Pathways to Sustainability and Grassroots Innovation Movements

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PSM and Honeybee Network & Sustainability
A Historical & Comparative analysis

Analysis of the connections of social movements-GRI activity insertion--inclusion, environmentalism--- dynamics of path construction

Investigations of how the framings of GRI activity relate to the outcomes of the PSM and Honeybee Network GRI interventions and one of the learning is that the outcomes reflect

1) the frames & strategies of insertion & mobilization of GRI activity under construction for engagement **with dominant pathways of modern development & environmentalism;**
2) **strategies of insertion into and mobilization of GRI activity formulated** in response to recognition of challenges & connection built with **framings of developmental planning**, institutional reforms, social mobilization and state's disengagement from NRM, ecological modernization and transformation governance

Pathways and GRI space formation: Closing and opening up of spaces

Historical analysis of the space formation

Understanding built uses the constructs of --Frames of local ingenuity, empowerment & structural change and modern development & environmentalism and the outcomes from the GRI activity and their relationship reflect the dynamics of----

Diagnostic, prognostic and motivational aspects of frames & heuristics constructed by PSMs and Honeybee Network & scaling up by looking into the dynamics of the closing and opening up of GRI space for alternate SD pathways &

Accommodation of GRI activity by dominant pathways linked to mobilization of political support, emergence of new technologies, changes in macro-policies, & ultimately the GRI activity's ability to exploit the opportunities opened up by change in the correlation of forces for SD

Shaping of development process	Gandhian and Neo-Gandhian orientation of economy & governance	Nehruvian orientation of mixed economy and governance	Left view on economy & governance
Socio-technical imagination, vision & path construction	A self-sufficient village economy, small is beautiful, redistribution of land through 'Bhoodan', non-party system of democracy, adopting anti-statist stance after facing the crisis of Nehruvian path, neo-gandhians resorting to post-modernist / neo-traditionalist politics	Priority to establishment of large technical systems as a blueprint of development, planning for capitalist development with land redistribution attempted mainly as rhetoric and its vision of the public sector in commanding heights, small-scale industry, after the emergence of big business as a major player in the economy & with the deepening of the crisis of Nehruvian imagination shift to market governance	Centrally coordinated workers' managed large technical systems (LTS), in transition planning as the agency of State capitalism as anti-imperialist step, with radical redistribution of assets, especially land- as transitional demands; later opting for decentralized planning for participatory local area development; State's accountability to the people .
Strategy of industrialisation	Decentralised industrial development; 'textile-first-type' strategy, ambivalence on modern S&T, tradition, community	Industrialization and establishment of basic industries and capital goods sector; import substitution, protection of cottage industries; after the experience of crisis export promotion, trade as an engine of growth	Extended support to heavy industry strategy, development of home market, cottage industry for employment & irrigated agriculture for food grains supply
Framing of challenge of development of socio-technical systems for national development	Traditional, indigenous & local knowledge, priority to individual small scale producer, service cooperatives in consumer goods / financial / other service areas	Import substitution via replication of duplicative / imitative technological strategy as more of replacement of import effort, S & T self-reliance & technological learning confined to strategic sectors.	S & T to meet basic needs of people; Self-reliance in large systems (LTS), irrigation, rail, road, telecom, steel, heavy industries, rail, roads, energy, health in public sector; small scale in consumer goods, in agro industry workers cooperatives

