Technology Connect for Inclusive Development: Innovating for Rural Livelihoods & Green Growth

TARA 25

Science for Equity Empowerment & Development (SEED), Division

Department of Science and Technology

Government of India, Delhi-16

193 Governments have made firm Commitments to Eliminate P and Hunger and Achieve 17 Other Major Development Goals by

India and the SDGs: Can India do it?

Emerging Challenges: Technological Solutions

- **India – Post 2015 : Investing in Sustainability**
- **SDGs – 2030 – to address challenges of poverty, inequality and climate change adaptation & mitigation**
- **Issues of sustainability – transforms to greener and inclusive growth with participatory governance**
- **Role of Technology in social Good initiatives**
- **Technology – Key enablers of new global sustainable development agenda – Conservation and livelihood gains**
- **Technology and innovation that transform people's lives : R&D leads giving back to society - Inclusive Innovation**
- **Role of Technology: focused response to social, developmental & environmental issues : Capacity building at local level**
- **To build technology ecosystems driven by skills and capacities –supported by finance, market and institutional arrangements.**

Key challenges faced by rural livelihoods

Rural livelihoods face challenges with respect to availability, quality, reliability & affordability of power

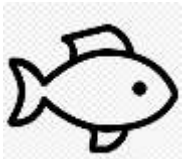
Key Livelihoods

AGRICULTURE & HORTICULTURE

- Escalating diesel prices increases operational cost for farmers (Annual cost of diesel for 2.2 kW pump – INR 30,0000). Erratic power supply impedes efficient operation of post harvest activities- threshing, hulling etc.
- Farm activities like cane crushing, spraying are animal or human powered causing drudgery
- Perishable produce (vegetables & fruits) require uninterrupted power supply to power cold storage facilities.

DAIRY

- Power outages and erratic power supply affect milk testing and weighing, lack of cold storage facilities can lead to spoilage of milk, freshness and aroma



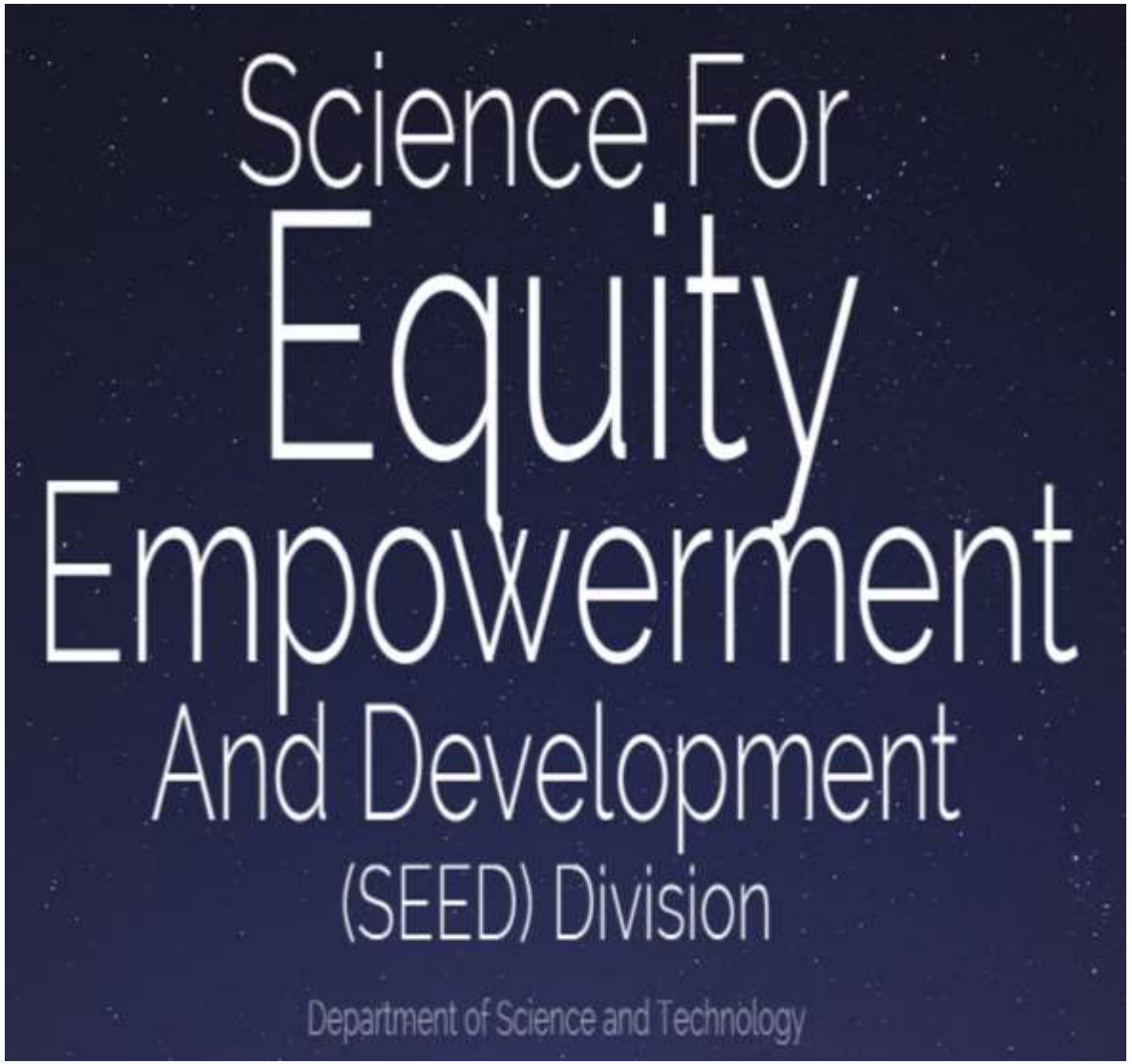
FISHERIES

- Drying fish in open areas is unhygienic, leads to contamination, incidence of birds preying on fish & does not fully eliminate moisture content, reducing shelf life

