entrepreneur leadership; and encompassed value creation, process dynamics, as well as governance actors and networks. The main SI outcome of this study was the creation of an educational event tourism attraction in Kundasang, Sabah. One limitation is that the context was a case study focusing only on Kundasang Aquafarm Sdn. Bhd. Further research is required to ensure an in-depth understanding of the influence of SI and establish an SI measurement in social, economic, and environmental contexts.

On boosting innovation and entrepreneurship skills amongst children and young people, with added focus on girls

Prasanta Dash
Chief, UNICEF Gujarat Office

UNICEF has been investing in boosting innovation and entrepreneurship skills amongst children and young people, with added focus on girls.

In Gujarat, in alignment with the vision of the Framework for Vikshit Gujarat @20247, UNICEF has been partnering with the government system to promote entrepreneurship skill-building programmes

as well as innovative financing for start-ups—efforts that promote entrepreneurial ecosystems, networks, and business social capital. The focus is on equitable and gender transformative skilling opportunities to prepare children and young people to thrive in the 21st Century.

Gujarat University: The Vikram Sarabhai Children Innovation Centre (VSCIC) & herSTART platform

Prasanta Dash
Chief, UNICEF Gujarat Office

The *VSCIC* (Venture Studio Child Innovation Centre), established by *GUSEC* and *UNICEF*, is India's first innovation center dedicated to children. This initiative, developed in alignment with Gujarat's *Student Startup and Innovation Policy (SSIP)* and UNICEF's *YuWaah (Generation Unlimited)* program, aims to identify, nurture, and promote child-led innovations, with a special focus on girls. By providing a dedicated platform, the center institutionalizes efforts to encourage creativity and problem-solving among young innovators. More details can be found at https://vscic.org/.

In addition, *herSTART*, launched in 2019, is an initiative designed to empower young women to become entrepreneurs and innovators. Open to all girls and women pursuing innovative ideas, prototypes, or business ventures, *herSTART* has been recognized as a key driver in Gujarat's startup ecosystem by India's *Department for Promotion of Industry and Internal Trade* in its *States' Startup Ranking Framework Report 2022*. On *October 4, 2022*, the Hon'ble President of India, along with key officials from Gujarat, inaugurated the *herSTART Incubator* and *herSTART Accelerator* in Ahmedabad. The program continues to break structural barriers and support women-led startups, including those in the tech sector. More information is available at https://herstart.in/. These initiatives contribute significantly to UNICEF's broader mission of fostering social impact for children and young people.

A design intervention on the traditional "Tekeli Pitha" (Kettle steam rice cake) preparation method: Utilizing an entrepreneurial strategy to expand a scalable company of a local grassroots culinary culture

Pranjit Sarma, Abhijit Padun
Central Institute of Technology, Kokrajhar Assam.

In addition to being considered a fundamental human need, cuisine also reflects a region's culture. Therefore, it always has a growing demand. North and Central Indian cuisine, North Indian cuisine, Western Indian cuisine, Western Coastal cuisine, South Indian cuisine, South Indian cuisine influenced by migrants from the Southern Arabian Peninsula, Eastern Indian cuisine, North East Indian cuisine, and Indianized Chinese are the nine main categories of Indian cuisine.

Each dish has a unique cultural identity that is reflected in its appearance and flavor. Because of this, individuals across the nation have a strong connection to their local cuisine. Assam, a prominent state in the northeastern part of India, is renowned for its diverse culinary traditions. Tekeli Pitha, an authentic dish, is a staple of Assamese breakfast, or Jolpaan, and is quite popular.

More aluminum cookware is produced in Assam than any other raw material. The primary reasons are: economical; considerably lighter and more accessible than other solutions; and effective heat conduction. Aluminium is frequently used to make pots and kettles because it conducts heat well. From a business perspective, an average of 150 to 200 pieces of "Pitha" can be sold per day. It takes about three to four hours. The rising expectations from customers sometimes restrict them from finishing their orders. The product thus requires that the mechanism be developed based on these problem areas in order to satisfy the customers' needs.

