Revitalising Rainfed Agriculture

Experiences from the grassroot
- : CONTRIBUTED BY :-

**ANDHRA PRADESH / TELANGANA**

Aashima Chaudhary,  
**WASSAN - RRA Network**

Bakka Reddy, C  
**WASSAN - RRA Network**

Bhagyalaxmi, S  
**WASSAN - RRA Network**

Bhanuja, C  
**APPS (Anantapuramu)**

Dinesh Balam,  
**WASSAN - RRA Network**

Laxman, K  
**RRA - CP, WASSAN (Doulathabad)**

Kailash,  
**CAVS (Srikakulam)**

Sanyasi Rao, M.L  
**WASSAN - RRA Network**

Ram, G  
**RRA - CP WASSAN (Doulathabad)**

Ramachandrudu, M.V.,  
**WASSAN**

Renuka Rani, B  
**MANAGE, Rajendranagar**

Padala Bhudevi,  
**CAVS (Srikakulam)**

Ravindra, A  
**WASSAN - RRA Network**

Sabyasachi Das  
**WASSAN - RRA Network**

Vijay Mohan Rao, A  
**WASSAN (Livestock Node)**

**KARNATAKA**

Balakrishnan  
**VRUTTI (Bengaluru)**

**JHARKHAND**

Aashrita Tirkey  
**RRA – CP, VSK (Palamu)**

Niraj Lakra  
**RRA - CP, VSK (Palamu)**
GUJARAT

Ramesh Bhatti
SAHJEEVAN (Kutch)

MADHYA PRADESH

Ardra Venugopal
RRA - CP, SPS (Dewas)

Dindayal Nayak
RRA - CP, SPS (Dewas)

Sridhar Rao
RRA - CP, SPS (Dewas)

Vijayshankar, P.S.
RRA - CP, SPS (Dewas)

Shubham, RRA - CP, SPS (Dewas, Madhya Pradesh)

Rajaram Morty
RRA - CP, SPS (Dewas)

MAHARASHTRA

Datta Patil
RRA Project of YRA

Himanshu Kulkarni
ACWADAM (Water Node)

Mukesh Patil
ACWADAM (Water Node)

Sahebrao
RRA Project of YRA

ODISHA

Nityanand
RRA - CP - PARIVARTTAN (Malkangiri)

Mrinalini Paul
RRA - CP (Malkangiri)

Rakesh
RRA - CP (Malkangiri)

Ramani Ranjan Nayak
RRA - CP (Malkangiri)

Sanjay
RRA - CP (Malkangiri)

Soren
RRA - CP (Malkangiri)

WEST BENGAL

Prosenjit Mondal
RRA - CP, PRADAN (Bankura)

Sourav Bag
RRA - CP, PRADAN (Bankura)
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACWADAM</td>
<td>Advanced Center for Water Resources Development &amp; Management</td>
</tr>
<tr>
<td>AICSMIP</td>
<td>All India Coordinated Millets Improvement Project</td>
</tr>
<tr>
<td>AKRSP-I</td>
<td>Aga Khan Rural Support Program - India</td>
</tr>
<tr>
<td>ANMOL</td>
<td>AN NGO</td>
</tr>
<tr>
<td>APPS</td>
<td>Anantha Paryavarana Parirakshana Samithi</td>
</tr>
<tr>
<td>ATMA</td>
<td>Agricultural Technology management Agency</td>
</tr>
<tr>
<td>CIKS</td>
<td>Center for Indian Knowledge System</td>
</tr>
<tr>
<td>CMSS</td>
<td>Community Managed Seed Systems</td>
</tr>
<tr>
<td>CNB</td>
<td>Cement Nala Bund</td>
</tr>
<tr>
<td>CP</td>
<td>Comprehensive Pilot</td>
</tr>
<tr>
<td>DSR</td>
<td>Direct Seeded Rice</td>
</tr>
<tr>
<td>JDTT</td>
<td>Sir Dorabji Tata Trust</td>
</tr>
<tr>
<td>ITDA</td>
<td>Integrated Tribal Development Agency</td>
</tr>
<tr>
<td>MANAGE</td>
<td>National Institute of Agricultural Extension Management</td>
</tr>
<tr>
<td>MGNREGS</td>
<td>Mahatma Gandhi National Rural Employment Guarantee Scheme</td>
</tr>
<tr>
<td>NABARD</td>
<td>National Bank for Agriculture and Rural Development</td>
</tr>
<tr>
<td>NBPGR</td>
<td>National Bureau of Plant Genetic Resources</td>
</tr>
<tr>
<td>NOC</td>
<td>No objection Certificate</td>
</tr>
<tr>
<td>NPM</td>
<td>Non-Pesticide Management</td>
</tr>
<tr>
<td>OBC</td>
<td>Other Backward Caste</td>
</tr>
<tr>
<td>PRADAN</td>
<td>Professional Assistance for Development Action</td>
</tr>
<tr>
<td>ST</td>
<td>Scheduled Tribes</td>
</tr>
<tr>
<td>SPS</td>
<td>Samaj Pragati Sahyog</td>
</tr>
<tr>
<td>VSK</td>
<td>Vikas Sahyog Kendra</td>
</tr>
<tr>
<td>WASSAN</td>
<td>Watershed Support Services and Activities Network</td>
</tr>
<tr>
<td>YRA</td>
<td>Yuva Rural Association (YRA)</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

ABSTRACT ................................................................................................................................. 1

RAINFED AGRICULTURE: INTRODUCTION ........................................................................... 5

I. PROTECTIVE IRRIGATION TO SECURE RAINFED CROPS .......................................................... 8

CASE STUDY - 1 Protective Irrigation (Red gram), Rellagutta Thanda, Gokarfaslabad Gram Panchayat, Doulathabad, Mahabubnagar district ................................................................. 9

CASE STUDY - 2 'Phad' Irrigation comes to the Rescue of two villages in Vidarbha district, Maharashtra ..................................................................................................................... 12

CASE STUDY - 3 Collectivisation of Groundwater, Chellapur village, Mahabubnagar district, Telangana ...................................................................................................................... 16

CASE STUDY - 4 Participatory Groundwater Management (PGWM), Khanar village, Burhanpur district, Madhya Pradesh .......................................................... 17

CASE STUDY - 5 Rainwater Harvesting though Happas, Hirbandh village, Bankura district, West Bengal .............................................................................................................. 18

II. LIVING SOILS: ENHANCING SOIL HEALTH AND PRODUCTIVITY IN RAINFED AGRICULTURE ............................................................................................................. 20

CASE STUDY - 1 Enhancing Soil Productivity, Mahabubnagar district, Telangana ................................................................................................................................. 21

CASE STUDY - 2 Enhancing Soil Fertility, Malkangiri district, Odisha ................................................................................................................................. 22

III. DECENTRALISED COMMUNITY MANAGED SEED SYSTEMS (CMS) ........................................ 23

CASE STUDY - 1 Seed Producing Farmer, Gangasanipalle village, Thankallu mandal (Jana Jagruthi) .............................................................................................................. 25

CASE STUDY - 2 Establishment of Seed Bank, Mahabubnagar, Telangana ................................................................................................................................. 26

CASE STUDY - 3 Seed Procuring Farmer - Ratnalapalli village, Nallacheruvu mandal, Anjaneya Swami Mandal Mahila Samakhya .............................................................................. 27

CASE STUDY - 4 Creation of Seed Banks, Palamu district, Jharkhand ........................................ 28
IV. MILLETS AND CROP DIVERSIFICATION FOR NUTRITION SECURITY ........................................ 29

CASE STUDY - 1 Value Addition and Marketing of Minor Forest Produce, The Better Sweet Tamarind ........................................ 31

V. AGRONOMIC INNOVATIONS ............................................................................................................... 37

CASE STUDY - 1 DSR (Dry Direct Seeded Rice) - The Hope of Rainfed Area for Foodgrain Security, Hirbandh block, West Bengal ................................................................. 38

CASE STUDY - 2 System of Rice Intensification (SRI) ................................................................. 42

CASE STUDY - 3 Non-Pesticide Management (NPM) and access Value added Marketing Strategy ......................................................... 44

VI. LIVESTOCK MANAGEMENT ................................................................................................................ 46

CASE STUDY - 1 Livestock Management, Chattarpur block, Palamu district, Jharkhand .................................................. 47

CASE STUDY - 2 Vaccination Support helps reduce desi-bird mortality, Srikakulam district, Andhra Pradesh ........................................... 50

CASE STUDY - 3 Udainagar Pragati Samiti fills the Critical Gap in Animal Healthcare Services, Dewas district, Madhya Pradesh ......................................................... 54

VII. FISHERIES ....................................................................................................................................... 61

CASE STUDY - 1 Nursery Entrepreneur, Ramaguda, Mathili, Odisha ........ 63

CASE STUDY - 2 Nursery Enterprise, Manika block, Jharkhand ........... 67

CASE STUDY - 3 Fish and Stay at Home, Resiyapa village, Palamu district, Jharkhand ........................................... 70

CASE STUDY - 4 A New Identity through Fisheries in Palamu district, Jharkhand ................................................................................ 72

CASE STUDY - 5 Nursery of Profit, Latehar, Jharkhand ......................... 74

CASE STUDY - 6 Like Fish takes to Water, Latehar, Jharkhand ............. 77

CASE STUDY - 7 When Women take over, Palamu district, Jharkhand .... 79

CASE STUDY - 8 Fight to finish for 'Right to Fish', Chattarpur, Jharkhand .... 81
ABSTRACT

Rainfed Agriculture in India is characterized by marginal soils, undulating terrain, uncertainties of rains, poor access to credit and markets. According to Agricultural Census 2010-11, more than half (55%) of the country’s Gross Cropped Area (GCA) is rainfed which is also the poverty landscape of the country as 84 % of rural poor live here.

The larger public policy on agriculture has remained focused on irrigated areas with rice and wheat as major crops; response to chemical inputs is purported to be higher in these areas to achieve national level security in food grain production. As the support systems to agriculture are framed in this context, much of the public expenditure and investments are couched in terms of input subsidies to achieve ‘higher productivity’ and in ‘irrigation’ development. The very design of agriculture policies and programmes excludes much of the rainfed areas or where it is successful, extends the logic of intensive irrigation-based systems to rainfed contexts.

In this context, RRA Network through its Comprehensive Pilots (CPs) and Thematic Pilots (TPs) implemented by its member NGOs aims to establish evidences and experiences on various aspects of rainfed agriculture like on soil, seed, millets, fisheries, livestock and credit, and markets and institutions. The key propositions for RRA Network are: expanding protective irrigation to secure rainfed crops, enhancing soil productivity, seed systems, millets and crop diversification, agronomic innovations, strengthening rainfed livestock support systems, fisheries and strengthening institutional capacities and decentralized planning.

In this comprehensive document, each of propositions listed above is explored through a variety of CPs and TPs as illustrated through case studies, thus establishing a case for integrated interventions in rainfed areas and policy advocacy parameters for wider outreach of the programme.