WEAVING/HANDICRAFTS/ DECENTRALIZED POWERLOOMS

- Lack of quality power supply and low voltage disrupts work & leads to loss of working hours & revenue

SEED, DST: Inclusive Development through Need based Technological Interventions



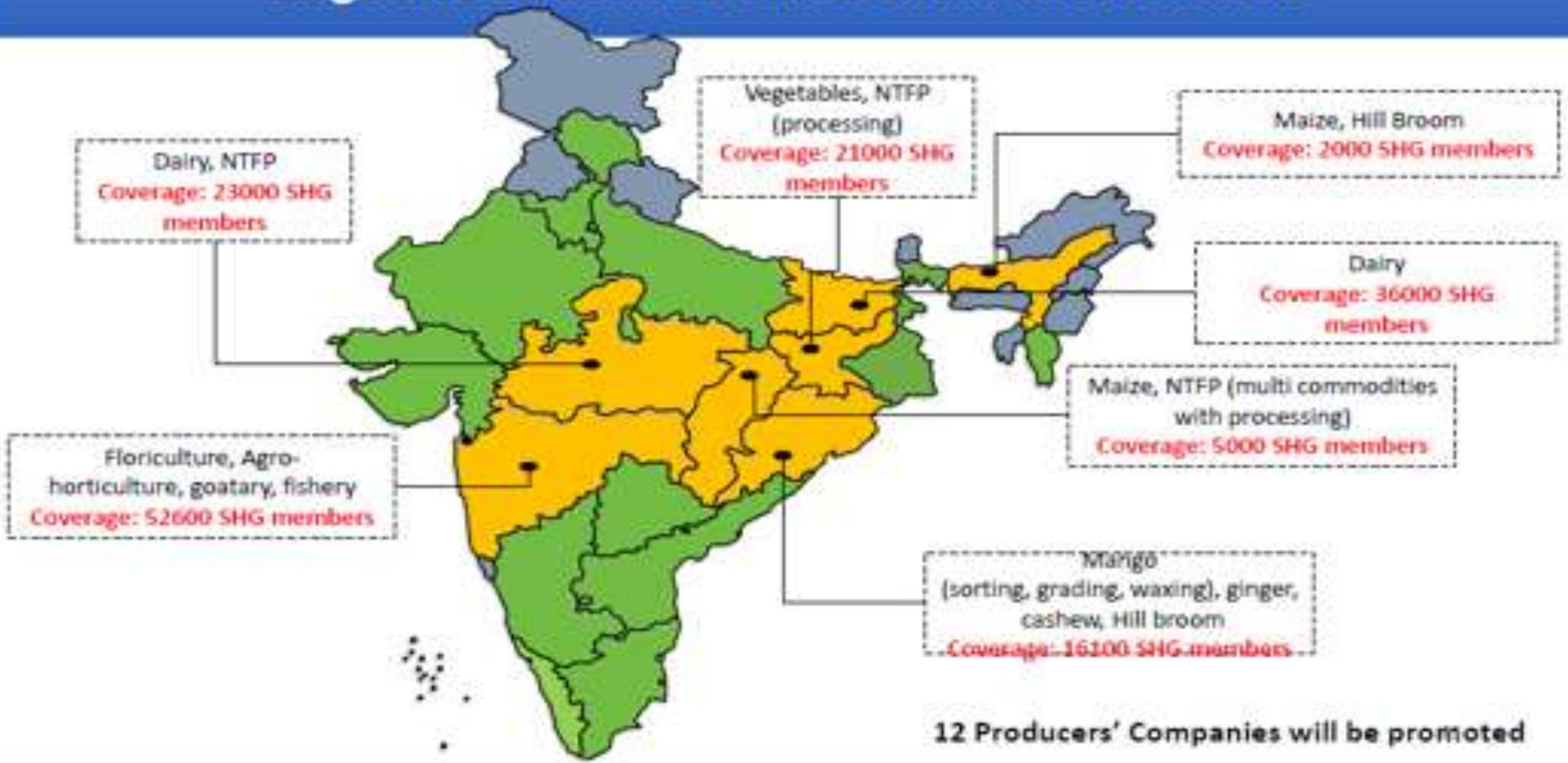
Focus:

- Working for technological empowerment and sustainable livelihoods at the grassroots levels
- Support action oriented and location specific projects for socio-economic up-liftment through technology intervention: Community engagement in technology optimization and adoption

STI Policy -2013:

- Innovation for inclusive growth implies ensuring access, availability and affordability of solutions to as large a population as possible.
- NGOs will be accorded a pivotal role in delivery of STI outputs, especially rural technologies, to the grassroots level

Large Size Structured Value Chain Interventions



Source: **http://rural.nic.in/sites/default/files/NRLM_PPT_PRC16Nov2017.pdf**

Long Term Core Support: Technological Advancement for Rural Areas (TARA) Scheme

OVERVIEW

- **Long-term support to S&T-capable NGOs with proven track record, deep community roots and effective institutional linkages – Active field laboratories**
- **25 + S&T driven organizations supported on specific challenges in identified regions**

PROGRAM FOCUS

- **Long-term Action Research Programs – Support & nurture innovative Ecosystem in rural settings**
- **To develop/deliver need-based & scalable technological solutions through adaptive R&D under field conditions**
- **Support core S&T manpower, otherwise, difficult to retain in grassroots organizations**
- **Support for working technology system with multiplication**
- **Demonstrable replicability and enterprise models**
- **Strengthen a network of S&T capable organizations in the country**