The aim of redesigning the product is to satisfy client needs by offering a user-friendly experience that incorporates a sustainable and productive approach. Brass is the material that will be used for the product because brass is strong, non-magnetic, and heat-conductive. brass cooking utensils have the advantage of losing only 7% of its

nutrients during cooking. Because brass utensils are composed of copper and zinc, they benefit from both metals. Essentially, brass, sometimes referred to as “pital,” is less expensive than copper and is made up of 70% copper and 30% zinc.

Making a product out of brass will offer a new business opportunity to increase market demand and meet consumer expectations in a way that is both economical and healthy. In order to increase a scalable business of a regional grassroots cuisine’s culture, this study might give designers new viewpoints and possibilities to conduct further experimentation.

Entrepreneurial Migrant Society as a Conduit of Social Culture in Folk Life

Harshit Kumar, Sunil Kumar Rai
Department of Hindi, University of Delhi

The entrepreneurship of migrant communities has redefined the social culture of community life, introducing it to a new dimension. This study examines the role of entrepreneurial migrant societies in preserving and enhancing social and cultural traditions. Various aspects, including social organization, cultural expression, and the integration of new technologies, are analyzed to understand their impact.

Findings suggest that entrepreneurial migrant communities serve as a bridge between different societal groups, presenting social culture in a modernized form while preserving cultural heritage. By incorporating innovation and technology, these communities not only sustain their traditions but also strengthen their collective identity. Additionally, their entrepreneurial initiatives contribute to the preservation and global dissemination of cultural heritage and folk arts, ensuring their accessibility beyond geographical boundaries.

This study highlights how migrant entrepreneurship fosters cultural sustainability while adapting to contemporary advancements. The research underscores the crucial role of these communities

in maintaining and enriching social culture, demonstrating that entrepreneurship can serve as a means of both cultural preservation and modernization.

Warli Art and culture

Vinesh Dilip Dhodi
Palhgar, Maharasthra

The world-famous Warli folk art is being actively preserved and promoted by integrating its training into school education. Students are taught Warli painting not only to familiarize them with their cultural heritage but also to help them develop a sustainable livelihood.

Through this initiative, students create traditional Warli paintings and sketches on decorative items, which they sell in local markets. This experience allows them to earn a small income while fostering a deeper appreciation for their artistic heritage. By engaging in this creative practice, students recognize the economic potential of Warli art, ensuring its continuity while gaining valuable entrepreneurial skills.

Plastic Upcycling and Weaving

Rajiben Vankar
Bhuj, Gujarat

In the heart of Bhuj, where tradition meets innovation, Rajiben Vankar's journey stands as a testament to resilience, determination, and sustainability. An artisan-entrepreneur and the visionary behind Rajiben – Crafting a Better Planet, she transforms plastic waste into stylish bags and accessories, redefining eco-conscious craftsmanship.

Overcoming gender-based barriers that once restricted her educational opportunities, Rajiben has emerged as the driving force behind a women-owned craft enterprise. With creative ingenuity and a deep sense of environmental responsibility, she hand-weaves waste plastic into functional art, championing both sustainability and social empowerment.

Pithora painting

Desingh Rathwa
Chotta Udepur, Gujarat

Pithora painting is a traditional art form practiced by the Rathwa and Bhil communities of Chhota Udepur district. Deeply embedded in their cultural and spiritual life, these paintings adorn the interiors of homes, covering three walls of a room or hut. Pithora art is believed to bring peace, prosperity, and joy while also symbolizing status and pride within the community.

The colors used in Pithora paintings are prepared using natural ingredients, often mixed with goat's milk or local wine. The brushes, crafted from bamboo, reflect the community's reliance on indigenous materials. Observations during the 23rd Shodhyatra revealed that these paintings are also created as a form of gratitude when prayers for the recovery of a sick person are answered, further highlighting their spiritual significance.