To begin with, in protective irrigation to secure rainfed crops, the RRA Network infers that strategies that promote a combination of introduction of new technologies, strengthening traditional knowledge systems, empowering community ownership and broad basing micro-irrigation infrastructure in rural areas could address rain fed
exigencies. The principles of water management that it pursues as a policy initiative are: ‘Water for All’ farmers; diversified cropping systems; a paradigm shift of interventions from ‘water as irrigation’ to water as moisture’; local governance for an inclusive and mutual sharing of water; regulating indiscriminate exploitation of groundwater; re-enforcing groundwater as ‘common pooled resource’ instead of an ‘individually owned resource’; ecological restoration; and not the least, primacy of drinking water for humans and animals.

In the second theme of enhancing soil productivity, the RRA network wishes to take forward the following principles: incentivizing farmers to add at least 2 tons of organic matter annually on every acre of rain-fed land; raising green manure crops; round the year vermi-compost preparation; and growing gliricidia plantations; and preparation and use of liquid manures. The RRA Network from its experience believes that soil must be treated as a ‘public good’ and therefore the government has the responsibility to support and incentivize farmers to maintain soil health comprehensively.

The third theme of seed systems envisages developing a seed support system that restores local knowledge of seeds that has been passed on from generations. One such initiative, The Community- Managed Seed Systems (CMSS) programme has been scaled up by the Department of Agriculture (DOA) in Anantapur district of AP, covering 183 villages, and reaching out to 2083 farmers in 800,000 ha in groundnut seed. The programme was piloted by WASSAN in collaboration with NGOs from the district and the DOA.

In the fourth theme of millets and crop diversification for nutritional security, the RRA network discovered that the fast declining crop diversity due to a shift in cropping pattern in favor of cash crops has made rural households vulnerable to attain food as well as nutritional security. In the RRA network CP locations the diversity has started to be re-established. The interventions required are: comprehensive and simultaneous efforts in production; consumer awareness and consumption; advocating for a Minimum Support Price; and introduction of these grains into the public distribution system and nutrition programmes.

Continuing with the fifth theme of agronomic innovations, the RRA network has taken the lead in promoting innovations throughout the supply chain of agricultural produces cultivated during the monsoon season. Farm produce aggregation through community based-institutions, farm management solutions through supporting local entrepreneurs, non-pesticide management at farm are some of the process innovations that were undertaken. On the product innovations, formulation of soil
inputs such as vermi-compost, Amrut khad, Neem oil, liquid organic pesticides were promoted to increase productivity and control agricultural pests.

Livestock management is the sixth theme in which the RRA network has strategically intervened. Under this, the decentralized community managed preventive animal healthcare programme takes care of vaccination services through community institutions (PRI/SHG federation/village institutions) in collaboration with the Department of Animal Husbandry. Similarly, the small ruminant (goat and sheep) programme envisages improving productivity within a given geographic area or a cluster of villages by integrating services and clubbing related interventions such as regular paid vaccination, ensuing fodder security, access to and provision for supplementary feeding, modifying rearing sheds and night shelters and developing links to collective trading routes.

In addition, the network has undertaken the Revival of Backyard Poultry (BYP) production with indigenous breeds through establishing support services in an enterprise mode. This initiative ensures regular supply of inputs such as chicks and feed, delivery of vaccination services and bundling services with extension of improved management practices at the household level.

The RRA network advocates that the following areas need more attention of policy makers: Integrating agriculture and natural resources management with animal husbandry at the farming household to optimize income opportunity and sustain natural resource vitality; increasing the fodder base in common grazing lands; reducing animal mortality through community-led preventive health care services; focusing on rearing more small ruminants such as backyard poultry as it generates quick supplementary income for the rearers.

The seventh theme in network interventions is on fisheries: working with government mainstream programmes to restore existing water bodies as well as creation of new water bodies drawing funds largely from MGNREGS; following a market-based approach to strengthen supply markets of fingerlings by promoting local entrepreneurs with technical linkages to the local state government fisheries department; and last but not the least, supporting the civil societies such as the fish farmers' institutions to sustain the interventions.

However, for the sustainability of the above themes, services and products, the role of institutions at various levels is of utmost importance. Therefore effective continuity and access to public and civic institutions such as government departments, banks, cooperatives, self-help groups, and NGOs have been very
critical in many of the CP areas for effective delivery of services such as extension, research, inputs, credit and agro-processing.

Several case studies illustrate remarkable local institutional capacity building, improved service delivery to farmers and a good working relationship between two sets of institutions: community level institutions (PRIs/SHGs/Cooperatives) and government agencies (DOA, offices of mainstream government programs).
INTRODUCTION

Rainfed agriculture is defined as farming practices that are dependent on rainfall for water. It constitutes the major poor agro-ecological zones of the country which are mostly resource constrained. In rainfed areas, farming is a survival mechanism rather than a growth oriented activity. Around 55% of India’s gross cropped area is rainfed (as shown in Map 1 from Rainfed Atlas of India) which is also poverty landscape of the country and 84% rural people live here (as shown in Map 2 from Rainfed Atlas of India). 61% of India’s farmers rely on rainfed agriculture.

Rainfed systems are characterised by undulating topography, soil types ranging from shallow red soils to deep black clays, common lands, crop varieties, livestock and rainfall conditions varying from 400 millimetres to 1600 millimetres. Rainfed areas have been facing historical neglect and discrimination in terms of public investments. India will have to feed about 1.3 billion people by 2020 requiring 5-6 million tonnes of additional grains every year (Rainfed Atlas of India). It is proposed that revitalising of rainfed production can fulfil the food crisis of the growing population.

Rainfed areas of India include 40% area for rice (Map 4 from Rainfed Atlas of India), 89% millets (Map 3 from Rainfed Atlas of India), 73% cotton (Map 5 from Rainfed Atlas of India).
Atlas of India), 88% for pulses (Map 6 from Rainfed Atlas of India), 69% for oilseeds (Map 7 from Rainfed Atlas of India). They also contain 78% of cattle, 64% of sheep and 75% of goats (Rainfed Atlas of India).

Rainfed areas have diverse agro-ecology in which 34 varieties of predominant crops are grown as compared to three or four crops in irrigated tracts. Rainfed agriculture relies on local knowledge and experience and facilitates extensive systems of production which are mutually dependent. There is a total of 326 rainfed districts in the country of which 11.20 million hectares is net irrigated area and 76.50 million hectares is net sown area (Rainfed Atlas of India - source: www.rainfedindia.org).
Rainfed agriculture must play a key role in ensuring food security. 40% of food grain output in 2020 will have to be produced in rainfed areas. The cultivated area has remained constant in past 40 years. This will further go down due to urbanisation, industrialisation, infrastructure and other land use. There is no option other than enhancing productivity and profitability of the rainfed areas.

Therefore, it is necessary to shift from current commodity-based approach to an area-focused, integrated farming system approach which addresses location-specific technological needs in relation to resource endowments and socio-economic parameters. The key to this paradigm shift in rainfed agriculture is to move to a knowledge-based, farmer centric and institutionally supported system where Government is the prime mover and facilitator. Despite larger production contribution, rainfed areas do not receive much policy attention.

The key propositions for RRA are:

- Expanding protective irrigation to secure rainfed crops
- Millets and crop diversification
- Seed systems
- Crop insurance
- Risk minimisation and resilience building
- Agronomic innovations
- Strengthening rainfed livestock support systems
- Fisheries
- Strengthening institutional capacities and decentralized planning.
- Enhancing Soil Productivity
Some field studies in context of above propositions are discussed below in the form of case studies:

I. PROTECTIVE IRRIGATION TO SECURE RAINFED CROPS

Agriculture production in rainfed areas depends on the short window of rainfall during the monsoon. Erratic rains and dry spells during crop growing season cause substantial production losses in rainfed areas. Provisioning of life saving irrigation/protective irrigation can secure rainfed crops against these dry spells and also increases production. Irrigation investment relevant to rainfed areas is to manage soil moisture deficit for securing crops of all rainfed farmers.

In rain fed areas too, supportive irrigation is a critical need of the plant for securing good yield. In the Indian context the timeliness, periodicity and volume is largely a good combination of precipitation supported by irrigation sources. The water requirement of any crop is however dependent on local conditions and is variable to factors such as soil texture, climatic conditions, and crop management practices.

Unfortunately, farm-based livelihoods in rain-fed areas are extremely vulnerable to a short window of rainfall during the monsoons. In addition, unpredictable shifts in climate and changes in cropping systems have further de-stabilized the rainfed farming. Specifically, the drought spells at the onset and during the crop season is causing substantial crop losses.

In this context and background, the RRA Network drawing experience from its pilot projects infer that strategies that promote a combination of: introduction of new technologies, strengthening traditional knowledge systems, empowering community ownership and broad basing micro-irrigation infrastructure in rural areas could address rainfed exigencies.

RRA Network envisions extensive critical irrigation to secure rainfed crops by incentivizing the efforts to harness groundwater as well as surface water. It also advocates an integrated development of soils, crops and water resources. The principles of water management that it pursues as a policy initiative is: ‘Water for All’ farmers; diversified cropping systems; a paradigm shift of interventions from ‘water as irrigation’ to water as moisture’; local governance for an inclusive and mutual sharing of water; regulating indiscriminate exploitation of groundwater; re-
enforcing groundwater as ‘common pooled resource’ instead of an ‘individually owned resource’; ecological restoration; and not the least, primacy of drinking water for humans and animals.

The case studies that illustrate these are deliberated further: Mothyanayak, a farmer at Doulatabad in Mahbubnagar district used critical irrigation methods to obtain a substantial increase in yield in red gram crop; In Vidarbha, diversion-based irrigation system supported by improved cultivation methods increased yield of rice crop; In Chellapur village, Mahbubnagar, the study showcases impact due to collectivization of ground water sources.

CASE STUDY - 1

Protective Irrigation (Red gram), Rellagutta Thanda, Gokarfaslabad Gram Panchayat, Doulathabad, Mahabubnagar district

Mothyanayak, lives in Rellagutta Thanda of Gokarfaslabad Gram Panchayat in Doulatabad, Mahbubnagar District. He has 3.5 acres of agricultural land in his village, which is mostly in semi-arid, sandy loam condition. The land has poor water retention capacity with high seepage. In the absence of rain, the land dries up
quickly. The village also experiences drought regularly. The region received adequate rainfall only in 2010 and since then, every year has been a drought situation. In 1 acre of wet land, he cultivates paddy and vegetables, while the remaining 2.5 acres is rainfed.

He generally cultivates jowar and redgram in the rainfed area. In Doulatabad region, usually dry spells are experienced between September and November, due to which there is a huge loss in the yield of redgram to farmers. Borewells are used in the field to irrigate paddy instead of rainfed crop (redgram) during the dry spells. As paddy requires more water, he uses the borewell water for irrigation of paddy. Traditionally, the farmers in the village use borewell water to irrigate paddy as they believe it will fetch them more income.