Core Support Groups (CSGs)

Appropriate Rural Technology Institute (ARTI)

BAIF Development Research Foundation

Barefoot College

Centre of Science for Villages

Development Alternatives - Technology and Action for Rural Advancement

Gorakhpur Environmental Action Group (GEAG)

Himalayan Environmental Studies And Conservation Organisation (HESCO)

Himalayan Research Group (HRG)

M. S. Swaminathan Research Foundation Community Agrobiodiversity Centre

Madhya Pradesh Vigyan Sabha

Mitraniketan

NB Institute for Rural Technology(NBIRT)

Peermade Development Society (PDS)

Rural Communes

Sardar Patel Renewable Energy Research Institute

Shri AMM Murugappa Chettiar Research Centre (MCRC)

Society for Economic and Social Studies, Centre for Technology and Development

Society for Energy Environment and Development (SEED)

Society for Technology and Development (STD)

Technology Informatics Design Endeavour (TIDE)

Vigyan Ashram

Vivekananda Institute of Biotechnology

Vivekananda Kendra - Natural Resources Development Project

WWF

TARA: Innovating for Rural Livelihoods & Social Enterprises

SEED Division of DST has taken initiative under the Technology Advancement for Rural Area (TARA) scheme to provide location specific technogolical solutions on specific challenges in rural areas. These innovative technologies are developed & scaled up by Core Support Groups involving local community. (www.dsttara.in)

Line Sowing Marker
for Crop Sowing in Hills
-Himalayan Environmental Studies and Conservation Organisation, Dehradun

Egg Incubator for
Marginal Farmer
-Vigyan Ashram, Pabal, Pune

Solar Tunnel Dryer
-Sardar Patel Renewable Energy Research Institute,
Vallabh Vidyanagar, Gujarat

Compact Biogas System
-Appropriate Rural Technology Institute, Pune

Induced Breeding for Production of Fish Spawn
-Vivekananda Institute of Biotechnology, Nimpith, WB

Solar Water Heater for
Mountain Area
-Himalayan Research Group, Shimla

Multi Fibre Extraction Machine
-Centre for Technology & Development, Delhi

Motorized Winch for Chinese Fishing Net
-Mitraniketan,
Thiruvananthapuram

Micro Solar Dome
-NB Institute for Rural Technology, Tripura

Technology for Testing
Soil & Leaves
-Shri AMM Murugappa Chettiar Research Centre,
Taramani Chennai

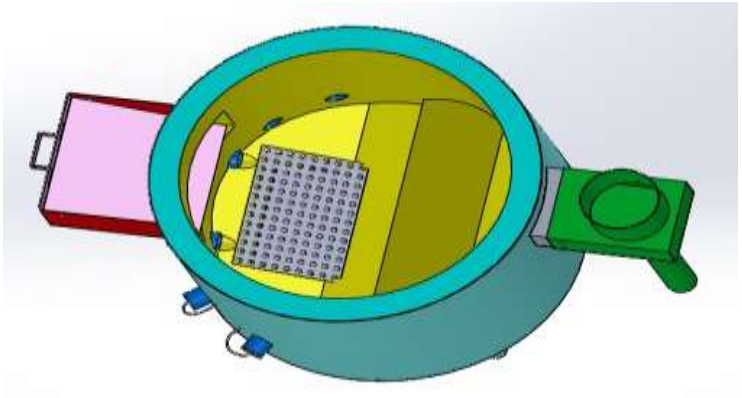
Solar Dehydration Technology
-Society for Energy Environment and Development, Hyderabad

Fuel Efficient Wood Burning Stoves
-Technology Informatics Design Endeavour, Bangalore

Design and Development of Dehusking Machine for Minor Millets
-Madhya Pradesh Vigyan Sabha, Bhopal

Cardamom Washing Machine
-Peermade Development Society, Idukki, Kerela

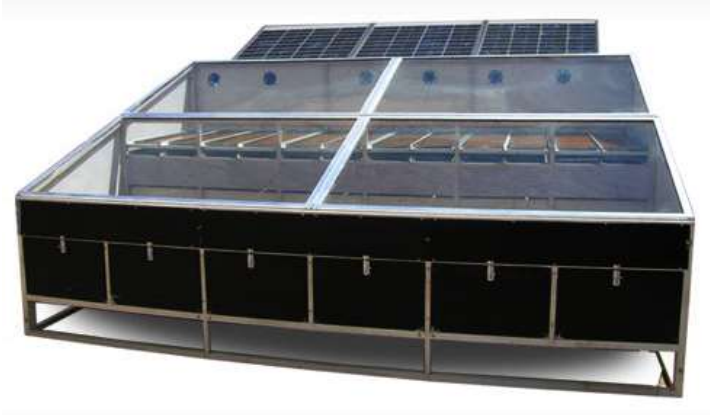
Waste to Weave Technologies
-Development Alternatives,
New Delhi



Cooking Devices developed by TIDE, Bangalore	Micro Solar Dome and its Usage : Designed by NBIRT, Tripura

Energy Efficient Devices developed by Core Groups with reduced Carbon Footprints: Clean Energy Access Products for Social Enterprise & Livelihood Gain

