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## RURAL SUSTAINABLE DEVELOPMENT AND SELF RELIANT TECHNOLOGY APPLICATION: WOMEN EMPOWERMENT PERSPECTIVE



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### ABSTRACT

Technology enables rural people and local communities to become self reliant. Self reliant technology can promote participation of the people which in particular can benefit the economy and society in many ways. Any technology strategy should be need-based, people-centered, eco-friendly and culture-specific. In rural areas, choice and role of appropriate technology in relation to women and development became crucial in building up local capacity to devise solutions to tackle the identified problems to improve their quality of life. While focusing on overall rural development through technological intervention, one has to ensure that the ultimate goal is to bring about sustainable development, which should be linked to the carrying capacity based developmental planning by analyzing the underlying co-relationship between poverty, gender and environment. Participatory technological development and dissemination is a necessary process that has to be set in motion to develop sustainable technology models for replication which will have an impact not only on the economic sphere, but also on the social, political, cultural, moral and environmental levels in rural production system. This paper explores how scientific and technical interventions can improve the quality of life of women in rural areas. The experience has brought to light the fact that there is vast potential, intelligence, strength and ability in our rural women that can be tapped and used for sustainable development. This paper also shows that several factors and approaches are crucial for technological empowerment of women as well as to ensure sustainability at the grass root level.



**KEYWORDS** : *Sustainable development, Women empowerment, Technology, Rural development and Rural women.*

### INTRODUCTION :

In India, rural women are extensively-involved in farm operations & agricultural activities from planting to harvesting and post-harvest operations, their knowledge as seed selectors, in seed storage & seedlings production, livestock management, post harvest processing of livestock and fishery products, processing of non-timber forest produce (NTFP) has contributed a lot to the viability of agro-diversity and production in the highly diversified Indian regions. In terms of grassroots realities, traditionally they have been using and managing natural resources, collecting food, fodder & fuel,

NTFP products, medicinal plants etc. for their livelihood, They possess vast knowledge of eco-system and properties control over such resources and right to land is negligible which are mainly dominated by men.

In the village, the environment related problems also contribute much to the degradation of productive resources: the land, the soil, water and forests. Ecological destruction through deforestation, population pressure, urban consumption pattern & rapid industrialization, wrong land use practices and degradation of village commons have displaced rural woman from productive activities - diminishing their means of livelihood. As a result women spent more time to cover long distances in search of food, fuel and water in addition to work in the field and at the household level. A study by Development Alternatives, Delhi in the Bundelkhand region of central India reveals that an average woman in that region spends up-to four hours a day fetching water. Another study, in Orissa, Eastern India, shows that women walk an average of 7 from 1.7 kilometers 20 years back. A recent study conducted by the Centre of Science & Environment, Delhi in Himalayan village in Chamoli, UP unfolds that women spend 59% , children 36% and men 15% work hours every year confirming back – breaking workload on rural womenfolk. Their misery is also compounded by the migration of male population from rural to urban areas in search of employment. Extensive studies also show that women producers have poorer access than men to all resources from land to credit and technology. In such conditions and prevailing social constraints, rural women used to work in a labour-intensive and non-monetized economy, thus, become victims of exploitation. These are perhaps, the alarming indicators about the Indian rural women, whose work is filled with drudgery and hardship – leading to feminization of poverty, thus, in real sense excluding them from full participation in developmental efforts to eliminate poverty.

In view of above and ground realities (Box-1), there is a growing perception about the link between gender, perspective, development and environmental concerns. Therefore, to bring people and nature back in balance and harmony along-with development, needs is to innovate and deliver sustainable rural technologies for sustainable livelihood by which women do not get marginalized in their communities.

Since rural women have special understanding of natural resource management & more sensitive to environment, they can play a crucial role in re-nurturing and re-greening rural India. Need is to use S& T to ease women's workload inside and outside the house involving them as equal partners, recognizing their knowledge, experience and the significant role they can play in sustainable development. In this process, emphasis should be given to reduce the number of government intrusion to stop digital divide among women and also to more empowerment for women with technological usage.