For one acre of red gram, a yield of 4 quintals is expected under normal circumstances. But in 2013, when he cultivated red gram, he got a yield of only 1.5 quintals per acre due to a long dry spell. He joined a farmers group, which later joined the Doulatabad Cooperative. From the group discussions in the cooperative and feedback from WASSAN coordinators, he realised that borewell water could be used even for rainfed crops during dry spell. He came to know how much water is required for each crop, how to use water conservatively and manage crop better. He was informed that paddy is a water intensive crop. The water required to irrigate one acre of paddy would irrigate 10 acres of rainfed crop, provided alternative irrigation methods are utilized.

He was also introduced to better seeds, alternative irrigation methods and other techniques that would help in getting better yield and increase his income and profits. One such method is protective irrigation. Though initially he was hesitant, he tried this method for the first time in 2014. Under this method, irrigation is required in four stages of cultivation - during sowing time, plant growing stage, flowering and pod formation. He provided water using flood irrigation method only during the flowering stage, as a result, the yield of redgram increased. He got a yield of 6 quintals per acre, an increase of 2 quintals over the expected yield.

Feeling more confident about protective irrigation methods, he wanted to continue experimenting with it. In 2015, he tried line irrigation for 1.5 acre of rainfed land, as opposed to the flood irrigation that he had used the previous year. In this method, water is supplied through deep ploughing along the rows of redgram plants. When using flood irrigation methods, there is a chance that some of the plants do not
receive enough water as the distribution is uneven. Line irrigation ensures that all plants get sufficient water. In flood irrigation, he observed that it takes about 5 days for the water to spread across the field unlike just 3 days in line irrigation.

In addition to line irrigation methods, he applied for silt through MGNREGS, which also helped in improving the moisture retention capacity of the soil. After using these techniques, the yield was 7.5 quintals per acre. Not only was the yield better, but the quality of the seed was also greater. Unlike in the previous years, the seed was healthy, in proper size and colour and well matured. He was happy cultivating crops through protective irrigation methods as both yield and income have shown increase. These similar methods have been adopted by 46 farmers of the same cooperative, spanning over 101 acres from 8 different villages.

Table 1: DETAILS OF CULTIVATION OF REDGRAM

<table>
<thead>
<tr>
<th>Year</th>
<th>Area Cultivated (in acres)</th>
<th>Yield in Quintal (per acre)</th>
<th>Yield in Quintal (total)</th>
<th>No. of Sater Supplied</th>
<th>Irrigation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2.5</td>
<td>1.5</td>
<td>3.75</td>
<td>No supply</td>
<td>Rainfed</td>
</tr>
<tr>
<td>2014</td>
<td>2.5</td>
<td>6</td>
<td>15</td>
<td>1</td>
<td>Critical irrigated</td>
</tr>
<tr>
<td>2015 (a)</td>
<td>1.5</td>
<td>7.5</td>
<td>11.25</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2015 (b)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>No supply</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: DETAILS OF REVENUE FROM REDGRAM – NON-IRRIGATED VS LINE IRRIGATED (IN 2015)

<table>
<thead>
<tr>
<th>Irrigation Type</th>
<th>Expenditure (per acre)</th>
<th>Net Income (per acre)</th>
<th>Gross Income (per acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfed</td>
<td>Rs 7,240</td>
<td>Rs 24,000</td>
<td>Rs 16,760</td>
</tr>
<tr>
<td>Critical irrigated</td>
<td>Rs 10,600</td>
<td>Rs 83,240</td>
<td>Rs 72,640</td>
</tr>
</tbody>
</table>

Table 3: DETAILS OF REVENUE FROM PADDY (IN 2015)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Expenditure (per acre)</th>
<th>Net Income (per acre)</th>
<th>Gross Income (per acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>Rs 13,800</td>
<td>Rs 29,400</td>
<td>Rs 15,600</td>
</tr>
</tbody>
</table>

Table 4: DETAILS OF REVENUE GENERATED BY OTHER FARMERS FROM REDGRAM CROP

<table>
<thead>
<tr>
<th>Name of Farmer</th>
<th>Village</th>
<th>Total land (in acres)</th>
<th>Critically Irrigated land (in acre)</th>
<th>Production from Irrigated Rainfed Crop (Total)</th>
<th>Net Income (in Rs/acre)</th>
<th>Expenditure (in Rs/acre)</th>
<th>Gross Income (in Rs/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gopal</td>
<td>Gokarfaslabad</td>
<td>3</td>
<td>2</td>
<td>8.4</td>
<td>45140</td>
<td>6230</td>
<td>39000</td>
</tr>
<tr>
<td>Shaukat Ali</td>
<td>Gokarfaslabad</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>52060</td>
<td>8154</td>
<td>43906</td>
</tr>
<tr>
<td>Mahipal</td>
<td>Gokarfaslabad</td>
<td>3</td>
<td>1</td>
<td>5.5</td>
<td>55000</td>
<td>8350</td>
<td>46650</td>
</tr>
<tr>
<td>Pothya Naik</td>
<td>Vuravunta Thanda</td>
<td>15</td>
<td>5</td>
<td>26</td>
<td>57200</td>
<td>7150</td>
<td>50050</td>
</tr>
<tr>
<td>Narasimhulu</td>
<td>Challapur</td>
<td>6</td>
<td>1</td>
<td>3.5</td>
<td>35000</td>
<td>7150</td>
<td>27050</td>
</tr>
</tbody>
</table>
CASE STUDY - 2

'Phad' Irrigation comes to the Rescue of two villages in Vidarbha district, Maharashtra

This is the story of two villages, Bhandarbodi and Uti of Ramtek and Umred blocks of Nagpur District of Vidarbha. This region of Maharashtra is usually in the limelight for the distress of farmers, who have been facing dire consequences due to erratic rainfall for the past 15 to 20 years. Ramtek and Umred are typical blocks of Vidarbha region, which is known to be a drought prone area. Vidarbha is frequently featured in news nationwide for farmer suicides despite receiving 800 - 900 mm rainfall on an average.
But these two blocks and some other areas of the region are also known as 'Konkan of Vidarbha' because of the prevalence of forests, water bodies, paddy cultivation and beautiful hills. Ramtek and Umred blocks are predominantly paddy growing areas inhabited by small and marginal land-holding farmers from Gond & Gowari (ST) and Kunbi (OBC) communities. Many farmers do not grow a Rabi crop and face crop failures due to drought spells in Kharif, though it is different geographically from the rest of Vidarbha.

Climate change is causing much more distress across region. People comment that a farmer's life is nothing but a cycle of debt and repayment. There is no prosperity in the farmers' lives for the past 15-20 years. Two community-based organizations in Vidarbha, Mahila Vikas Parishad and Maharashtra Yuva Parishad that have been working for women empowerment and youth development respectively, felt that the need for an analysis on why things changed so much in the past 20 years. While farmers were known to cultivate two crops earlier, many of them are unable to save even one crop to provide food for their families. The area, which has enough water and abundant natural resources, is unable to secure the lives of people.

The leaders of these federations initiated a dialogue with the people about agriculture. During the meetings and consultations, a traditional system called 'Phad' that envisioned a community shared, diversion-based irrigation system was rediscovered. This system requires farmers to make an open canal on ponds or construct other structures like check dams, nala bunds and uses gravity to irrigate their lands. This system was traditionally used by people, but without much regulation. This resulted in the last farm not getting any water, while the first one got most of it.

Despite such problems, the phad system was utilised for a long time but eventually collapsed. Some of the factors that led to the downfall were lack of proper regulation on water usage among people; siltation and technical management related issues like absence of control on overflow and canal maintenance. The government intervened by making new systems and repairing old structures by deepening of pond and preparing chambers for canal system. Though these interventions worked, they could not achieve the level of success that was expected.

Yuva Rural Association (YRA), an organization working in the region on agriculture and NMR related issues with the farmers and government conducted discussions in 2012-13 on phad system. YRA professional Sahebrao Somkuwar proposed the idea of
using a pipe for canal system instead of an open one. This idea was borrowed from the Dilasa Organization which had utilized it in other villages. The farmers were doubtful of the idea and opined that as the pipeline would be underground, it would not be possible to bring the water to the surface without using any energy source.

After many consultations, the farmers were convinced about the idea. They were made to understand that using gravity and maintaining level of pipe and outlets, the water could be brought to the surface without using any energy source. Some of the farmers accepted the experiment, with the hope that even if the pipeline doesn't work, at least the structure would be repaired.

The revival and construction of Phad system was agreed upon in two places - in Uti village with 6 farmers in 25 acres on Cement Nala Bund (bandara as locally called in the region) and Bhandarbodi (Ramtek block) village with 8 farmers in 35 acres. A CNB and pond had already been constructed by the government a few years earlier. Both the structures were underutilized and only a few farmers were lifting water from it. Farmers of Bhandarbodi village were unable to accept the idea of pipeline as phad distribution, and a woman farmer, Rayabai Raut even refused to participate in the process. She stated that the idea would not work at all.

To start the process in both the villages, an individual sahmati patra (consent letter) was taken from all farmers along with a NOC from the gram sabha. A resolution was passed, and a user group constituted, with the following guidelines for water sharing prepared with everybody's consent. Farmers will take water serial wise. First farmer will take water first and rest would follow. All farmers should meet to decide who would be taking water when and it should be followed as per plan. All farmers would collectively contribute towards maintenance, repair and other works from their contribution to water user group. The key to the system would be with the President of the group and he/she would maintain a record of water usage of each member.

Each farmer would also maintain a diary of water usage every year or season wise. It was also decided that they would together decide in meetings which crops and how much acreage to grow every year based on water availability in the structure. This would allow them to use water effectively and avoid fights. If someone violates the rules, water would not be given to that farmer. The farmers contributed their labour for the construction of canal and chamber to store and channelize flood water. Pipes and construction material were provided from project funds of JDTT.
Despite apprehensions of the farmers, these structures have become a huge success, with the concept of including pipes in Phad irrigation system proving to be a game changer. Farmers in Uti have also started growing different vegetables like tomato, lady’s finger, gwar, chilly and beans along with the paddy crop in Kharif while gram and wheat are cultivated in Rabi with remaining water. In Bhadarbodi, paddy is produced in Kharif with a better yield. While earlier, the farmers had a yield of 10 quintals per acre, they are now cultivating between 15 and 20 quintals per acre. In Rabi, gram and wheat were produced with the excess water, after holding a meeting to decide which crops would be grown.

Rayabai Raut, the farmer from Bhandarbodi village who was initially reluctant to participate, left her valve open in the night, convinced that water from the pipeline would never reach her land. In the morning, she was pleasantly surprised to see that her farm was well irrigated and called up Sahebrao to express her disbelief and happiness. The farmers have now started growing 'Jai Sri Ram paddy', a variety that produces scented rice that sells for Rs. 2400/quintal. An assured supply of irrigation for dry spells eased the shift from the old variety of 1011, which sold for Rs. 1500 per quintal. Also, due to protective irrigation, a yield increase of 2-3 quintals per acre was achieved in paddy. Thus, farmers have significantly higher incomes from the Kharif Paddy crop.

Following the success of the phad system in these two villages, 13 new phad systems have cropped up in the block, eager to replicate the success. Another benefit of the phad system has been the recharging of ground water levels in the region, further improving irrigation in the farms. The farmers observed that there were many advantages of the phad system. Many of the water conservation structures in the area need maintenance and repair and have huge transmission losses when transporting water to far away farms.