Socio-technical framing of justice in innovation-making, mobilization processes, planning for socio-technical system development	Upsizing of traditional small scale industry and peasant based agriculture	Downsizing of modern technology to make it 'appropriate' for small scale / tiny / micro enterprises	Centrally coordinated networks of irrigation, energy& power, rail, road, telecom; workers' cooperatives of petty producers, contested space of decentralized planning, PSM approach to development.
Path construction & promotion of social carriers of production & innovation for inclusive development	Landowners & big business as trustees of wealth, individual small producer,	State sector in basic industries & strategic areas, foreign and Indian big business in consumer goods, individual small producer in retail	Minimize dependence on big business, more reliance on public sector, small scale business in retail & workers cooperatives
Nature of institutional reforms in rural areas	Social protection of village industries, voluntary land redistribution,	Access to irrigation & power, roads, etc.; green revolution.	Land reforms, universal entitlements & rights based access, target petty producers by adapting technology of green revolution
Attitude to mainstream S&T	Embedded in rejection of modern S&T	Embedded in the idea of socially neutral S&T	Space for critical, re-constructivist attitudes to modern S&T based progress
Role of State, Market and community w r t meeting the priorities of poor	Local self-government, individual petty producer, control over land & water in the hands of traditional community,	Mixed market economy, small scale business, targeting of credit & information for poverty alleviation, provide school education for all & area development,	Public distribution of food, availability of transport & health through public sector agencies, provide universal education, land reforms, critical of community based institutions

Analytics of Path Construction, Outcomes & GRI Framings: - Attention to diagnostic, prognostic & motivational aspects

Diagnostic, prognostic and motivational aspects of framings of social movements with the force of "Environmentalism"

and the **diagnosis** of the causes of unsustainable development (the connection of the processes of industrialization and modern S & T development with the ongoing processes of socio-ecological change reflected in the frame of GRI response

Understanding the **prognostic aspect** of the frames chosen w r t the vision w r t the perusal of solutions to the problems and challenges of environmental change (*the role of state and community, market and planning, local, indigenous and S&T knowledge traditionality, modernity*) reflected in the frame of GRI response

Understanding the **motivational aspect** of frame of GRI as reflected in the heuristics of mobilization undertaken by the social movements to participate in the processes of innovation making for the achievement of sustainable development

Socio-technical frames of sustainability transition play an important role in the realization of aims of SD in a holistic manner---*problem formulation (diagnostic), prognostic (vision for solution building) & motivational aspects of frames deployed by the social movements for the alignment of their own vision of transformative socio-ecological change and GRI activity*

PSM AND HONEYBEE NETWORKS FRAME ANALYSIS

Context for the formulation of GRI activity frames Neo-Gandhian Versus Modernist Ideology

GANDHIANS:

- **Small is Beautiful, and Socially Just**
- **Village Community is Egalitarian and Democratic**
- **Modern S&T and Industrialization is violent, destructive and Degrading**
- **Traditional Knowledge is basis for sustainability, democracy, morality and social justice**

MODERNISTS:

- **Industrialize or Perish: Grow First & Clean Later, Profit is Essential for Growth, Big is Powerful in contemporary world**
- **Community and Tradition are Backward; Nation State is Unit of Development and Progress:**
- **Modern S&T Essential Ingredient for Progress and Development: Mechanization is index of Progress**

Connection of GRI with Environmentalism in India

Diagnostic, Prognostic and Motivational Aspects of Progressive and Radical Environmental Frames:

Challenge the Current Paradigm of Development and Believe that the aims of Conserving Natural Resources can only be achieved if the Livelihood Needs of the Resource Dependent People are Met Adequately:

Similarities with Ecology of Affluence:

Critique of Modern Development: Search for An Alternative

Different from the Ecology of Affluence Because Its Main Focus is on:

Issues of Livelihood and Work and

Issues of Distribution and Social Equity

Trends Within Indian Environmental Movements

"Environmentalism of the Poor (EOP)"

- **Is an Umbrella Term that Emboding Different Types of Social Action: Rights Movements & Livelihood Struggles**
- **A form of Radical Environmentalism Which is Anti- Modern Dev Science and Tech:**
- **Looks towards Tradition as an Alternative: Reinvents Gandhi to Construct their Ideology and Alternative**

Progressive Environmentalism

- **Also Speaks for the Poor: Treats Poverty as the Biggest Degrader and Polluter**
- **Is a Rights Movement But Critique and Interpretation of Modern Development is Different from EOP.**
- **Believes That Social and Economic Justice forms the Basis of an Alternative that can not be Pro Tradition or Pro Capitalist Modernity**
- **Believes in Use of Science and Technology to Dev Sustainable and Just Society**