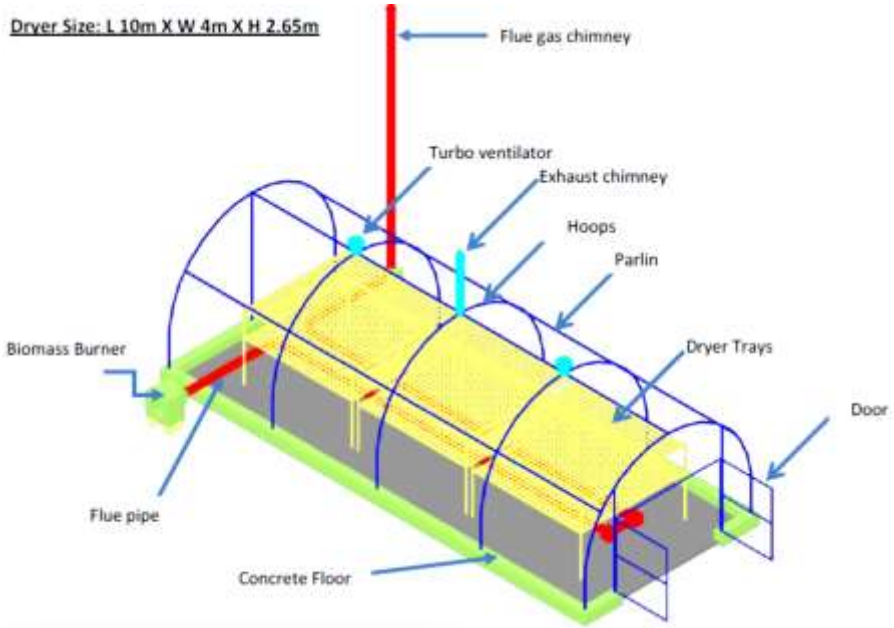
TECHNOLOGY ADOPTION

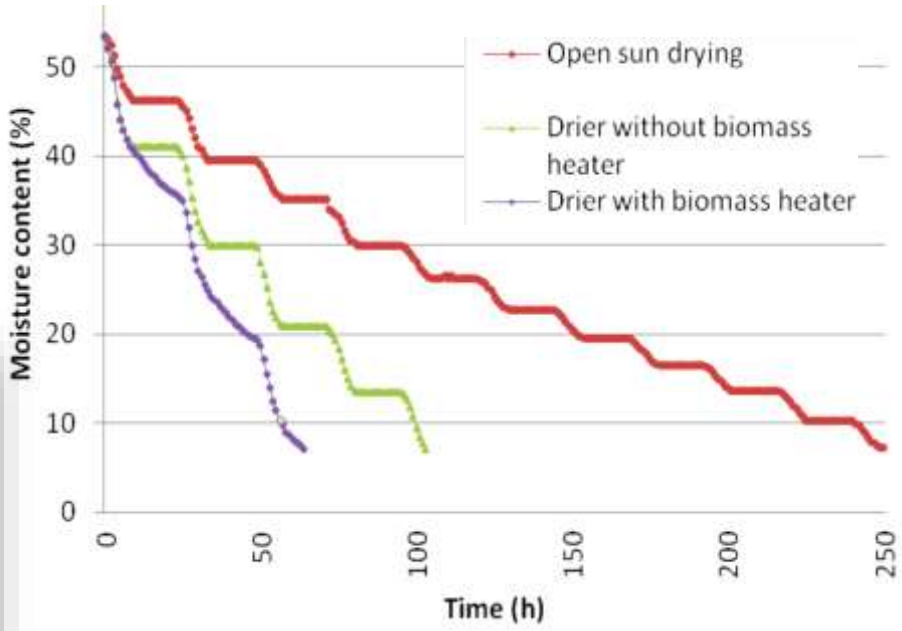


Solar Dryer developed by SEED, Hyderabad – technology adopted by HESCO

Biomass based tray dryers developed by TIDE, Bengaluru – adopted by many NGO's in Himalayan Regions

TECHNOLOGY MODULATION (ADAPTIVE R&D)





Technology Transfer Overseas

Australian Entrepreneurs from Byron Bay Pty. Ltd.

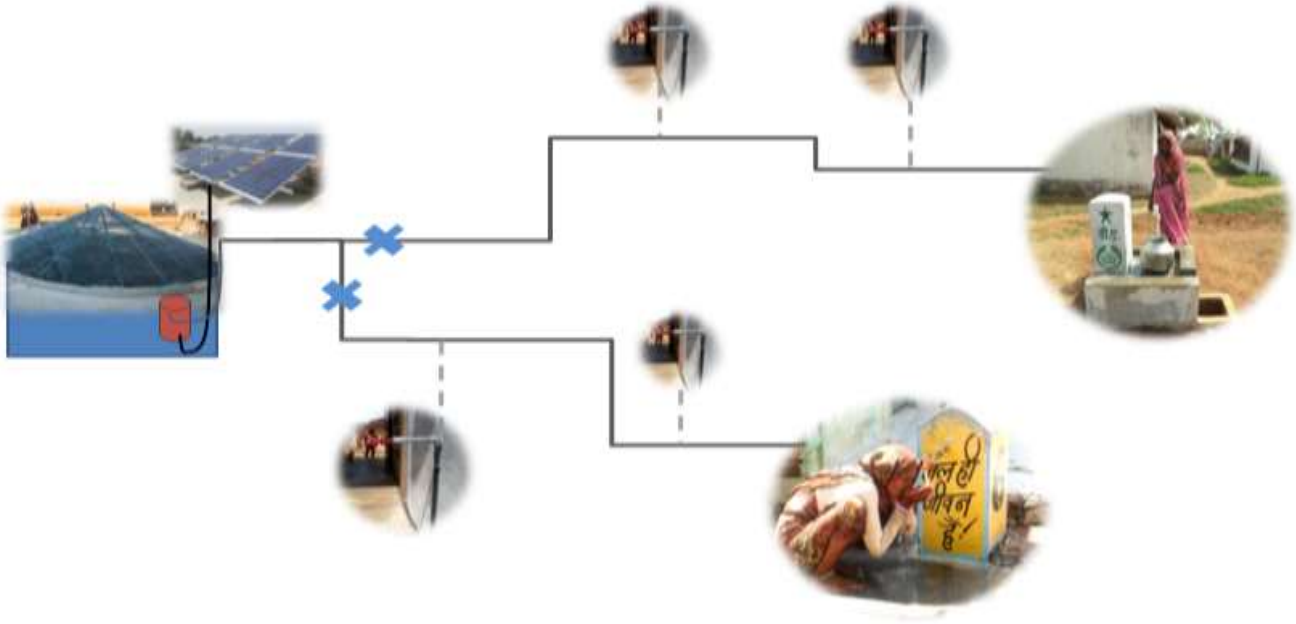
Drying of Fish at Mauritius by Lyons fishermen co-operative society.