The phad method does not need any electricity or external energy to draw water. The pipeline innovation in phad also eliminates transmission and evaporation losses that are usually observed in gravity based flood irrigation. A structure can be converted into phad system keeping in mind that the farm's geography should allow gravity to carry water and a repaired or new structure should be constructed to hold and transport water.

A tank with discharge holes at the source can be used to regulate the discharge of flood water. A gravity based network of pipelines should be present to take water to
the farms downstream. An average of 30-acre compact patch of land for irrigation is a must. An average 6 farmers are required in a group to make investment and maintenance viable. A Water User Group needs to be formed for supervision and monitoring during construction and participatory water management after the structure is built.

After the success of the *phad* irrigation system, YRA has achieved great goodwill among the farmers. The organization has capitalized on this by introducing a range of innovative interventions. Farmers of the region have now undertaken alternative practices such as System of Rice Intensification (SRI), mixed cropping and poultry with *desi* birds to improve yield and income.

**Collectivisation of Groundwater, Chellapur village, Mahabubnagar district, Telangana**

A small experience in Chellapur village in the RRA-CP in Mahabubnagar district in Telangana, set the stage for the Department of Agriculture in Andhra Pradesh to initiate an RRA program in Anantapur District at scale investing about Rs. 2.5 crore from RKVY and other programmes. The programme was led by WASSAN in partnership with different NGO partners. Farmers in the selected area of about 50 to
100 acres (with irrigated area less than 20%) pooled their private borewells into a grid that extends pipelines to the entire rainfed area within the block.

Sprinkler irrigation sets were accessed by the farmer groups and maintained collectively. Rice area within these blocks has been reduced substantially while protective irrigation should be a right to all the farmers who do not own these borewells. All the farmers agreed not to dig new borewells for at least 10 years. The collectivization of groundwater was accompanied by setting up institutions for community managed groundwater regulation, including monitoring of groundwater level and borewell yields.

A pilot program is now extended to 7 Mandals and 900 acres in Anantapur catching the imagination of many! Farmers are willing to pool their borewells for securing rainfed crops. Biomass generation and application of soil organic matter are integral parts of these proposals to be funded under MGNREGS. A similar proposal for scaling up in the RRA-CP area in Dalit lands in Doulatabad Mandal is presently being considered by the Rural Development Department. Where these programs are taken up, rainfed crops are secure against any moderate rainfall failures, while yields and incomes have increased substantially.

**CASE STUDY - 4**

**Participatory Groundwater Management (PGWM), Khanar village, Burhanpur district, Madhya Pradesh**

In the Khaknar CP in Burhanpur (Madhya Pradesh), depleted water tables lead to poor soil moisture water conditions. AKRSP(I) facilitating the CP program, is evolving an approach to participatory groundwater management delineating water recharge and water harvesting zones to improve the effectiveness of MGNREGS works related to groundwater recharge. Intercepting run-off through contour trenches, bunds, check dams and percolation tanks was taken up.

The focus was on comprehensive planning and linking water retention measures to sub-basin level demands on water use. Locally appropriate water harvesting and recharge techniques were developed by building local knowledge and capacity for
designing such structures. AKRSP(I) tried to revive the seasonal streams and *nallahs* through a series of check dams.

Small and marginal farmers were supported through the creation of small water bodies like farm ponds and the provision of mobile diesel pumps. Existing wells were renovated, and new wells were constructed. A support irrigation scheme for rainfed farmlands was designed in this CP on a pilot basis though convergence with NABARD, Jamsedji Tata Trust and MGNREGS.

---

**Rainwater Harvesting through Happas, Hirbandh village, Bankura district, West Bengal**

In Hirbandh in Bankura district of West Bengal, PRADAN has dealt with the instability in crop production owing to water shortages during dry spells. The undulating terrain here receives more than 1000 mm rainfall. Protective irrigation was provided to *kharif* paddy and mono crop paddy was shifted to multiple cropping systems.
Demonstrations were undertaken by PRADAN for location and situation-specific models for irrigation. Since the area is marked by low per capita land holdings, the thrust was on improving crop intensity by taking two to three crops. With local adaptations to the 5% model (allocating 5% of contiguous farm land to water harvesting), a module of ‘happas’, which are small deep ponds constructed on the farms in medium and highlands for harvesting rainwater, evolved. These landscape-based systems were designed to provide supplementary irrigation to *kharif* paddy followed by intensive irrigation for a high value *rabi* crop. Farmers began to make amendments to the original design and the ponds became deeper. The adoption rate of this simple labour-intensive technology was significant in villages dominated by scheduled castes and tribes.

A study by IWMI estimates an increase in the average annual incomes by Rs. 5,792, with a Rate of Return on investment of 24.8%, a result of irrigation through *happas* in the area. The crop mix has diversified further now with farmers growing paddy, maize, mustard and vegetables. The *happas* are being put to multiple uses like domestic purposes, livestock and fish. The earth excavated from the *happas* is being used to level lands. The project was successful in engaging with the Gram Panchayats and has also persuaded the Panchayat and Rural Development Department to use unallocated MGNREGS funds to the tune of Rs. 220 lakhs for constructing *happas*. 

---

**“Happa”, on farm water harvesting structures that are being constructed under MGNREGS programme. Happa has been very effective for providing protective irrigation of Rainfed crops.**

**PRADAN** has demonstrated this on farm water harvesting structures in large scale in Hirbandh and other blocks in Bankura district, West Bengal.
II. LIVING SOILS: ENHANCING SOIL HEALTH AND PRODUCTIVITY IN RAINFED AGRICULTURE

Soil holds the key to productivity and resilience in rainfed agriculture. It performs many critical functions in almost any ecosystem but in India the deteriorating health of soils has led to stagnation of agriculture – both in irrigated as well as rain fed lands. In the recent years the civil societies have got the focus back to the soils where interventions and approaches have revolved around improving the soil organic matter. The scientific community as well as practitioners have re-enforced that adding organic matter not only improves soil biology, but also enhances soil moisture and increases the efficiency of fertilizers.

While conservation of the soil is the first step, annual addition of organic matter to trap moisture is the most critical factor. Watershed development programs funded largely by government programs have provided the necessary support for soil water conservation reinforcing that the public agencies is a major stakeholder in investing in soil and water as a ‘public good’. However, there is little invested in soil organic matter thereafter.

As soil conservation is sufficiently established both in IWMP and MGNREGS programmes, RRA network started with a focus on the revival of practices and improved measures in addition of ‘organic matter to soils’. The network has come up with the 3 M framework: Organic Matter, Microbial Activities and Moisture Management for transforming soils in rainfed areas as ‘Living Soil’.

The principles that the RRA network tried and want to take forward: incentivizing farmers to add at least 2 tons of organic matter annually on every acre of rain-fed land; raising green manure crops; round the year vermi-compost preparation; and growing *gliricidia* plantations; and preparation and use of liquid manures. All these were tried out as comprehensive pilots (CPs) in prioritized districts of the network. Though the planning process, technical protocols and operational mechanisms were well worked out, the CPs lacked dedicated programs and financial resources to take these pilots to scale across the region. RRA from its experience believes that soil must be treated as a ‘public good’ and therefore the government has the responsibility to support and incentivize farmers to maintain soil health comprehensively. The following case studies highlight the methods of improving soil organic matter piloted in Daulatabad, Bagli and Chhatarpur blocks supported through MGNREGS and Department of Agriculture.
CASE STUDY - 1

Enhancing Soil Productivity, Mahabubnagar district, Telangana

In Mahabubnagar CP (Telangana), a combination of silt application, farm-level compost pits in rainfed lands with plantation of Gliricidia, an awareness program to use crop residues for composting were packaged into a program under MGNREGS. Dryland horticulture was also included in the package. Cost estimates were developed for all these and an attempt was made to include these in to the MGNREGS software. Sanctions were obtained for individual components and they were made part of the shelf of works. It is a long-drawn struggle to get these components initiated on the ground as the plans, priorities and the shelf of works in the scheme change frequently. There are also complexities in getting work orders and IT-related problems.

In order to improve soil health and organic matter, Compost, Vermi-compost, AmrutKhad and Green manuring have been promoted in Daulatabad, Hirbandh, Bagli, Khakhnar, Chhatarpur blocks under RRA programme. Convergence with MGNREGS and Department of Agriculture for such activities has helped in upscaling.
Enhancing Soil Fertility, Malkangiri district, Odisha

In the Malkangiri CP (Odisha), soil fertility plans are prepared and submitted under MGNREGS. AKRSP India already has a program called ‘AmritKrishi’ – for preparing liquid manure (that includes some botanicals) and preparing compost – AmritKhad. Efforts are being made to establish local enterprises around liquid manures.
Monsoon failures early in the season often force farmers to repeat sowing. In a year of abnormal rainfall, the loss of a crop leads to a shortage of seeds in the subsequent year. Seeds that are better adapted to the local situations in rainfed conditions are in great shortfall. Incidentally, the public sector seed system and distribution network is geared for popularizing certified and improved seeds of few main crops/varieties produced by the research through subsidies.

There is a tendency to overlook the local varieties of seeds which is crucial especially in rainfed agriculture. It is crucial because diverse varieties of seeds need to be available on time for normal sowing as well should be available for contingency for repeat showing in case of crop failure.

The private sector research prioritizes development in hybrid seeds of cash crops that are profitable to industries. Also these seeds are not available to farmers on time through government distribution system. In this context, where the seed industry is moving towards hybrid and GM seeds, developing a seed support system that restores local knowledge of seeds that has been passed on from generations is necessary.

RRA CPs is at several stages of evolving such seed systems in collaboration with the Department of Agriculture in. It started with an assessment of seed issues across the CP locations by CIKS, which was anchoring the nodal support. Two centralized training programs were organized by CIKS for the CP partners on the basics of seed management. A series of technical publications are available in the RRA website (http://www.rainfedindia.org).

One of such initiative, The Community- Managed Seed Systems (CMSS) program has now been scaled up by the Department of Agriculture (DOA) in Anantapur district of AP covering 183 villages, and outreaching 2083 farmers covering 800,000ha in groundnut seed. The program piloted by WASSAN in collaboration with NGOs from the district and the DOA. Doing away with the formal distribution channels (Seed corporation, seed certification agency), locally adopted germ plasm of groundnut K6 seed was multiplied and distributed within a cluster of villages making farmer’s accessibility to quality seeds reliable and timely.
Venkatramana from Ananthapur sustains himself and his family on the three acres of land he owns where he grows groundnut and some red gram. Shortage of seeds and high cost in crop inputs are his two biggest impediments. “We would stand in queue from 5 am and wait for upto a day or two sometimes. We would get fewer bags of seeds because there were just too many of us. I could cultivate only part of my land”. The quality of the seeds was extremely poor-we would throw half the seeds away. Then there was the cost of the fertilisers and pesticides. It is difficult to make a profit when your cost is so high. Under the CMSS, he is assured of getting the nine bags of seeds needed for three acres of land. There is no end to his happiness now.