**BOX-1: Women & Rural India: Key Facts & Figures**

- ❖ Indian population comprise of 48.1% women & 51.9% men.
- ❖ Rural population: 71% of India's population. Farm production: 55-66% of total labour.
- ❖ Male-based sex ratio: Rural areas: 9.4%; Urban areas: 8.9% ,
- ❖ Work 1212h a man and 3485h a women.
- ❖ 70% of the population earns their livelihood from agriculture.
- ❖ Work force participation rate of women: 22.7 (male 51.6%) Rural areas: 27.2%, Urban areas: 9.7%
- ❖ Agriculture & allied sectors employ 89.5% of total female in rural India.
- ❖ Female literacy: 38% as compared to male literacy rate of 66% Rural areas: 30.4%; Urban areas: 63.9%
- ❖ Rural poverty: 39% and Urban Poverty: 30%
- ❖ Proportion of Pregnant women with anemia:88%
- ❖ Human Development Index rank and gender- related Index rank: same 105 out of 146 countries – indicating low life expectancy at birth, low educational attainment, low income and gender disparities
- ❖ Women have heavy work load with dual responsibility for farm and household production
- ❖ Women's average contribution in overall farm production: 55-66% of total labour.
- ❖ In the Indian Himalayas a pair of bullocks works 1064h, a man 1212h and a women 3485h in a year.
- ❖ Taking the economy as a whole, women perform two—thirds of the work, but, earn only one – tenth of the income.
- ❖ Inter-state and intra – state variations in gender roles in agriculture, environment & rural production
- ❖ Unequal access to land & property rights.
- ❖ 90% women in forest & tribal belts earn their livelihood by carrying heavy loads on their heads.
- ❖ In dairying 75 million women are engaged as against 15 million men, while in animal husbandry the ration is 25 million to 1.5 million.
- ❖ Country is loosing 1.5mha of forest cover annually, whereas fuel-wood contributes to 84% of the total household energy consumption in rural India- contributes to hardship for women.
- ❖ A Chulha-user inhales 40 mg of carbon monoxide (CO) per kg of woods as against 17 mg/kg & 43 mg/kg of CO inhaled by active and passive smokers respectively: injurious to health.

Source: Census of India,2001; UNDP Human Development Report,2006

**3.OBJECTIVES OF THE STUDY**

The main objectives of this paper are as follows:

- ▲ To explore the participatory technology modulation/ development which are environmentally compatible and socio-economically sustainable;
- ▲ To study the need identification and technology gaps as perceived by women in rural areas;
- ▲ To promote gender based equity in access to S & T based benefits as an integrated component for sustainable rural development;

- ✦ To analyze the sustainable technology models for women empowerment visa-vis rural sustainable development;
- ✦ To assess the impact of economic and social perspectives of women workforce in rural sustainability;
- ✦ To make awareness and technology capacity building among women-owned enterprises and equal access to opportunity and employment.

#### 4. METHODOLOGY

The study is basically based on secondary data. Data have been collected from various sources like journals, books, manuals, websites, and reports of the state concerned for literature part. Data have been interpreted with the help of statistical devices.

#### 5. NEEDS: GENDER PERSPECTIVE

**Empowerment & Sustainable Development:** While focusing on overall rural development through technological intervention, one has to ensure that the ultimate goal is to bring about sustainable development which should be linked to the carrying capacity based developmental planning by analyzing the underlying co-relationship between gender, poverty and environment. A study by the Institute of Economic Growth, Delhi has indicated that the gender, environment and poverty (GEP) vulnerabilities overlap in some regions and GEP gaps in the states were found to be highest in Northern India followed by South and North-East India. Therefore, measurement of sustainability is the immediate challenge. The visible indicators of sustainability, whether qualitative or quantitative, have also indicated loss of bio-diversity, degradation of resource base in many areas. It is true that with the green revolution technology, India has achieved self-sufficiency in food grains. According to FAO, the most disadvantaged of all are women, the "silent majority" of the world's poor. Studies indicate they have title to only a fraction of farm land, though rural women produce up to 80% of food in the developing countries and access to just 10% of credit and 5% of extension advice.

The term "Empowerment" has been widely used in relation to women. Today, it is used more often than terms like women's welfare, upliftment, development, equality, efficiency or awareness raising. Women's empowerment should lead to the liberation of men from false value systems of oppression. It should lead to situation where each one can become a whole being, regardless of gender and use their fullest potential to construct a more humane society for all. The question really is how to empower women. They have been oppressed and suppressed for a long time. Such trends demand innovative approaches, institutional development, awareness and education and socio-economic motivation for economic development and environmental soundness which are complimentary to each other. But, such development at village level can be sustainable only when social and economic processes are more equitable, efficient and endogenous. Need is to weaken the culture of silence and dependency and promote the process of empowerment. Thus the promotion of gender based equity in access to, and control of productive resources; access to research and extension service benefits; enhancing women's participation in decision making process at all levels must be pursued in order to address the root causes of persistent poverty and food insecurity among rural women and the families they support. In this process, focus must be given for technological empowerment of women with skills and critical thinking that fosters a sense of self-reliance and ability to evaluate what is beneficial or detrimental to their interests as well as the factors contributing to the degradation of environment and unsustainable development. Here women's empowerment is operationally concerned with the genuine empowerment through education, ideas, consciousness, mobilization and participatory