Training Program on Fruit Bar Processing for M/S. Honey Foods, Saudi Arabia

Training on Fruits & Vegetable Processing

GREEN ENERGY FOR DRINKING WATER

Sustainable and Safe Access to Water for all



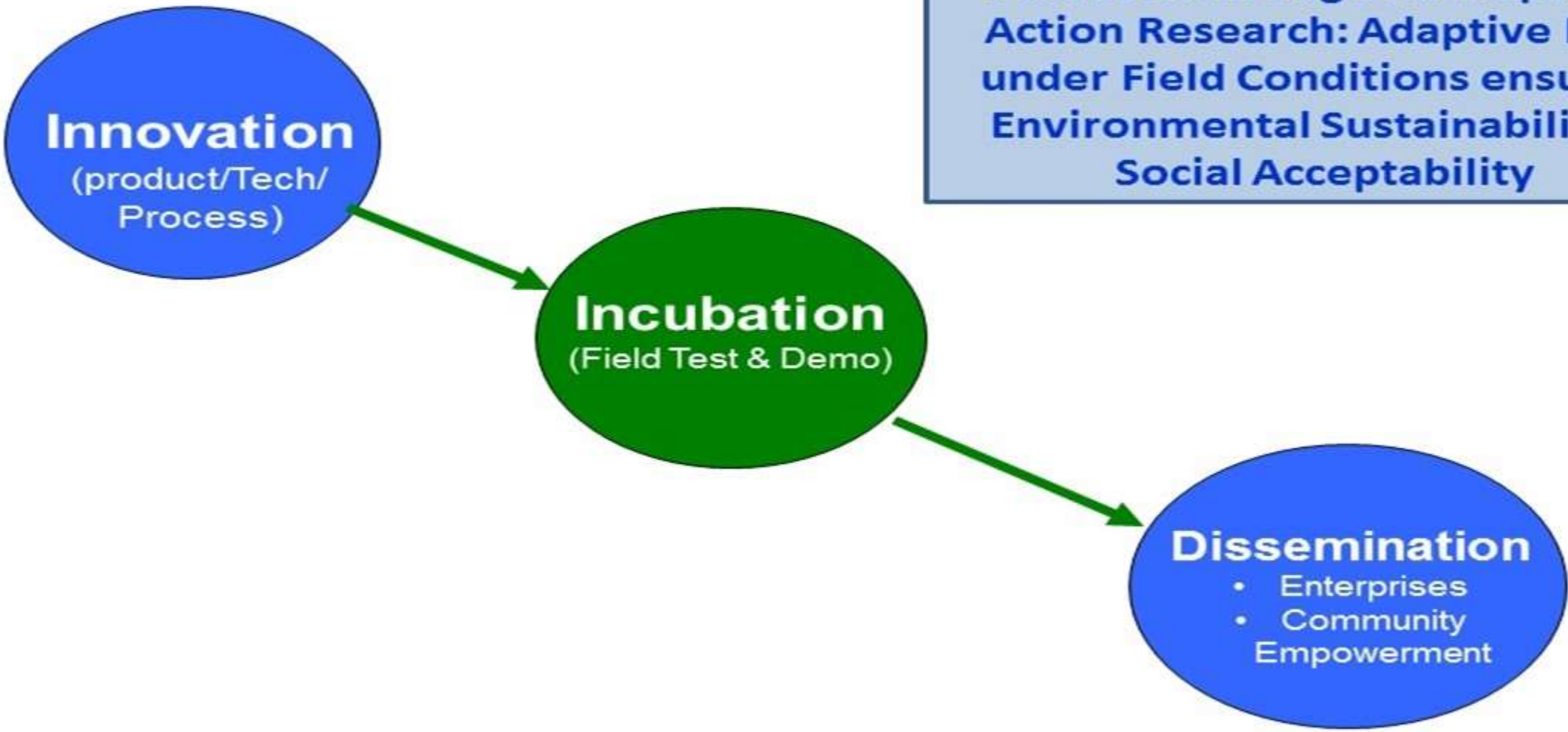
INTERVENTIONS

- **Community owned and operated water supply system (COCO)**
  - 1-2 HP **solar powered pumps**
  - Piped water supply
  - Ground water from a bore well supplied to **household and public connections**
  - **Pay for use model** + premium for HH connection

- **Behaviour change communication** for
  - **Clean and responsible** water use/consumption
  - Water **quality testing**

Development Alternatives

Strength in our Approach : Looking for Scalable Green Technological Solutions through Participatory Action Research: Adaptive R&D under Field Conditions ensuring Environmental Sustainability & Social Acceptability