The programme is an encouraging first step but needs to diversify in terms of identifying and propagating germplasm of local seeds of other crops. It also needs to invest substantially on strengthening the institutions in maintaining buffer seeds locally in the villages. There is great deal of local empowerment of community organizations and NGO on a business model, the facilitation costs being linked to volumes of seeds transacted. The process also witnessed DOA providing the seed subsidy directly into the bank accounts of the farmers. Statistically looking, the DOA in Anantapur channeled Rs.97.84 lakh subsidy during 2013-14 through this program. (http://www.rainfedindia.org/issues/images/CMSS.pdf).

Similarly, Satvik- one of the partners in the Kachchh network through the programme called Anmol prioritized and multiplied well performing local varieties of different crops which adapted to the harsh arid environment of Kachchh.

The need for initiating a collaborative pilot programme and its modalities emerged during a recent workshop on Community- Managed Seed Systems jointly organized by MANAGE and the RRA network. Shared experiences of NBPGR, Seva Mandir, ANMOL, CMSS, WASSAN, Directorate of Seeds Research, Directorates of Sorghum, Oil seeds, etc., and civil society organizations helped to deliberate on the operational modalities of a seed system and to initiate a national program in addition to taking forward the CP initiatives.
Vijay Shankar Reddy is a producer farmer and has 11 acres of land, of which two acres are under groundnut cultivation. He grows tomatoes in another acre. The rest lie barren as he has irrigation to cover just those three acres. His groundnut fields are the primary source of income for this 31 year old and it is critical that they give him the maximum yield possible.

However, for the past decade, profits have been fluctuating for Vijay. The biggest challenge for him has been in sourcing the seeds. “After waiting in queue for hours, sometimes up to a day or two, I would manage to get three bags of seeds (90 kg) which is enough for just an acre. For the other acre, I would be forced to source seeds from outside which meant more expenses. Worse, by the time I managed to procure the required quantity, it would often be too late for sowing.” Under the CMSS, Vijay was able to produce six bags even though the limit was three bags per acre per farmer.

During Rabi, the Department of Andhra Pradesh, in a first, agreed to allocate more seeds to producer farmers with assured irrigation. “The seeds were not only supplied...”
in time for the Rabi season, but they were of good quality too.” The average yield from Vijay’s two acres is about 40-50 bags (approximately 25 bags from each acre – each bag weighing 30 kg). Though he expects a better yield this time, he is also realistic. “Though we got better seeds this time, there is a major power and water crisis here.

Nonetheless, the biggest benefit is that with the CMSS, we do not have to go outside our villages to procure seeds. This helps us enormously in becoming self-sustained in seed production and besides keeping our costs to the minimum, it also ensures seed supply for the farmers. We have 26 farmers producing seeds under the CMSS in this village- they will have more than enough to supply to the 89 consumer farmers who have signed up for the programme.”

**CASE STUDY - 2**

**Establishment of Seed Bank, Mahabubnagar, Telangana**

A more systematic approach was piloted in the Mahabubnagar CP. An initial assessment suggested the need for three cluster-level seed systems to cover the Mandal of which one was piloted. A cluster-level seed bank was established by the farmers’ cooperative in convergence with ATMA, Department of Agriculture and IWMP. The seed bank multiplied groundnut and paddy varieties, ensured quality, enabled local procurement and distributed within the cluster in collaboration with the Agriculture Officer.

The subsidy was paid directly to the bank account of the farmer. The seed bank now has a capital base of more than Rs. 2 lakhs from their profits and subsidy from the Department converted into capital. It has produced 56 quintals of groundnut and 68 quintals of paddy seed and sold it to the farmers. It has seeds of 9 crops including groundnut, paddy, green gram, cow pea, finger millet, fox tail millet and others. The institutional processes and business development are still to be standardized and technical capacities to be enhanced.
Seed Procuring Farmer - Ratnalapalli village, Nallacheruvu mandal, Anjaneya Swami Mandal Mahila Samakhya

“My dream is for my children to study as much as they want. If I am able to support this, I would be the happiest man.” Venkataramana Nayak’s daughter, 19, studies BSc in Biochemistry, while his 17 year old son is giving his intermediate exams. Venkatramana hopes to realise his dream by doubling his income under the CMSS programme. “My yearly income thus far has hardly exceeded Rs 8,000. This Kharif season, however, I expect my earnings to go upto Rs 20,000.” Venkatramana sustains himself and his family on the three acres of land he owns where he grows groundnut and some red gram.

Shortage of seeds and high cost in crop inputs are his two biggest impediments. “We would stand in queue from 5 am and wait for upto a day or two sometimes. We would get fewer bags of seeds because there were just too many of us. I could cultivate only part of my land”. The quality of the seeds was extremely poor-we would throw half the seeds away. Then there was the cost of the fertilisers and
pesticides. It is difficult to make a profit when your cost is so high. Under the CMSS, he is assured of getting the nine bags of seeds needed for three acres of land.

He has already identified a producer farmer to purchase the seeds from- his next door neighbour, Raja Reddy. The village has 80 consumer farmers and 40 producer farmers signed up under the CMSS programme. “Farmers in our village are united. We know we will be better heard as a group. So we are all determined to make the CMSS work to the entire village’s benefit.”

**CASE STUDY - 4**

**Creation of Seed Banks, Palamu district, Jharkhand**

In the Palamu CP (Jharkhand) seed banks were initiated in a quasi-business mode in five Gram Panchayats on the SHG platforms. An initial exploratory exercise listed farmers’ preferred varieties. The foundation seed of these varieties was sourced from KVK, Birsa Agriculture University and other places and they were multiplied locally. Seed farmers were trained with support from ATMA. Seed banks procured seed and established a mechanism of distribution to the farmers either payable as cash or in kind but at a ratio of 1: 1.5 times. Local supply of finger millets seed sourced from AICSMIP and other places brought back finger millets into the crop systems in a substantial way.
IV. MILLETS AND CROP DIVERSIFICATION FOR NUTRITION SECURITY

Farmers practicing rainfed agriculture survive on a diversity of crops, animals, natural resources and livelihoods, mainly as a measure of managing risk. Millets and minor millets are good drought resistant crops that not only assure food security but also are good sources of nutrients such as proteins, minerals and fiber. Millets and minor pulses in particular, can thrive on poor soils, can double up as fuel and fodder crops, and can consume carbon and are cultivated with low external inputs. They offer greater resilience to rainfed agriculture.

Incidence of high malnutrition in tribal areas is attributed to a steep decline in cultivation of millets as they are being replaced by rice, cotton, a competitive crop. The fast declining crop diversity due to a shift in cropping pattern in favor of cash crops has made rural households vulnerable to attain a food as well as nutritional security.

There is a strong need of mobilization, campaign and use of improved techniques for productivity enhancement in order to bring back the lost acreage under these important crops. The increase in area under irrigation and subsidized food grains availability of wheat and rice have greatly affected the food grain diversity in rainfed areas. Between 1970-71 and 2010-11, the area under millets declined by more than 45%. However, there is promise. The rise of prices for millets and an appreciation of their value as a ‘nutrition grain’ in the urban areas could bring back the glory of millets. The high production growth rate of millets at 4.8% (including maize and barley) compared to the total food grains (3.31%) is another encouraging indication.

In the RRA network CP locations the diversity has started to be re-established: Finger millet, Bajra and Sorghum were cultivated in Malkangiri, Doultabad, Bagli, Kakhanar, Bhuj and Palamu; minor millets such as Foxtail millet, Little millet and Barnyard millet in Malkangiri, Palamu and Kakhnar; pulses such as red gram, horse gram, chickpea, soybean, mung bean, lentil, and green gram were food crops grown across many CP locations. In the Malkangiri CP, finger millet is part of the regular diet of tribal communities and is cultivated on the uplands.

On the flip side, in the Doulatabad it was observed that rice and groundnut have replaced finger millets, and the cultivated area under sorghum has shrunk. In the SPS CP, sorghum is still under cultivation but is increasingly being substituted by maize.
However, it was observed that there is a direct correlation between cultivation and consumption and is closely linked to the culture of that geography.

The interventions required are: comprehensive and simultaneous efforts in production; consumer awareness and consumption; advocating for a Minimum Support Prices; and introduction of these grains into the public distribution system and nutrition programs. RRA-CPs intends to pursue this approach in convergence with mainstream government programs as these could impact a large population.

The CPs are moving towards developing local production clusters (production-processing-consumption) while simultaneously working with state nutrition and welfare programmes to generate a bulk demand. Additionally, millet seed banks have helped restored local varieties and have led to an increase in crop coverage, particularly in Palamu and Malkangiri CPs. Quality seeds sourced from the agricultural stations also helped to improve productivity.

Based on the experiences of RRA Network Members, Comprehensive Revival of Millets Programme has been initiated by DoA, Government of Andhra Pradesh in 44 Mandals in 7 districts covering 75,000 households to bring back millet in around 1 lakh acre cultivated land. A similar programme called ‘Mission on Millets’ initiated by DoA, Government of Odisha in 30 Blocks in 7 districts in 25000 acre of cultivated land with an outreach of 1.2 lakhs households.
Value Addition and Marketing of Minor Forest Produce, The Better Sweet Tamarind

In July 2014, a Centrally Sponsored Scheme was launched for marketing and development of value chain of Minor Forest Produce through Minimum Support Price; TDCCOL (Tribal Development Cooperative of Odisha Limited, Bhubaneswar) was declared the SPA (State Procurement Agency) for ten such items listed down. TDCCOL formed groups and planned to procure quantities of tamarind and hill broom from the respective PPA (primary procurement agency) which comprised two or more producer groups which were formed under this programme.

However, due to reasons like corrupt practices and lack of trust among the farmers, their endeavour remained incomplete and no procurement took place. With no option left, the women of these groups were forced to sell their products at a greater loss to the existing traders. This bitter experience of the previous year was holding back the groups from attempting any such deal this time around. RRA (Revitalising of
Rainfed Agriculture) wanted to establish a reliable and fair linkage system between these groups and the market.

The Network started exploring options and came across SHPL (Safe Harvest Private Limited), a company that deals with marketing NPM (Non Pesticide Management) farm produce. For the first time in the past ten years, the local prices of seeded tamarind went up to Rs 22 a kg. In certain villages, there were instances of the middlemen paying a sum of Rs 25 in the village itself. This was as a direct consequence of RRAN's intervention. RRAN's strategy was to procure at a maximum price of Rs 20/kg, or Rs 1 more than local rates, the aim being that the primary collector should get the best price possible.

When the local players became aware of the strategy, they also hiked up their procurement prices. In some areas where the rates fluctuated between Rs 20 - Rs 25, RRAN did not intervene, as it did not have such high purchasing power. Apart from the procurement rates, RRAN procurement agencies were asked to keep in mind the quality of the tamarind. To ensure good quality, the agencies were encouraged to procure either from their own village or those close by.