approach to improve their lives in practical way, which would ensure a sustainable future for rural India. This is where sustainable development must have its roots. Priorities should be on activities whichever easily manageable, require low external inputs, contribute to family nutrition, easily marketable, provide regular income and create assets o direct benefit to woman. Technology must ensure sufficient production of food, fodder, fuel, energy, clean drinking water supply and fertilizers without spoiling and damaging the environment. Thus, drudgery should be reduced both at household related tasks & occupational tasks. This would energise rural women to move towards active and useful participation in other economic activities and in the overall technological transformation of the society.

More attention needs to be paid on gender sensitization in research and technology and to work towards bridging the gender gap. The need is to promote gender based equity in access to S & T based benefits as an integrated component for sustainable rural development. This will improve access to affordable and environmentally sound technologies and generate meaningful employment in the local economic structure.

## 6. CHOICE OF TECHNOLOGY

For environmentally sound sustainable development, technology choice can have a critical impact on many aspects of women's empowerment. Especially the way we choose it, the way we innovate and design it and the way we deliver it. A technology maybe appropriate to a woman if it reduces their drudgery, improves their environment, improve their skills and enhance their comforts. Schumacher defies it as "the technology of production by the masses, making use of the best modern knowledge and experience that is conducive to decentralization, compatible with the laws of ecology, gentle in the use of scarce resources and designed to serve the human person instead of making him the servant of machines", According to another view, the technologies should upgrade traditional skills and capabilities; minimize fatigue and reduce drudgery; be innovative and capable of easy assimilation; generate significant and assured added value to existing methods of operation; generate employment and use local resources, need low capital investment and should result in low cost production of goods; be capable of replication and adoption and should blend harmoniously with existing environment for self-sustainable development of the rural women and community as a whole.

In rural scenario, choice & role of appropriate technology in relation to women and development became crucial in building up local capacity to devise solutions to tackle the identified problems to improve their quality of life. The emphasis should be to improve to understand skills, provide managerial capabilities and to understand the science behind the processes/ products. This will inculcate a scientific temper and make them more open to improved/ emerging technologies for improving production efficiency and reducing drudgery in their day to day work.

Women can participate in technology in three ways as consumers of technology, as producers of technology and change agents in dissemination of need based technology. Some of the emerging technology which are directly beneficial are energy technology & small scale bio-technologies for sustainable agriculture, while others like information and educational technologies offer lots of scope to overcome the barriers of illiteracy, lack of education and participation in development and adoption of such technologies. Livestock enterprise with appropriate production technologies also offers immense potential for social transformation of rural women's lives. This will help them to strengthen both nutrition and livelihood security. In terms of emerging technologies biotechnology offers a powerful capacity to produce science based products like bio-fertilizers, biocide, microbial culture and vermi-culture for sustainable agriculture; tissue culture based production of fuel, fodder and commercial species of plants, fertility control vaccines for population control; improved production

and productivity of cattle and buffaloes using embryo transfer techniques and conservation techniques to tackle narrowing genetic base to meet the needs of rural womenfolk in particular & community as a whole.