PSMs and Progressive Left Environmental Alternative

- **Poverty is the biggest polluter: Industry & Development should eliminate & not create poverty**
- **Modern S & T becomes destructive and creates inequities because it is embedded in iniquitous social and productive relations and profit as the driving force: Forms of property and control over technology choices essential matter**
- **Modern S & T and production to be based on production for livelihood and use versus production for profit and productivism: should be guided by social needs and check unsustainable practices**
- **Market is no basis for solution: State intervention and people oriented institutional alternatives for new forms of production as basis for new society**
- **Neither tradition nor capitalist modernity: An alternative modernity vision: Capabilities and rights of underprivileged should be upgraded via local economy as a system as a part of need based multi-level economy**
- **Community is exploitative, iniquitous, violent: The golden age lies not in the past; Gender, caste, class differentiation is source of differential access: revival of traditional society will not do**
- **Industrialization can not be equated with capitalism: Question of what type of industrialization is needed**
- **If Modern S & T is the problem: it has offered solutions when reconstructed**
- **State has an important role; no to market governance and yes to multi-level planning; (PSMs perspective)**

Socio-technical frames targeting directly the marginalized people for development

Frame I (KVIC, Gandhian and Neo-Gandhian Tradition)

Upsizing / modernizing indigenous technology and individual producer to be made competitive by upgrading the local / traditional technology

Frame II (CSIR & Nehruvian Imagination)

Downsizing modern technology in order to make the technology appropriate for tiny / micro / small & medium enterprises &

Frame III (PSM)

Organizing the unorganized for cooperation in production, economies of scale & scope via technological upgrading of peasant-artisan economies as systems in itself for multi-sectoral network development

Cooperation for innovation & production is not automatic, entrepreneurial leadership had to be developed from within social movement (TUs; solidarity economy, fair trade , mutual aid, group enterprises)

Gandhian Frame I based technological upgrading fails to sustain the individual small producer

KVIC remained wedded to improving traditional technologies by scaling them up to intermediate levels and using power-driven machines;

Individual producer not able to handle increased costs & scale of output affected adversely the formulation of viable projects, gains limited to part time employment; Under competition tiny / small industry units were edged out with the withdrawal of support during post-liberalization;

Limited attention to co-product development in socio-technical frame:

In order to use extensively local engineering capabilities and materials for building the local economy as a system there was the challenge of substitution of non-local products by innovations using local resources mainly e.g. replace stainless steel vessels by glazed clayware and, if necessary, metal bottom or internal pipes, etc. for heat transfer.

Non-conventional energy sources biogas / biomass gasifiers were not suitably integrated into industrial activities requiring machines. The focus was more on providing non-conventional energy sources for the purpose of cooking and lighting.

Technology for co- products and by-product formation was given very little attention. (Panditrao, Y. A., 1994).

Technologies capable of strengthening inter-links in the local economy by developing input output relations among existing occupations, in terms of specific products and services were ignored. Economies of scale and scope were needed to be realized.

Frame II
Nehruvian Approach

- **Frame II suffered from the primitive notion of structural competitiveness; it followed essentially the approach of downsizing,**
  - CSIR treating rural technology generation as a spin-off activity from its main mission of catch up in modern science based industry, CSIR persisting with technology push methodology for the rural sector, only 18% of CSIR rural technology users were in production and the rest have either not started or have chosen to discontinue the production
- **Achievements & Limitations of Frame II when combined with LTS: the case of dairy industry**
  - Amul one of the biggest Indian brand in dairy products started the journey of its long career in CSIR , CFTRI developed a process to make condensed milk powder from buffalo milk, NDDB chose to adopt the LTS heuristics to develop all the dairy products and systems around, but when the vision of cooperatives and LTS socio-technical imagination were combined in the case of dairy sector success came at the cost of indigenization;
  - NDDB under the leadership of 'Milk man' Kurein, known for the development of state enterprise in cooperative mode where millions of farmers are shareholders, developed the approach of large scale processing by introducing pasteurization of milk and nitogen cooled vans and milk storage requiring the facility of refrigeration which most of the poor households lacked.
  - Milch cattle using a higher level of maintenance investment created from foreign breeds for which the poor lack resources, leading to the neglect of local productive breeds, Failure to upgrade peasant-artisan economy as a system; local, regional & national components not set up in complementary fashion