Most tribal sellers add water to the tamarind before selling it, as it increases the weight. Faced with problems like being unable to bargain for their product's quantity or quality with the trader, these sellers have devised their own ways to make up for the inevitable loss. However, RRAN procurement agencies explained that there was no need to indulge in such practices. The sellers were assured that unlike the traders, the procurement agencies would not cheat on weight and the primary collector would get his/her dues. This message was in turn conveyed to the primary collectors. Tamarind is something that is sold by the collectors on a weekly basis at the local haato (market) or to traders and middlemen who purchase from the doorstep of the collector. Cheating in quantity and price is a part and parcel of this traditional transactional arrangement. Another common practice is the booking of trees in advance, where the ‘sahukars’ buy off certain trees and take on the sole responsibility of collecting, processing and transporting the produce and keep the profits. Hence, the SHGs who wanted to bring in alternative methods in the tamarind business had to make haste and equip themselves against such old time competitors and practices.
THE PROCESS OF PROCESSING

The main hurdle was to convince the community to de-seed the tamarind, a practice that is followed only for small quantities, meant for household consumption. The easiest way to sell for the community, in terms of habit and labour, is in the seeded form. However, SHPL declared that they were unable to deal with the de-seeding at a later stage and hence it had to be done at the selling stage itself. Thus began the journey of converting seeded tamarind to deseeded, altering the entire value chain of tamarind in Malkangiri. With this arose the question of who will de-seed and how.

RRAN started surveying the villages to gauge the potential of tamarind and then initiated discussions with SHGs that were interested to enter this venture. Training programmes were held and fund support was disbursed to facilitate the entire process. In the process of de-seeding the tamarind, a number of new dilemmas arose for the SHGs. Should the tamarind be deseeded using a ‘kaanta’ (sharp knife like instrument) or by beating it with a stone on a flat platform? Both the methodologies were tried and tested in different areas.

Though the latter theoretically seemed simpler, the women were more comfortable with the former. The SHGs were apprehensive about drying the tamarind as they were aware that the weight would decrease in the process. When demonstrations showed that the pulp made up only forty percent of the weight, with the seeds making up a further forty percent and the fibre ten percent, the SHGs were asked to dry the tamarind even more. At this juncture, the SHGs were even more vexed about the proposition. After explaining the cost dynamics to the groups, SHPL initially offered a price of Rs 45/ kg, which was later negotiated after observing the emerging market trends and the actual proportion of remaining pulp. The final rates were decided on Rs 50 to Rs 52 depending on final quality check by SHPL representatives.

<table>
<thead>
<tr>
<th>SHG at CC</th>
<th>PANCHAYAT</th>
<th>DESEED QUANTITY (IN KG)</th>
<th>TOTAL BUSINESS DONE BY SHG</th>
<th>SHG'S INVESTMENT</th>
<th>CLUSTER LEVEL RESOURCE CELL SUPPORT</th>
<th>INCOME FROM SELLING SEEDS</th>
<th>NET PROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maa Gupteswari</td>
<td>Gundhawada</td>
<td>367</td>
<td>18717</td>
<td>7000</td>
<td>4000</td>
<td>2000</td>
<td>9717</td>
</tr>
<tr>
<td>Mahima Shakti</td>
<td>Nuaguda</td>
<td>550</td>
<td>28600</td>
<td>NA</td>
<td>12000</td>
<td>2980</td>
<td>19580</td>
</tr>
<tr>
<td>Jeeban Jeebika</td>
<td>Salimi</td>
<td>810</td>
<td>40500</td>
<td>20000</td>
<td>10000</td>
<td>4900</td>
<td>15400</td>
</tr>
<tr>
<td>Jeeban Deepo</td>
<td>Kiang</td>
<td>390</td>
<td>19500</td>
<td>12000</td>
<td>NA</td>
<td>2500</td>
<td>10000</td>
</tr>
<tr>
<td>Jeeban Vikas Haldi</td>
<td>Badapadar</td>
<td>750</td>
<td>38250</td>
<td>22000</td>
<td>2000</td>
<td>8250</td>
<td>22500</td>
</tr>
<tr>
<td>Maa Mangala</td>
<td>Tumsapalli</td>
<td>135</td>
<td>6750</td>
<td>NA</td>
<td>5000</td>
<td>325</td>
<td>2075</td>
</tr>
</tbody>
</table>

CASE STUDY - RAIFED AGRICULTURE
In Nuaguda village, out of the four existing SHGs, Mahima Shakti SHG took up the challenge of buying and deseeding almost 1 ton. Seeing this achievement, Durga Dei SHG was inspired to try their hand too. Out of the four SHGs, this was the oldest but had unfortunately never really taken off. Their savings were meager and additional remunerative activities almost nil. This time they loaded a tractor with almost 2 quintal tamarind from the close by Narsinghpur village and had it delivered to their village.

Thus began the de-seeding of tamarind and reviving of Durga Dei SHG, with the women of the SHG working collectively. A few SHGs had the misfortune of purchasing low quality seeded quantities and hence had a tough time de-seeding it. Unseasonal rain also played havoc, with the Jeeban Vikas Haldi Utpadakaran producer group being forced to sell off 12 quintal of spoilt purchase before they could start the de-seeding process.

Since SHPL was interested only in the pulp of the tamarind, the seeds collected were sold by the SHGs directly in the local haato at prices varying from Rs 5 to Rs 10/kg. This served as an additional income for their labour, which otherwise was just about met by selling the deseeded tamarind to SHPL at an average of Rs 50/kg.

The facilitating organisations faced a dilemma whether to centralize or de-centralize the entire process. While centralization would ensure easier quality control, convincing a single SHG to de-seed large quantities was near impossible. Small producers are usually unable to store and take responsibility of large quantities of perishable and even non-perishable items. This hinders them from coming together and hence decentralised procurement and aggregation seemed favourable. Collection Centres were chosen according to the availability of storage facilities, which in most cases were Panchayat rooms given to the respective procurement SHGs for storage purpose.

For the tribal seller, the most important criteria in selecting his/her market is easy access and immediate payment. These sellers have come to realise that investing in time and labour for adding value to their products is of little consequence since the market they are familiar with does not provide scope for it. However, if analysed, this is reminiscent of the chicken and egg situation. Hence, when RRAN offered the tribal sellers a market for de-seeded tamarind, they were skeptical about the viability of the market. The process helped them learn small value addition techniques that could be done at their homes and help them fetch higher prices.
Another factor which restrains marginal producers/collectors to experiment is the access to credit. The procuring SHGs faced the same issue and were linked to their respective community cluster resource cells, which provided them credit support. This was imperative for them to purchase the goods from primary collectors. It was observed that the decentralised mechanism worked well, but only with an average minimum of 5 quintals seeded tamarind at each decentralised collection center. Smaller quantities turned out to be nonviable from business point of view. For the coming season, if the groups are open to dealing with larger quantities, a simple de-seeding machine would be required to process the tamarind at centralised locations.

**THE WAY AHEAD**

While this year's intervention is the first of its kind in the district of Malkangiri, the attempt to document and reflect the entire experience is not to judge whether it was a success or failure. Rather, this exercise aims to provide a small window of opportunity for the community to explore and decide for themselves the options they have. The community could choose whether to sell seeded or de-seeded tamarind to organizations like TDCCOL that promote fair trade or continue with existing middlemen.

**INTRODUCTION OF MILLETS, MALKANGIRI, ODISHA**

In Malkangiri, a pilot program was initiated with ITDA to introduce millet snack in the welfare hostels serving food for 4000 children. In Malkangiri CP, millets were introduced through a millet-based snack in special residential hostels in the district. SHGs were encouraged to procure ragi and groundnut from farmers/weekly market, process them and supply (at market rates) to hostels. The cooks at these hostels were trained to prepare millet-based recipes. 4000 children have been covered in Maithili and Malkangiri blocks so far.

**FINGER MILLET DEMONSTRATION, PALAMU DISTRICT, JHARKHAND**

In the Palamau CP area, special millet food festivals are organized in villages and in Kisan Melas where women demonstrated various millet-based preparations. These efforts helped increase the uptake of finger millet seeds from the seed bank. Finger millet demonstrations were taken up in 60 acres supported by ATMA.
REINTRODUCTION OF MILLETS, SRIKAKULAM DISTRICT, TELANGANA

WASSAN reintroduced intercropping in 1325 acres by convergence with INSIMP (Initiative on Nutritional Security through Intensive Millet Promotion) program in Kharif 2013 across 14 villages. These efforts have put sorghum back into the crop systems as intercrops in several villages. The millet node in a collaborative program on “Re-valorizing Small Millets” supported by IDRC, ITDA, and the Department of Women and Child Development, introduced millet-based menus in ICDS (Integrated Child Development Services) in Srikakulam district as a pilot program. Millet promotion was also taken up with 2000 farmers converging with the INSIMP program. The millets node also actively contributed to the development of the state nutrition policy for Andhra Pradesh.
V. AGRONOMIC INNOVATIONS

Agronomic Innovation is often viewed as the application of better solutions that meet new requirements, unarticulated needs, or existing market needs in the farming sector. This is accomplished through more effective products, processes, services, technologies, or business models that are readily available to local markets, local governments, NGOs, and farmers.

In the rain-fed agriculture scenario, RRA network has taken the lead in promoting innovations throughout the supply chain of agricultural produces cultivated during the monsoon season. Farm produce aggregation through community based-institutions, farm management solutions through supporting local entrepreneurs, non-pesticide management at farm are some of the process innovations that were undertaken.

On the product innovations, formulation of soil inputs such as vermi-compost, Amrutkhad, Neem oil, liquid organic pesticides, were promoted to increase productivity, and control agricultural pests. In the RRA network CP locations, small-land holding farmers and communities have shown great competency in introducing productivity-enhancing innovations, which have resulted in enhanced pest and weed management, greater water use efficiency and promoting biodiversity.

Important lessons have been drawn to expand rural innovations with a potential to bring large-scale impacts, such as integrated pest management, agricultural extension through Farmer Field Schools for informal and participatory learning and knowledge, and the System of Rice Intensification.

This has been made effective due to the support from governments, civil society organizations and the direct involvement of local farmers. Furthermore, continuity of innovations has been sustained through undertaking agricultural research, new agri-business models, integrating farmers’ knowledge with practice and thus making agriculture more sustainable, resilient, and productive.

The potential to innovate for rainfed regions for crop productivity is immense as most research has traditionally followed where the factors of production is under control. The practice of employing scientific soil and water conservation methods in uncertain rainfall conditions is challenging. Nevertheless, case studies of agronomic innovations pioneered by RRAN such as ‘Dry Direct Seeded Rice Method’ and ‘System
of Rice Intensification’ in Bankura of West Bengal by PRADAN, RRA Malkangiri; formulations of soil inputs by AKRSP-I, WASSAN and SPS; and aggregation and sale of Non-Pesticide Management (NPM) products by Safe Harvest Pvt. Ltd. have proved that innovation opportunities and issues faced by farmers are many for pursuit.

CASE STUDY - 1

DSR (Dry Direct Seeded Rice) - The Hope of Rainfed Area for Foodgrain Security, Hirbandh block, West Bengal

This is the story of some hand to mouth farmers, who have food grain security of only 5 to 6 months that is produced in the small farmlands. Typically, the soil fertility of these lands is very poor and they do not have access to protective irrigation. In Hirbandh Block, paddy is the main food crop and is totally rainfed. Paddy is cultivated during kharif season in all types of land like upland, medium upland, medium lowland and lowland, with farmers usually following the traditional transplanting paddy practices. The changing climate has had a negative impact on the agricultural
practices in this region. For water intensive crops like paddy, the unpredictability of the monsoon and reduced rainfall greatly damages the yield and production.