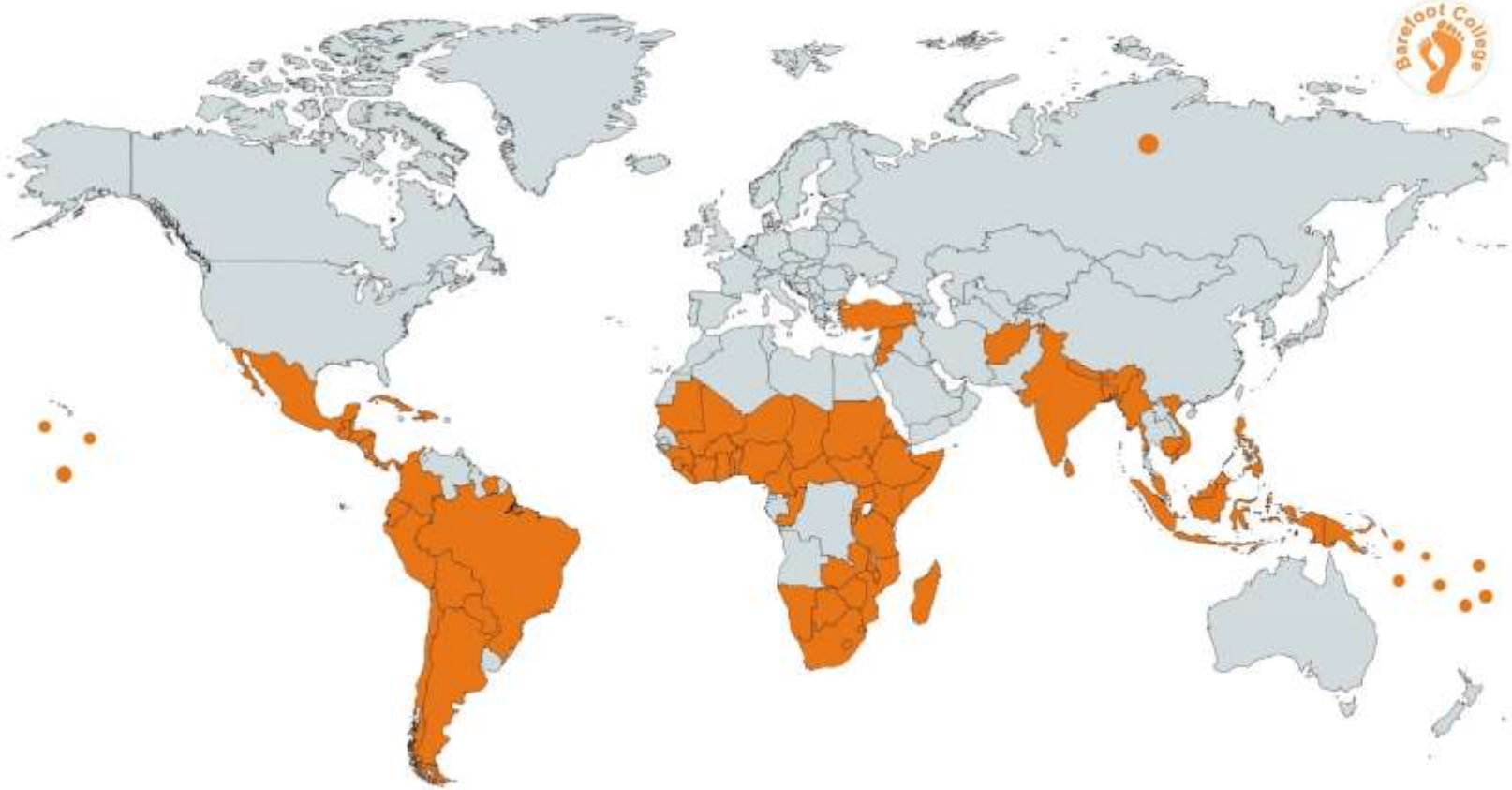
S&T INTERVENTIONS FOR SOCIAL GOOD

Environmental Well Being	*Economic Development*	*Social Well Being*
• Land and Water Resource Management • Building farmers' capacity for Adopting Climate Resilient Agriculture • Community based Environment Management System	• Financial inclusion of Women Groups • Diversifying Farm based Livelihoods • Services and Manufacturing based enterprises	• Community Services • Basic household amenities • Community institutions as Agents of change

Women Solar Engineers – Barefoot college

WORLD MAP: BAREFOOT APPROACH FOR SOLAR DOMESTIC LIGHTING AS ON 2018

1285 Women Barefoot Solar Engineers Completed training at Barefoot College Tilonia, Rajasthan from 91 Countries
They have Solar Electrified 73,211 households and are Maintaining the same in 1,323 Villages.
Beneficiaries 585,688. Liters of Kerosene saved -58,313,556.



1. Mexico (14)
2. Belize (3)
3. Guatemala (12)
4. El Salvador (4)
5. Honduras (4)
6. Nicaragua (4)
7. Panama (7)
8. Cuba (2)
9. Dominican Rep (3)
10. Haiti (4)
11. Suriname (2)
12. Colombia (14)
13. Ecuador (4)
14. Bolivia (4)
15. Peru (9)
16. Chile (9)
17. Brazil (4)
18. Paraguay (3)
19. Argentina (4)
20. Costa Rica (3)

Total = 114 (BSE)

(20 Central/Caribbean/South American Countries)