Frame III: Community and Tradition Transformation

Socio-technical systems and social carriers assembled right from the start for wider diffusion; though also appropriate to existing situations but these designs ultimately seek to transform & contribute to structural change

- Flayers distinguish themselves from tanners; community transformation challenge
- Tech upgrading undertaken because tanning unit was not able to enroll flayers who allowed their carcasses to dry and digest in open;
- Carcass chopped & cooked in a specially designed cooker under 35 psi pressure for 2-3 hrs.; tallow tapped off, cooked flesh separated from digested bones, meat meal & bone meal produced; bones crushed in a bone crusher & passed through vibratory sieves to make bone meal for poultry feed or bone ash as excellent ;
- A typical unit would cover 12 villages with 4 carcasses per day ; mother unit & 3-4 satellite units processing 8 carcasses at a capital cost of Rs. 8-12 lakhs (working capital incld), providing 4 and 12 flayers employment income & annual turnover of Rs 20-30 lakhs

•More examples demonstrated in the field: Fruits & vegetable processing", silvi-agri-pastoral cover development, "Milk processing & dairy farming,", rural engineering & energy, plant based health systems

Honeybee Network
Framing in the Era of Market Governance

- Honeybee network successful in including the socially excluded innovators and helping some of them to create business
- Success realized in respect of the insertion of the "non-formal grassroots innovators" into the conventional processes of recognition and reward and promotion by the government
- Scaling up of innovations in a select set of technological artifacts.

HBN Frame and Heuristics

HBN following the pathway of leaving to the individual producer to operate and grow in the market without changing the organization of production.

- "Scope of HBN interventions" still insufficient for the "system of production and innovation" to be upgraded

Pro-poor and environment friendly innovation making impact for socio-ecological change still limited.

Economic background of innovators in various modes of diffusion

	Poor	**Self-Subsistent**	**Financially Stable**	**Unable to assess**
Innovator entrepreneurs	7	18	17	-
Innovators seeking support	5	3	-	-
Diffusing innovation openly	6	13	15	2
Transferred technology	2	4	-	-
Seeking technology transfer	2	6	-	-
Not-seeking diffusion	11	43	30	4

Distribution of innovative potential of innovators in various modes of diffusion

	Single Innovation	**Many Innovations (Serial Innovator)**	**Unable to assess**
Innovator entrepreneurs	19	22	1
Innovators seeking support	3	3	-
Diffusing innovation openly	15	20	1
Transferred technology	2	4	-
Seeking technology transfer	2	6	-
Not seeking diffusion	52	35	1

Pattern of distribution of knowledge sources

Nature of source	Number
Local and traditional knowledge	44
Observational and Experiential knowledge	24
Traditional + Modern scientific knowledge	6
Modern science and engineering knowledge	108
Unclear	6

Number of innovations in various sectors of application with respect to different modes of diffusion

Sector	Innovator Entrepreneur.	Seeking Enterprise support	Diffusing innovation openly	Technology transferred	Seeking tech transfer	Community Knowledge	Others
Plant breeding & pest management	11		19	1		1	19
Farm tools/ machinery	9	1		2			13
Irrigation/ Water Management			1				3
Agro-processing industry	5	3			1		8
Animal Husbandry	4		5				
Herbal/ local medicine			4			1	
Industry (nonagricultural)	4		1	3	6		10
Household/ small technicians	9	2	4		1		21
Small craftsmen/ artisans			1				7
Public utilities			1				1

Design of socio-technical systems for SD
System thinking matters

Success of leaf cup production due to system thinking; paper & plastic plates were given a strong run by this innovation in the process of competition; Leaf cup making machine developed with both pedal / motorized version, back up in die creation; The role of PTC Patna, committed scientist as a knowledge intermediary