The Hirbandh block has been experiencing a delay in the start of monsoon, which is usually during late July or first week of August. Apart from the delay in monsoon, dry spells are being experienced during the grain filling period, worsening the scenario. The main constraint of the traditional practices is that there should be enough water for land preparation during seedling transplantation.

As the area is rainfed, a delayed or deficient rainfall could leave a massive impact on crop productivity. If the transplantation process gets delayed, production is decreased due to the aged seedling. On the other hand, if the nursery raising is delayed, then the initiation of panicles is affected due to the cold temperature. The farmers unfortunately face production losses in both scenarios, getting an average production that ranges between 1 and 2.5 ton per ha especially in medium upland, which consist of 55% of total paddy land in Hirbandh Block.

PRADAN, along with the SHG based institution, takes initiatives to cope with the vulnerabilities associated with climate vulnerabilities and revive the rainfed agriculture by replacing the transplanting practices with the DSR (Dry Direct Seeded Rice). DSR method is not new to the farmers of this area, as it was used by the previous generations. However, due to problems faced during line sowing and weeding that resulted in low productivity, it was abandoned. The advent of new technologies like line marker for line sowing and dry land weeder for weeding has solved these problems.

**DSR as a technology it has the following principles:-**

- It is started with the first onset of monsoon
- Land preparation involves ploughing the land until good pulverized soil is prepared, which is usually three times
- Preparation of line with line marker
- Sowing the treated seed in the line with low seed rate followed by NPK (nitrogen, phosphorus, potash) application in the line
- Weeding the land thrice, at an interval of 15 days, followed by fertilizer application each time.
- Thinning of seedling if the density is high
ADVANTAGES OF DSR

- Farmer has long period for sowing
- The method depends only on soil moisture
- Seedlings that have been grown using DSR method can survive dry spells better
- Due to early sowing, there are chances of cultivating a second crop from the medium upland areas
- The average production is 4 ton per ha under the DSR method, as opposed to 1.5 to 2 ton per ha under traditional practices

Encouraged by PRADAN, a group of 80 women farmers came forward to take up the challenge of changing contemporary transplanting practices by adopting the DSR method. Following DSR principles, they sowed the seeds from second week of June, with the first onset of monsoon. As the method depends on soil moisture, the requirement of rainfall is less when compared to traditional methods. After ploughing the land two or three times, the farmers sowed the seeds in the moist soil and followed it up with three weedings with a weeder at an interval of fifteen days. On the other hand, most of the farmers using traditional methods raised their seed bed during second week of June. However, as there was a delay in receiving sufficient rainfall for land preparation, the transplantation was done in the fourth week of July.

By this time, the age of seedling was about 35 to 40 days, which is not suitable for good production. The fact that there was a dry spell of 10 days following the transplantation also damaged root establishment. In the fields where the DSR method was used, the roots were well established and had deeply penetrated into the soil by this time. Therefore, the dry spell did not have such a negative impact. Dry spells were also experienced during late August and September, a period crucial for grain filling. Again, the impact was much worse in fields where traditional methods were used and less pronounced in fields that used the DSR method.

Unsurprisingly, it was found that the farmers who used the DSR method got a much better yield. While these farmers had an average yield of 4 ton per ha, the other farmers either lost the crop completely or were only able to harvest 1.5 to 2 ton per ha. This was started with an exposure, organized by PRADAN to nearby district
Purulia, where good results were observed by utilizing Dry Aerobic Direct Seeded Rice (DSR) method.

As part of this programme, village level agriculture training on planning for kharif season, with emphasis on soil moisture-based crop like DSR paddy, has been carried out by PRADAN. The organization has also been providing on-field demonstration and training in every village, apart from grooming women leaders for expanding the DSR technology.

To scale up the technology in coming year, PRADAN visited the fields where DSR method was used along with approximately 250 women farmers who had used traditional methods, before the crop was harvested. During the tour, the farmers compared their crop with the DSR crop. They analysed if it was possible for them to implement this method in their farms. The women farmers raised a number of questions, which PRADAN answered.

A woman farmer who had practiced DSR method in her field also shared her experience, which inspired the other farmers to try it in their own fields. Amita Baskey, Balika Tudu and Anjali Hasda are three farmers who practiced the DSR method in their fields. They feel that they can implement the method independently and are confident about spreading the technology to other farmers. Amita Baskey has taken up the responsibility to scale up the technology in her village in the coming kharif season. The scaling up has spread to other villages as well, with farmers in villages like Chakadoba, Rangamati, Bankakadam, Tatulia and Natundi also planning to use DSR practices in all the mid-upland areas of their village for the next year.

Graph 1

Cum Rainfall mm

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cum Rainfall mm
In Hirbandh, Bankura CP, SRI method was applied in paddy and mustard cultivation. PRADAN created awareness through technical training to farmers to adapt SRI as per local conditions. SHG members in particular were encouraged, through organizing technical training and field visits, to adopt SRI. The graph shows the production in Ton/Ha over different dates of sowing, indicating variations in yield based on the date of sowing.
video shows in villages, experience sharing by farmers and interactive session in the villages and field demonstrations. Selected progressive farmers as CRPs (Community Resource Persons) supported to share, build knowledge and skills of other farmers in the villages and provided on-field support during the cropping season.

Training programmes also covered pest and disease management, practical activities like seed selection and treatment in addition to basic SRI principles. Convergence was established with the Block Administration, and the Block Agriculture Officer provided technical support through field visits arranging for weeders to the farmers. Initially, SRI technique was applied to paddy and later extended to mustard, wheat and vegetable cultivation. PRADAN established a collaborative relationship with CRIJAF for equipment and seeds for other crops to demonstrate SRI.

In the Malkangiri CP, SRI was promoted in convergence with the Department of Agriculture extending to 400 farmers in 300 ha. About Rs. 14.1 lakh was converged to purchase markers and weeders at fifty percent subsidy from the Agriculture Department. Community level institutions (PRIs/SHGs) procured and distributed the inputs for SRI. The results have been very encouraging.

In the Mahabubnagar RRA-CP, WASSAN promoted SRI as a part of the JAI-SRI programme supported by the Department of Agriculture and NABARD in four districts of Telangana and implemented it in the CP area by the federation of SHGs. The SRI programme extends to 4000 hectares in 2 blocks, each village with 100 acres in a contiguous patch under borewell irrigation. In Palamau, SRI promotion is taken up at scale, but failure of paddy crop due to scarce rainfall situations in consecutive years has affected the programme. Direct Seeded Rice was tried in the CP at Bankura (West Bengal), replacing transplantation. Reduction in water and labour requirement was observed but weed management was a problem.
Non-Pesticide Management (NPM) and access Value added Marketing Strategy

NPM is a sustainable agriculture approach that relies on pest management techniques without relying on synthetic chemical pesticides. Farmers in many RRA CP areas do not use chemical pesticides but their produce does not have a different identity. In the recent past though, a slow shift towards unsustainable cultivation practices has been observed. These areas are most conducive for the promotion and adoption of NPM agriculture.
Safe Harvest, a private limited company promoted by civil society organizations, both within and beyond the RRA network, has come on board as a support node for the RRA CPs since April 2014. Since then, RRA network partners began working closely with this company to ensure market linkages and adoption of NPM practices. Safe Harvest enables CP-partners establish NPM standards and protocols through capacity building, training and regular monitoring by means of Collective Guarantee System (CGS), where training, monitoring, review, certification and market linkage happens at a farmer institution level. It facilitates 3rd party lot-wise sampling and testing for 98 pesticides to ensure that the produce is NPM.

This relationship offers a great opportunity to directly link farmers in difficult geographies who are willing to abide by the NPM protocol to retail to urban markets across India. Safe Harvest has made preliminary visits to each of the CP areas to understand the potential to promote NPM agriculture. It has conducted foundation NPM training programs for three CP–partners. It has undertaken field monitoring visits to two CP–locations in 2013 and two CP locations in kharif 2014. CGS certification has been established at two CP–locations. Among CP–partners, SPS and WASSAN have had a relationship with Safe Harvest.

Farmers associated with these two organisations have been aggregating wheat, tur and groundnut for Safe Harvest. Since June 2014, Safe Harvest has helped bring nearly 3500 small and marginal farmers from four CP locations, growing varied crops like soybean, maize, pigeon pea, groundnut, chick pea, wheat, paddy, turmeric, millets, pulses and chili into its fold. In each CP location, Safe Harvest has identified at least one potential crop that can be marketed; Pigeon pea in Daulatabad, turmeric and tamarind in Malkangiri, black gram and chilli in Khandwa and wheat in Dewas.
VI. LIVESTOCK MANAGEMENT

Around 70% of the livestock population in the country is being reared in rain-fed and dryland areas. Livestock rearing in extensive agriculture systems in these areas is dependent on conservation and regeneration of fodder in common lands used for grazing. These range lands indirectly provide livelihood security to the animal rearers by generating income through valued products such as meat, milk, leather and fibre, besides contributing to draft power and soil fertility.

Large and small ruminants and indigenous poultry rearing in the backyards, particularly in rainfed areas, contribute substantially to the agricultural portion of the GDP. Yet, livestock sector faces numerous challenges such as high mortality and morbidity rates, shrinking grazing lands and fodder resources being the important ones to address. In addition, livestock rearers have no access to credit or infrastructure support.

In order to address these problems RRA Network has intervened in many strategic areas through ‘Area Approach’.

- Decentralized community managed preventive animal healthcare programme takes care of vaccination services through community institutions (PRI/SHG federation/village institutions) in collaboration with the Department of Animal Husbandry.
- Small ruminant (goat and sheep) programme envisages improving productivity within a given geographic area (area-productivity) or a cluster of villages by integrating services and clubbing related interventions such as regular paid vaccination, ensuing fodder security, access to and provision for supplementary feeding, modifying rearing sheds and night shelters and developing links to collective trading routes.
- Revival of Backyard Poultry (BYP) production with indigenous breeds through establishing support services in an enterprise mode. This initiative ensures regular supply of inputs such as chicks and feed, delivery of vaccination services and bundling services with extension of improved management practices at the household level.
As RajKumar Dewda, a para vet from Dewas reflects “there are hits and misses but the love, respect and gratitude of various families when I save an animal is great.”

RRA network advocates the following that need more attention of policy makers: Integrating agriculture, natural resources management with animal husbandry at the farming household to optimize income opportunity and sustain natural resource vitality; and increasing the fodder base in common grazing lands.

But central to the programme is to reduce animal mortality through community-led preventive health care services; focus on rearing more small ruminants such as backyard poultry as it generates quick supplementary income for the rearers. The various case studies from Andhra Pradesh, Jharkhand and Madhya Pradesh demonstrate the effectiveness of vaccination services through the local systems.