Understanding The Role of Jewellery And Its Traditional Crafting Techniques In The Modern World - Creating Indian Legacy through Intercultural Craftsmanship

Awani Sankritya, Dr. Ravindra Singh, L.K Das
Department of Design, Delhi Technological University

The traditional craft practices of India form the genesis of Indian cultural heritage. India has its very own visual language. The Indian nation is home land to variegated craft practices, making them the soul of the country. The hand-crafted products from painted scrolls, toys and jewellery are not only intermediary of cultural values and heritage but also a medium to bridge the gap between tradition and modern design innovation. These practices have been existing majorly in an unorganized manner and leaving an impact on the

Indian economy making the handicraft sector the second largest after agriculture. For ages, humans express through creativity and the craft guilds or artisan communities have mastered specific techniques to handcraft products that enthrall us all and survive the test of time as well. This study examines the craft of jewellery making, highlighting its ability to transcend cultural boundaries. Mughal and Persian techniques have influenced Indian craftsmanship and vice versa, with skills passed down through generations by master artisans. Jewellery serves as a unifying element, bringing together diverse religions, genders, artistic narratives, and traditions.

The study explores various jewellery-making techniques and their role in fostering a sense of solidarity within communities. It also emphasizes the significance of indigenous craftsmanship in contemporary design, showcasing how traditional methods continue to shape and inspire modern jewellery-making practices.

Creativity in Context: The Impact of Cultural Rigidity on Creative Performance

Ashapurna Das and Apurva Sanaria
Indian Institute of Management, Bangalore

Culture significantly shapes human life, influencing identity, lifestyle, and creativity. Different cultural contexts either encourage or constrain creative expression, affecting the key components of creativity: originality and appropriateness. The meta-analysis conducted by Barth and Stadtmann (2024) on cross-cultural creativity underscores the impact of cultural rules and norms, revealing a recurring theme of rigidity in creative performance.

Drawing from Gelfand et al.'s (2017) tightness-looseness theory, this paper defines cultural rigidity as the degree to which societies accept creative ideas that align with their established norms and values. Highly rigid cultures enforce strict rules with lower tolerance for deviation, whereas less rigid cultures demonstrate greater flexibility. This distinction is crucial at the grassroots level, shaping how cultures engage with and share creative outputs, as well as their openness to collaboration within entrepreneurial settings. This study argues that cultural rigidity influences both the appropriateness and originality

of creative expression. It presents three propositions illustrating how rigidity impacts these components individually and collectively, highlighting the dual role of cultural norms in either facilitating or constraining creativity.

PUNARAVARTAN : Cultural heritage, material innovations and circularity to achieve sustainability

Manisha Seth
eCoexist,Enterprises, The eCoexist Foundation

The festival of Ganesh Chaturthi is a very important cultural event across the country, especially in the state of Maharashtra. This ten-day festival involves the worship of a Ganesh idol which is finally immersed in water during the ritual of visarjan. The use of industrial materials such as Plaster of Paris (PoP) and chemical paints in the Ganesh idol has resulted in large-scale pollution of natural water bodies when these idols are immersed in them. In 2020, the Central Pollution Control Board established a ban on the use of chemical materials in the making of these idols. It was expected that most artisans would return to the use of natural clay which is a non-renewable resource and has its own impacts even though it is better than PoP.

The PUNARAVARTAN campaign was started in 2020 to encourage the collection and reuse of natural clay. It was collected from citizens after the festival and returned to the artisans for free. What started as a small experiment grew to collect over 20 tons of clay each year in Pune. The clay is now collected during home immersions and from public immersion tanks by the Pune Municipal Corporation. The first goes back to artisans and is reused to make idols the following year. The latter is offered to green architects for innovations in mud building.