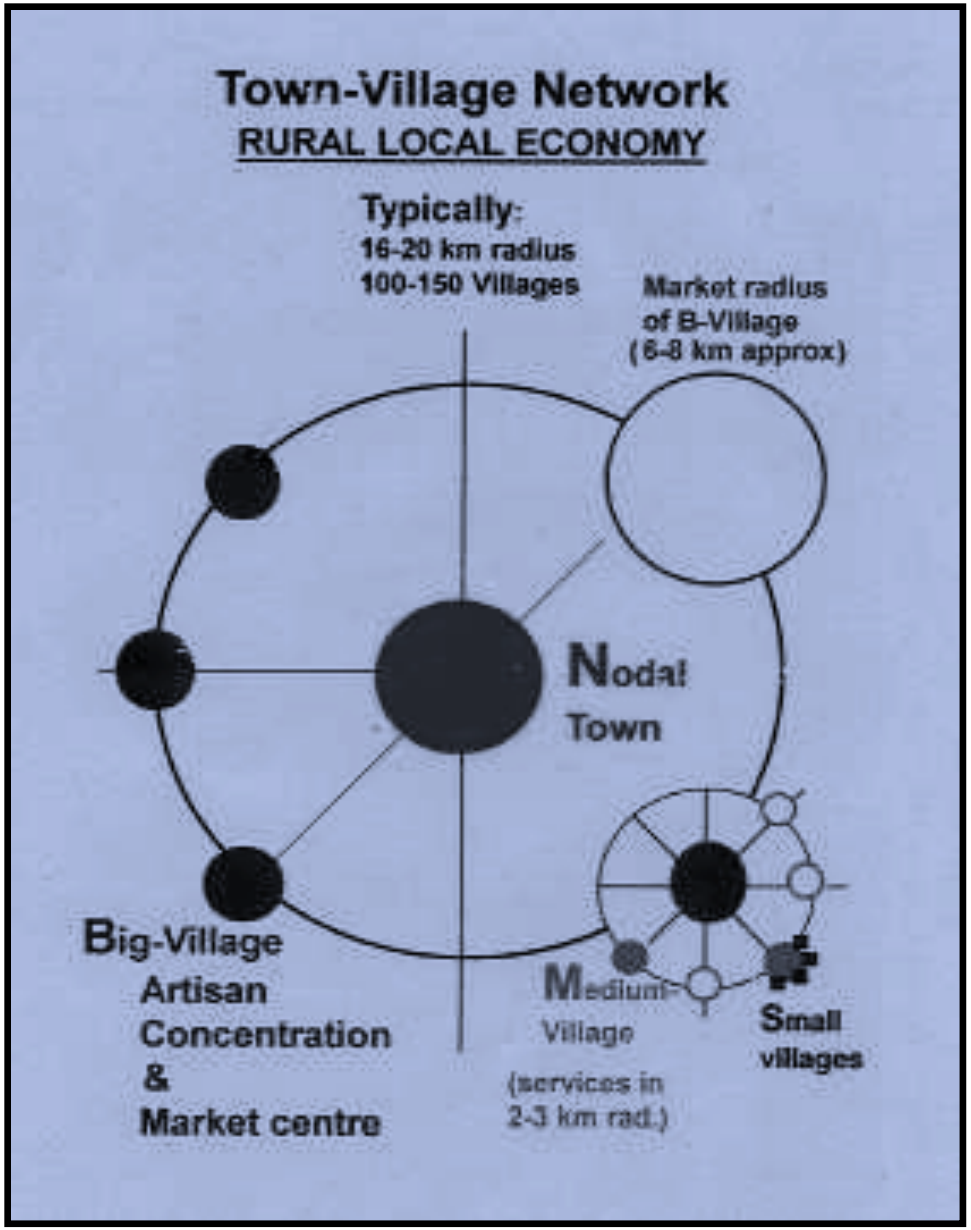
Development of hand pump attachable iron removal plants, low cost culverts for rural roads, red clay based sanitary wares, cook stoves, biogas units and many other such technologies that use local raw materials & skills; ***but not widely diffused for the reason of lack of suitable social carriers and technologists failing to see the systemic dimension.***

Technologies for pre-fabricated building components, fire retarded roofs and the two-pit latrine system, ***while possible but not widely adapted due to the lack of suitable social carriers.***