1. Mauritania (6)
2. Mali (15)
3. Senegal (17)
4. The Gambia (6)
5. Guinea Bissau (6)
6. Sierra Leone (22)
7. Liberia (12)
8. Burkina Faso (13)
9. Niger (4)
10. Ivory Coast (12)
11. Togo (8)
12. Ghana (5)
13. Benin (5)
14. Cameroon (12)
15. Namibia (11)
16. Chad (2)
17. Sudan (8)
18. South Sudan (13)
19. Ethiopia (29)
20. Djibouti (5)
21. Kenya (20)
22. Uganda (20)
23. Rwanda (12)
24. DR Congo (12)
25. Central Africa (4)
26. Burundi (4)
27. Tanzania (29)
28. Zanzibar (13)
29. Malawi (21)
30. Zambia (8)
31. Zimbabwe (11)
32. Mozambique (3)
33. Botswana (15)
34. South Africa (5)
35. Lesotho (6)
36. Comoros (6)
37. Madagascar (27)
38. Somalia (3)
39. Cape Verde (3)
40. Nigeria(3)

Total = 435 (BSE)

(40 African Countries)

1. Palestine (1)
2. Jordan (2)
3. Russia (Siberia) (2)
4. Afghanistan (17)
5. Nepal (5)
6. Bhutan (54)
7. India (439)
8. Sri Lanka (3)
9. Bangladesh (7)
10. Myanmar (43)
11. Vietnam(4)
12. Cambodia (6)
13. Malaysia(3)
14. Philippines (12)
15. Indonesia (15)
16. Timor (4)
17. Turkey (4)
18. Syria (3)

Total = 626 (BSE)

(18 Asian Countries)

1. Papua New Guinea(12)
2. Solomon Island (4)
3. Kiribati (5)
4. Nauru (4)
5. Vanuatu (4)
6. Samoa(4)
7. Fiji (19)
8. Tonga (4)
9. Micronesia (8)
10. Marshall Island (3)
11. Tuvalu (6)
12. Cook Island (3)
13. Palau (2)

Total = 78 (BSE)

(13 Pacific Islands)

QUANTITATIVE DATA

Number of countries with barefoot solar communities: 89

Number of women barefoot solar engineers: 1208

Number of household solar electrified: 60,400

Number of beneficiaries (direct and indirect): 773,120

Avoided emissions through using solar electricity : 1,169,659.6kgCO_2 avoided annually

HEALTH, ECONOMIC, AND SOCIAL IMPACTS

95% Black smoke reduction in household

81% increase use of mobile phones

75% increase in savings

80% increase in study time among children by 1.5 hours per day

EMPOWERMENT IMPACTS

45% of women and girls feel safer at night

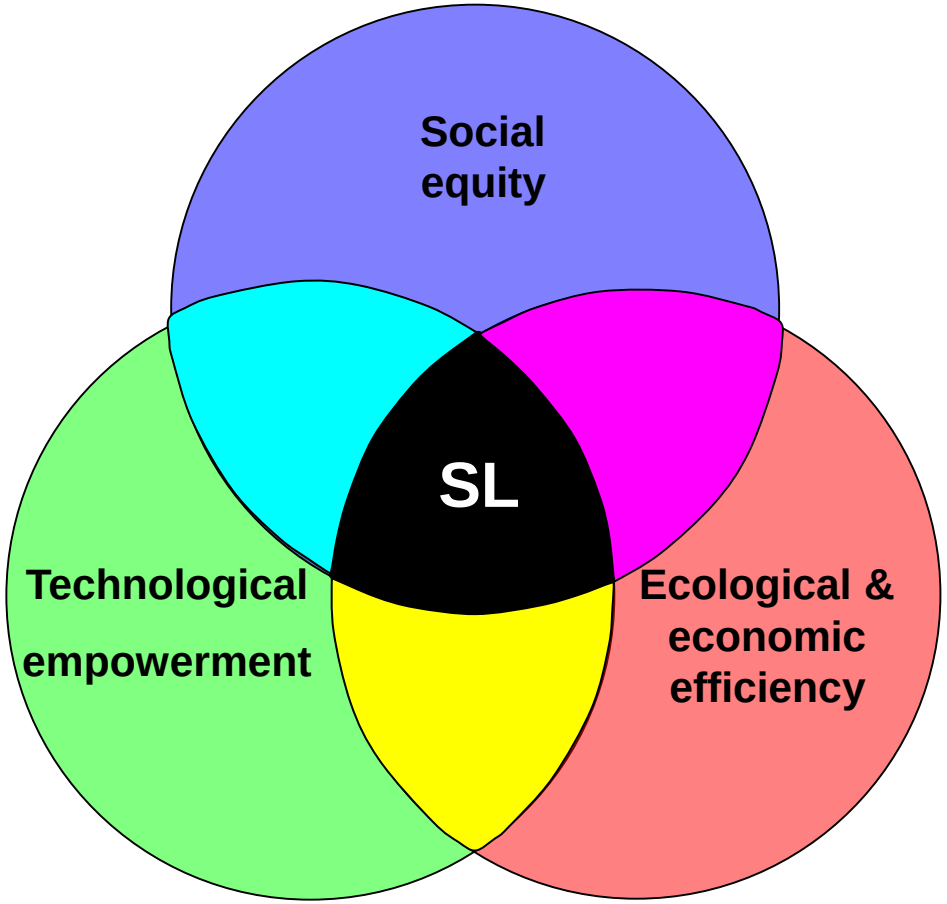
95% women solar engineers report an increase in decision making over income