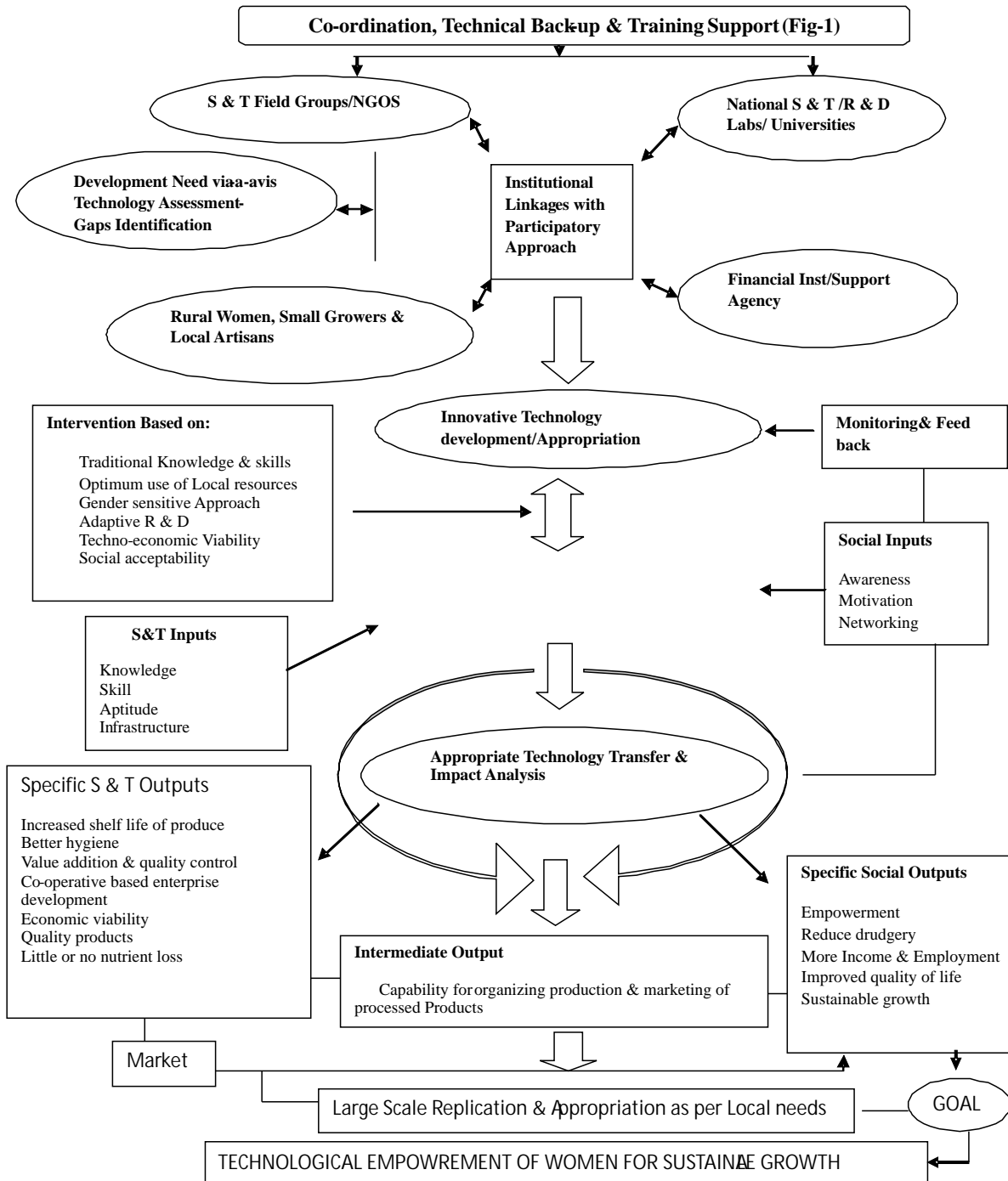


Fig-1: System Approach For Participatory Technology Development & Transfer At Village Level

### 7. TRANSFER OF TECHNOLOGY AND MODULATION WITH SYSTEMS APPROACH

For effective transfer of technology, it is essential that various inter-related components of the technology, namely, "hardware" (materials such as crop variety), "software" (technical know-how,



information), "Human ware" (human ability)," orgaware" (organizational and management aspects) and the final products (including marketing) are rendered accessible to rural women as consumer / end-users. In fact, a large number of technologies and institutions dedicating themselves for scientific and technological research work are available. But there is a need for 'systems approach' to modulate and transfer technology to the field as user and environmental friendly and cost effective so as to have easy adaptability and reliability. Thus, focus of technology development and transfer would be to a problem solving approach rather than merely developing products or processes for the benefit of rural women and society.

An effective technology development and transfer process should, therefore, involve the following steps:

- + Need assessment : need identification and technology gaps as perceived by women in the village;
- + Identification of technology source (S & T institutions);
- + Maximum utilization of local resources which can be sustained economically and ecologically; skills and markets;
- + Participatory technology modulation/ development which are environmentally compatible and socio-economically sustainable;
- + Self -sustaining S & T base in rural areas to facilitate participatory planning, designing, execution and monitoring of chosen technologies: technology development, field testing, demonstration & training and finally dissemination to meet the local needs;
- + Setting up of viable S & T based micro-enterprise in rural areas and linking them with national S & T institutions/labs for adaptive R & D based on field generated specifications ;
- + Qualitative shift in production/distribution from household models to collective, networked "industrial forms for higher productivity, incomes and reduced drudgery;
- + Constant interaction between the innovator, the producer and technology transfer group for technology assessment and further refinement;
- + Last but not least, innovations should be in the spheres of both social behavior and technology to bring about the desired ends of self-reliance, equity and sustainability.