Single innovations but socio-technical design of Mitti-cool, milking machine reflect local endowments and scale requirements

Success in GRI came with the emergence of frame III: System thinking & creation of new social carrier s of socio-ecologically just innovation

- **CLRI developed an improved process of vegetable tanning; failed to commercialize the process in face of inertia and embedding of industry and labs in an earlier trajectory, PSM came with its intervention, some success followed, national leather technology mission formed,**
  - Strategies chosen for the cooperation among tanners flayers and product makers played a critical role; Shift from ties and trust to brokerage based scaling up strategies, assembling of social carrier of innovation for group entrepreneurship and the formation of FG, TG & SG
  - One million artisans; Tech upgrading using Frame III of NTSI for cooperation in production , process on shelf in CLRI
  - A typical network of leather artisans in roughly a block of 80 settlements, with a nodal training unit to which village level flayers bring new hides for improved vegetable tanning
  - Improvements introduced for productivity using local tannins , quality product, diversified production & effluent treatment, clean processes
  - 10 FT tanners, 30-50 product makers in the system ; processing 10-12 hides per day; Rs 6-8lakhs (+ working capital) capital cost); 12 lakh turnover; 4 lakhs worth income
  - Value addition & employment generation; youth being able to improve social status
- Experience of fruits and vegetable processing, tank management, stoves, biogas, etc.


Town-Village Network
RURAL LOCAL ECONOMY
Typically:
16-20 km radius
100-150 Villages
Market radius
of B-Village
(6-8 km approx)
Nodal
Town
Big-Village
Artisan
Concentration
&
Market centre
Medium-
Village
(services in
2-3 km rad.)
Small
villages

Strategies for scaling up

Shift from ties to brokerage Local economy, economies of scale & scope; FGs, TGs and SGs

Enhancement of access to capabilities, resources & markets in local economy via multi-sectoral cooperation of the poor in production to achieve economies of scale & scope requiring local (taluk) and not economy of merely an individual producer or of village to be upgraded as a system in itself,

- **Developing user capability for continuous technology improvement & the development of systems for multi-sectoral cooperation**
- **Assembling of social carriers & institutional development for technology user capability development and multi-level planning**

While there exists the estimated potential (3500 local economies), mapping in the 90s for the development of potential to be upgraded as multi-sectoral network involving more than twenty sectors ,

- **Wider support needed for the creation of worker-peasant alliance in order to prepare the people for structural transformation;** PSMS aim for the construction of a new path for the creation of alternate development paradigm and the establishment of contact zones for structural transformation through the development of n**etwork system of innovation making for the development of peoples' technologies**

Broad Findings from the experience of innovation making by the PSMs and Honeybee Network

Socio-technical frames of sustainability transition play an important role in the realization of aims of SD in a holistic manner---*problem formulation (diagnostic), prognostic (vision for solution building) & motivational aspects of frames deployed by the social movements for making of transformative socio-ecological innovations*

Strategies deployed for scaling up of the innovations by the grassroots innovation movements tell us about- the *need to make a shift from ties and trust based to brokerage based systemic processes for the development of new social carriers of innovation for the realization of goals of SD*

PSMs and Honeybee Network's experience tell us about *the challenge faced by the social movements in respect of the development of appropriate heuristics for the opening up of knowledge systems for SD (**Need assessment, User capability development, Continuous development of socio-technical system, Network development)***

Some further examples of the outcomes from the strategies chosen to deal with the dilemmas & challenges

Pursuing an assembly of complementary strategies:

combining scientific temper and capability development, functional literacy and continuing education programme under development; development of peoples' health movement ; Nai "Nai Talim" and many other such tools

Appropriate design of socio-technical system necessary but not sufficient: wider political support for the creation of agency demands forging of an effective worker-peasant alliance on the ground.

"NPM to agro-ecology based rural development,

PSMs experiments in rural industrialization

Some more examples of the challenges facing w r t the construction of pathways needed for the forging of socio-technical alliances

Bio-farming based rural development;

Banking on biomass for socio-ecologically sustainable development,