45% increase in women participation in community groups

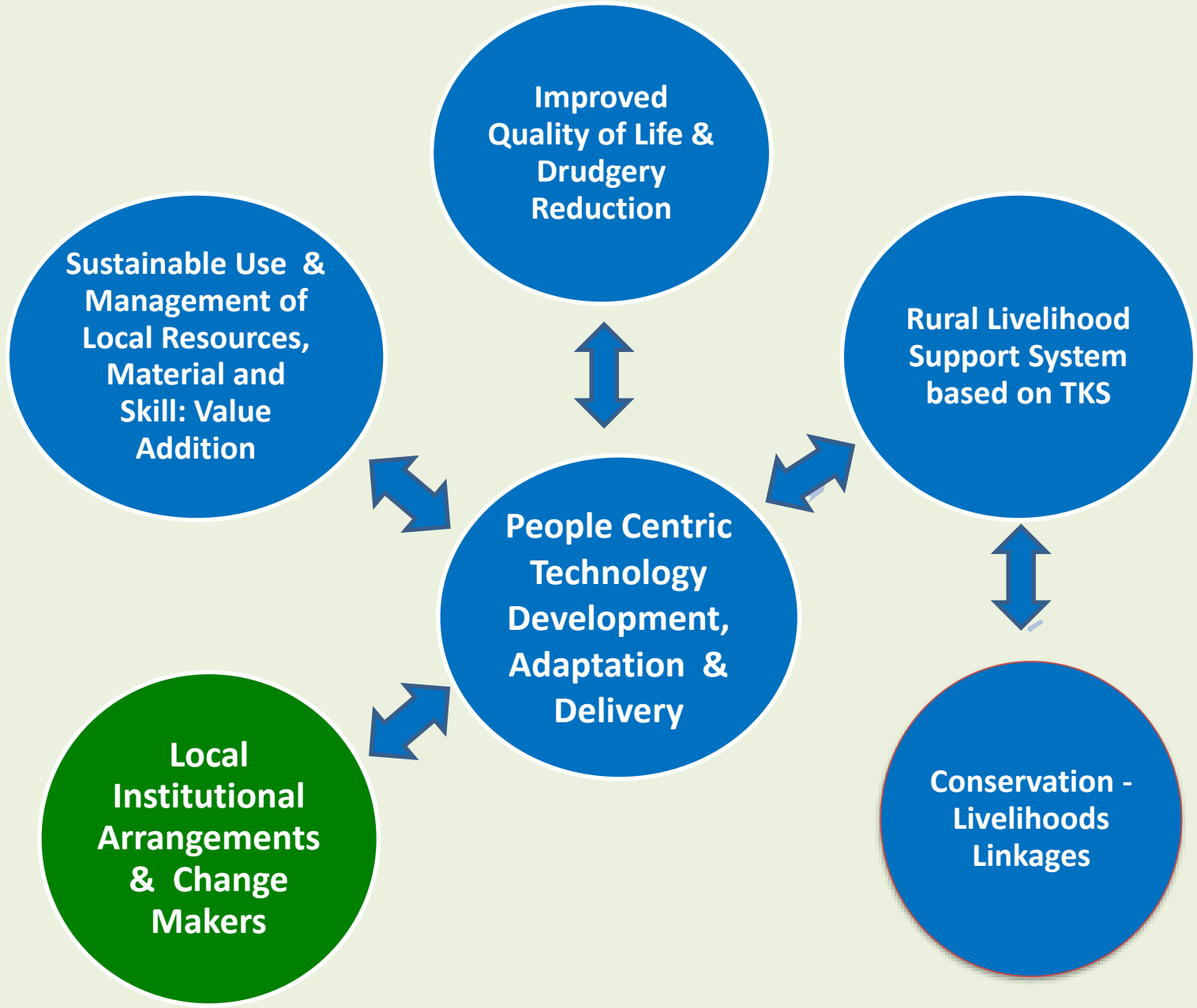
Founded on the lifestyle and work-style of Mahatma Gandhi, Barefoot College is a 46-year-old not for profit Social Enterprise. It works to champion the wisdom, skills, knowledge and Human Capacity of the rural poor to innovate and implement their own solutions for economic uplift of their communities. Rural illiterate and semi-literate women can and must be catalysts for sustainable development by gaining confidence and competence through the mastery of applicable technology, in all its forms.

Information Centre : Night schools

SEED



We believe that the Key to sustainable development is the creation of sustainable livelihoods in inclusive manner : Inclusive Growth



Technology Delivery & Responsible Governance : Interface and Effective Linkages

SEED's Perspectives: Transformational Change, SDGs Local Priorities

Need based Technological Intervention

- Crucial role in knowledge generation & dissemination for excluded population (Women, tribal SDG -10,17.8)
- Has gone ahead of SDGs – put in place GOALS, APPROACHES & PROCESSESS appropriate to achieve & sustain theses.
- Building S&T capacities SDG 8– Social Enterprise, improved livelihoods and quality of life

Drivers of Change: Actors & Factors

- Has grassroots systems in place – building local institutional arrangements + Hand-holding
- SEED + Resource Persons tuned to local realties
- Our Partners: With S&T knowledge base, social knowledge and sensitivities
- Community engagement in technology optimization and adoption – Hand-holding

Possible Areas of Collaborations & Co-operation ?

- Sustainability research: Joint action research projects between institutions and scientists.
- Technological solution packages for rural areas and livelihood generation:
  - Green Enterprise Solutions: Value chain development with multiple stake holders.
  - Green Production Technology Models (construction, processing and value addition of MFP etc).
  - Renewable Energy Applications.
  - Technology Applications in difficult Areas for Conservation & Alternative Livelihoods (Mountain & Protected areas).
  - Capacity buliding programmes.....

DURRIE MAKING

Empowering Women

WWF-INDIA has constructed a shed for weaving durries for the Tharu women of Palia block in Lakhimpur Kheri, Uttar Pradesh.

Improved Loom DeSign

The addition of a pulley in the looms has led to improvement of traditional looms. Weavers can now roll the durrie while seated and it has led to reduced weaving time per durrie. The cost of the pulley addition to the loom is Rs 2500.

Skill Development

Women have been trained by designers on better designs, improved colour coordination as well as quality control of products. A business plan has also been developed to market the durries.

Thanks

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