The campaign has now been endorsed by the Maharashtra Pollution Control Board and will be replicated by municipal corporations across the state. This campaign addresses several social and environmental issues simultaneously. The traditional murtikars who have always used only natural materials for their craft get support for their livelihoods through the free clay returned to them. The campaign involves a

network of over 18 organizations in Pune city alone and more across the state. This collaboration brings together diverse interest groups; from Ganesh mandals and temples to waste management NGOs and private recyclers. In the battle against toxic chemical substances artisans have taken a lead in some parts of the state - the campaign is a boost in their efforts. Culturally the campaign revives the true significance of the visarjan ritual and reminds people about the sanctity of nature and the need to protect it. Ganesha becomes an advocate for conservation. While the festival is religious in nature, it has a history of being a medium of social change, and through the campaign it inspires citizens to conserve and protect the environment. The circularity that is inherent in the ritual of visarjan is now reflected in the circular economy created by the campaign, keeping nature as the focus for everyone, through a stunning art form.

Rabari embroidery Craft

Bhavana Rabari
Kutch, Gujarat

Bhavana Rabari, an artisan from Mindiyala village in Kutch, faced a profound challenge when the tradition of Rabari embroidery was banned for personal use. Determined to preserve her cultural heritage, she adapted the intricate embroidery designs into stunning paintings.

With support from the Kaarigar Clinic, Bhavana gained a deeper appreciation for her art and its cultural significance. Today, her paintings celebrate Rabari traditions, serving as a bridge between the past and present while inspiring others to reconnect with their roots.

Ahir Embroidery

Dharmila Chad
Kutch, Gujarat

Dharmila Chad, an artisan from Kotai village in Kutch, reimagined traditional embroidery as a powerful storytelling medium with the

support of Karigar Clinic. Her intricate stitches weave narratives of social struggles, ecological challenges, and community resilience.

Harnessing the reach of social media, Dharmila introduced her craft to a global audience, receiving orders from as far as London. Her journey highlights the transformative power of art and storytelling, proving that every voice, no matter how small, has the potential to be heard.

Mud Mirror Work

Shruti Thacker
Kutch, Gujarat

Shruti Thacker, a Computer Science graduate from Kutch, channeled her passion for Lippan art to create a unique fusion of tradition and innovation. Blending her technical expertise with artistic vision, she elevated the traditional craft to a global platform.

With support from Kaarigar Clinic, Shruti leveraged social media and masterclasses to showcase the therapeutic beauty of Lippan art to audiences worldwide. Her mission extends beyond artistic creation—she is dedicated to preserving cultural heritage and inspiring the next generation to embrace their traditions.

Mata ni Pachhedi

Jagdish Chitara
Ahmedabad, Gujarat

Jagdish Waghibhai Chitara, born in 1972 in Aghar village near Ahmedabad, is a master of *Mata ni Pachedi*, a sacred art form traditionally practiced by the Devipujak community. Originally created as a temple on cloth for those denied entry to religious sites, this intricate painting style embodies both devotion and resilience.

While selling his artwork on the streets, Jagdish was discovered by Gita Wolf of Tara Books, leading to his contributions to *The Great Race*,

a tribute to this ancestral craft. He continues to honor his heritage by creating detailed *pachedis* that narrate the 999 tales of the Goddess, preserving the artistic and cultural legacy of his community.


IIMA
FIFTH INTERNATIONAL CONFERENCE ON
CREATIVITY & INNOVATION
AT/FOR/FROM/WITH
GRASSROOTS (ICCIG 5) - 2025
Venue: Indian Institute of Management (IIM) Ahmedabad
January 28-30, 2025

Philosophy of Nine Es

The ethical fulcrum of SRISTI can be captured by Nine E's (Education, Environment, Equity, Efficiency, Ethics, Excellence, Empathy, Expertise and Enterprise) - the values that are central to the existence of Honey Bee Network. These provide a framework for societies seeped in mediocrity to get over their inertia and move towards a compassionate, creative, competitive as well as collaborative society.