To reach majority of those women who live in the vast areas of rural India, grass-root level voluntary organizations, NGOs with scientific and technological capabilities, provide the crucial link between emerging new developments in knowledge and technology, their modulation and dissemination to strengthen and diversify the rural economy using local resources and material as per women's needs. They can facilitate the articulation of felt needs on one hand, and also match those needs with potential source of technology. However, to make such intervention at village level, it is imperative to consider and emphasize contribution of target groups to the innovations and appropriateness of technology which is made based on their traditional knowledge system and perceptions. This will make them feel part of it as producer or consumer or end user of technology.

Awareness generation and technology capacity building through demonstration-cum-training among rural women about the importance of technology relating to their needs is also a necessary aspect for technology delivery system. The entire technology package will have to be developed based on women needs, which, in turn must be evolved through a detailed scientific micro turn must be evolved through a detailed scientific micro turn must be evolved through a detailed scientific micro planning exercise. Thus, appropriateness of technology delivery system through S & T base would

revolve around effective education and learning process to facilitate the development of creative, innovative and autonomous capabilities in individual woman and women's groups through attitudinal/behavioral changes to promote evolution and transfer of environmentally sound technologies.

There are several organizations with strong grassroots base active in rural India to represent the poor's interests. The development approach of several of these based on the above systems approach have resulted in sustainable models of activities, where application of science and technology have resulted in improving living conditions as well as new opportunities for gainful employment to rural poor, including women. For instance, the collaborative program between the Council for Advancement of People's Action and Rural Technology (CAPART), New Delhi, and the Department of Science & Technology (DST), New Delhi, has taken up large scale replication of some of the technology models as package of appropriate technologies involved and proven by the latter through their partners. In this endeavour, one of the most successful models recently developed is in food processing sector involving women as 'primary stakeholders' at all levels as producer, as consumer and change agent from designing to adoption of cost effective technology package to suit local needs.

## 8.CONCLUSION

Technological interventions can improve the quality of life of women in rural areas. The experience has brought to light the fact that there is vast potential, intelligence, strength and ability in our rural women that can be tapped and used for sustainable development. This also shows that following factors / approaches are crucial for technological empowerment of women as well as to ensure sustainability of development programme at the grass roots level:

- + Gender- sensitive planning at the local Panchayat level with gender/sex- segregated information to support S & T based developmental efforts in rural production system.
- + Gender integrative participatory technology development/ appropriation.
- + Eco-restoration and employment generation through judicious use and transfer of appropriate technology package appropriated with involvement of women at all levels both as "change agent" as well as "consumer" of technologies.
- + To deal with rural poverty, need is t deal with ecological poverty through participatory approach for ecological restoration.
- + Proper recognition of the productive and domestic roles of women.
- + To make such intervention successful, other areas of interest and support activities to provide basic facilities like drinking water, health & sanitation, nutrition, family planning, adult education and social security etc, should be taken care for overall sustainable community development to have a catalytic effect. With such support services, access to training and education or participation in economic and social life becomes a reality for rural women.
- + Importance of S & T base in the actual area for effective technological intervention/ to develop location specific technology package taking into account the perceptions of women beneficiaries.
- + Involvement of local women motivator as active "change agent" or "natural carrier" of technology through motivation, talks and audio-visuals, awareness build up through demonstration and hands on the job training in relevant field.
- + Strong institutional linkages between S & T field groups, R & D institutions with an extension machinery to disseminate the proven technological package at grassroots which empowers and enable rural women to seek local solutions and have face-to-face interaction between them and

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scientists for proper scientific know-how.

- + Equal sharing of benefits amongst different stakeholders.

Therefore, participatory technological development and dissemination is a necessary process that has to be set in motion to develop sustainable technology models for replication which will have an impact not only on the economic sphere, but also on the social, political, cultural, moral and environmental levels in rural production system. As in rural areas, the entire activities go around womenfolk and women's active participation should be ensured at every level from planning to implementation stage both as change agents as well as beneficiaries for the achievements of goals of equality and development and empowerment by changing social attitudes and elimination of all forms of gender-based discrimination – will be a guiding factors for any future development planning. Hence, in a country like India having about 5'91,000 villages, each of them covered by one or other programmes of rural development, the need of the hour is to devise strong and well-knit technology delivery systems in identified areas and dovetail them with such programmes, This requires a systems approach regarding needs - identification, choice of technology, appropriate scaling, technology up-gradation, innovation, economical and ecological sustainability and optimum use of local resources with emphasis on technology literacy amongst women through mass communication for up-gradation of skills and capabilities.

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