CASE STUDY - 1

Livestock Management, Chattarpur block, Palamu district, Jharkhand

Kokro village located 8 kilometers south of Chhattapur Block, falls under Charai panchayat of Palamu district. The village has 117 households of different castes. In
2012, during a study conducted by Vikas Sahyog Kendra (VSK) it was found that a majority of the households in the village were dependent on livestock for their livelihood. Another striking find was that villagers of Kokro suffered financial losses due to lack of access to vaccination for their livestock, leading to high mortality rate. The villagers carried out traditional practices which were not effective. Similar problems existed in other villages of Chhattarpur Block too.

A request for vaccination coverage in the block was made to the Block level veterinary officials. The officials cited lack of man power and lack of supply of medicines from the district as the reasons for their inability to extend coverage. Owing to the difficult situation, VSK initiated a training programme for its staff to vaccinate large and small ruminants. Campaigns were organized alongside, at the village level to spread awareness about the benefits of vaccination. Demonstrations of administering vaccinations to the livestock were conducted in the villages. These demonstration programmes motivated and sensitized a few village youth about health issues among livestock. Fifteen such interested youth from different villages were identified and trained to be Para-vets.

With support from the RRA network, VSK started a special programme on livestock health. With participation of the villagers, a disease calendar was prepared, which was shared with the District and Block veterinary officer. The block veterinary officers and staff conducted a three-day training programme for para-vets over disease symptoms, basic remedial measures and home treatment for minor diseases. As a result of two such training programmes conducted in 2014-15, the para-vets gained both theoretical and practical knowledge on aspects of livestock health and vaccination. Mundrika Bhagat, a man aged 41, from Kokro village, was one such Para-vet. In 2015, Mudrika started giving vaccinations and charged a nominal service fee of Rs. 10 for large ruminants, Rs. 5 for small ruminants and Rs. 2 for desi Birds.

The service fee charged by Mundrika was less than that charged by local quacks. In the first year, Mundrika was able to provide 100% vaccination to all the livestock in his village. He also covered three adjoining villages. He was able to earn Rs. 10,000 annually through this service. His other financial requirements are met from agricultural activities. His seasonal services have provided him with additional income for him during the non-agricultural season.
The details of vaccination given by Mundrika in Kokro village are given below:

Table - 6: Details of vaccination in Kokro village

<table>
<thead>
<tr>
<th>No. of Household</th>
<th>Name of the Medicine</th>
<th>Cow</th>
<th>Ox</th>
<th>Buffalo</th>
<th>Goat</th>
<th>Birds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>Haemorrhagic Septicaemia (H.S.); Black quarter (B.Q) &amp; Foot and mouth disease (FMD)</td>
<td>108</td>
<td>114</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>245</td>
</tr>
<tr>
<td>67</td>
<td>Pest des Petits Ruminants (PPR)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>278</td>
<td>0</td>
<td>278</td>
</tr>
<tr>
<td>14</td>
<td>Newcastle (Rani Khet)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>121</td>
<td>121</td>
</tr>
<tr>
<td>146</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>644</td>
</tr>
</tbody>
</table>

Mundrika’s effort has contributed to reducing livestock mortality and disease outbreaks. Villagers have also begun to see the need and started seeking vaccination even before the disease outbreak.

With the increased demand and shortage of supply of medicines through the department, the people of Kokro and adjoining villages plan to raise a collective demand for indent to the department through the farmer organization formed at the block level. Mundrika takes active role in mobilizing the people and making them aware of their rights. VSK is advocating the systematising of the vaccination process and services of the Para-vets. Para-vets like Mundrika are role models and torch bearers to the concept of community Para-vets.
CASE STUDY - 2

**Vaccination Support helps reduce desi-bird mortality, Srikakulam district, Andhra Pradesh**

Chinnayya Adivasi Vikas Sangham (CAVS) is a local Adivasi group that works in five mandals of Srikakulam district, Andhra Pradesh. CAVS, as part of its campaign on millet promotion, organized a meeting with the community at Kothabaleru hamlet of Sorlangi Gram Panchayat. During the meeting, concerns were raised by a woman about the dying desi poultry she was raising in her backyard. She wanted the organization to help with medicine for the diseased birds. The symptoms (bird stopped eating & drinking and is dull, neck is twisted and heavy breathing) the woman described suggested that the birds were suffering from Newcastle disease/or Ranikhet Disease (RD), locally known as Medavirupu rogam.

There is no treatment for the disease except preventive vaccine. But in order not to disappoint her a few herbal medication tips were shared. During the course of the meeting, it was realized that the same concern was raised by the other households too. As the discussion progressed with other women in the meeting, it was revealed that, each of them (the village had 54 households) lost 5-6 birds.
Apparently they were Dispose nearly 20-25 birds dying from the disease every day. When RD attacks mass mortality occurs in the village and it spreads from one village to the other. An off the hand calculation revealed a loss of staggering proportions amounting to nearly Rs 87,500 (an average of 6 birds per household, each costing Rs. 250). This is the common scenario of entire rural India.

This discussion at Kothabaleru hamlet of Sorlangi Gram Panchayat snowballed into discussions at all 60 villages that CAVS worked in. It resulted in the passing of a resolution by the gram sabha to have a local poultry vaccinator within the village to protect their desi poultry. The resolution also included the villagers’ willingness to pay for the services of the poultry vaccinator at the rate of Rs 2 per bird/ per vaccine. However, 2 of the 60 villages were not convinced to pay the vaccinator. Realizing the need of the hour, CAVS organized a four day training programme on Backyard Poultry (BYP) at Kothabaleru and Hiramandalam villages during July 2015. A total of 58 participants (selected by the community) from 58 villages, attended the programme. Trained vaccinators conducted a RD vaccination campaign in 58 villages in July 2015 and they covered another 96 tribal villages where the demand arose in August 2015.

A total of 37,168 birds were protected from RD through Lasota vaccine in 154 villages. The community paid Rs 54,000 to the community vaccinators. The second round of RD vaccine was done in Sept/Oct 2015 and the third round is due in Dec/Jan 2016. The Joint Director of Animal Husbandry Department, Srikakulam supplied 3 vaccine carriers to vaccinators to maintain cold chain.

As the supply of Lasota vaccine is poor from the Animal Husbandry Department, vaccinators procure from the open market at a cost of Rs 94/per a 500 dose. Lasota vaccine is generally used for chicks below 30 days. However, many commercial poultry farms use Lasota once in two months to control RD, by the spraying method. The vaccinators follow a calendar prepared during

Desi Poultry makes up 84 % of country’s poultry population as per the 19th Livestock Census, 2012. Even in this scenario, over the last 4 decades India has made lot of investments blindly on promoting commercial poultry farming, particularly broiler and improved breeds. During the same time rural backyard poultry has been neglected completely. There is no program to strengthen backyard poultry, in India.
the training program. They assemble at the CAVS office once in two months to make an action plan.

How does the RD vaccination happen? The vaccinator informs the village headman (Grama pedda) about the poultry vaccination camp well in advance to the date of organization of the camp. The village headman makes sure all the families are informed about the camp, by the “Jennodu” (messenger of the village). After the camp, one person collects the money from each household and hands it over to the vaccinator. During the vaccination time they also administer herbal syrup orally extracted from Nelavemu (Andrographis paniculata). It acts as de-wormer. Each vaccinator earns about Rs. 900 to 950 per month, and treats it as a supplementary income.

Since July 2015, there has been no mortality due to the RD disease. Flock sizes have increased in each household, from 12 to 20 birds. Women renovated their poultry night shelters according to the flock size. CAVS has convinced ITDA to support poultry night shelters under MGNREGS. They grow millets and use it as integrated poultry feed. As a result of reduction in poultry mortality in villages, many women are enthusiastic about rearing the desi birds but at present there is no particular source to buy chicks. Farmers at Namakkal, Salem district of Tamilnadu are successfully managing desi poultry breed-farms.

As per the lesson learnt from them as an experiment, WASSAN and CAVS have submitted a proposal (slight modification of the Namakkal Model) to the District collector, Srikakulam seeking support to establish desi poultry breed-farms in the area. The idea is that each breed-farm (having 50 hens with 10 cocks) will produce 1000 chicks per annum.

Out of this, 50% chicks are to be sold to 100 families (5 chicks each), and the remaining 50% to be raised in the breed farm. The breed-farm owner can earn Rs1, 00,000 per annum. The breed-farm owner would need 500 square yard of land to manage one unit with 50 hens and 10 cocks.

The Srikakulam district collector liked the concept of desi poultry breed-farms and sanctioned 3.5 lakh towards establishing five breed-farms. CAVS is to facilitate building night shelters and preparation of package of best practices for forage development. Five young Adivasi farmers came forward to set up breed-farms in five villages during August 2015. Various District officers like ITDA PO, Joint Collector, Joint Director (JD) animal Husbandry, ATMA PD regularly visit these breed-farms.
Many NGOs and CBOs have visited the area and interacted with women raising poultry and vaccinators to know the entire process.

ITDA PO has given a demand note to these breed-farms to supply chicks to 10,000 families at five chicks per family. The present ITDA demand note cannot be met by the existing breed-farms. CAVS has been asked to support the establishment of more breed-farms to meet the ITDA demand. ITDA is willing to support the establishment of 100 more breed-farms to meet their demand note.

ITDA PO has actually come forward to accept that in their previous intervention of giving Adivasi families improved hybrid birds has not benefitted them much. Improved birds are more susceptible to disease and they cannot protect themselves from predators.

*Desi* bird backyard poultry would be the answer to supplementing family incomes.
Udainagar Pragati Samiti fills the Critical Gap in Animal Healthcare Services, Dewas district, Madhya Pradesh

Quality and affordable animal healthcare is difficult to imagine in areas still struggling for human healthcare services. Despite recent gains made due to improved road connectivity and electricity in this part of the Dewas District in Madhya Pradesh, it still remains relatively remote. This story is from the Bagli block in Dewas which is geographically spread across the Nimar and Malwa regions. In a journey of about 20 kilometers in the block, to cross the Ghats (hills), one leaves behind Malwa which is Ghat upar (above the hills) and reaches Nimar which is Ghat Neeche (below the hills)! Malwa and Nimar are distinct culturally and agro-climatically. Hence, Bagli with 118 Gram Panchayats is a fairly large area to govern. Not just for animal healthcare

OFFICIAL DEPARTMENT CHARGES FOR SERVICES ★

- Treatment of large animals - Rs. 5
- Each dose of vaccine - Rs. 1
- A.I. charges - Rs. 40

★ Govt. workers are not authorized to collect charges for vaccination
but for general administration. Within the block itself, there are agro-climatic and socio-economic diversities which result in inequities in service delivery. Politically and socially less influential Scheduled Tribe communities of Ghat Neeche, namely, Gonds, Korkus, Barelas, Bhils and Bhilalas, receive lesser or poorer services.

There is a primary animal healthcare centre in Bagli, the block headquarters which is Ghat upar, the farthest village Ghat Neeche being at least 50 kilometers away. Udainagar, the major town Ghat Neeche is the only place that has a Veterinary Assistant Surgeon (VAS), a trevis, a fridge to stock medicines and two Assistant Veterinary Field Officers (AVFOs). There are two other dispensaries in the area but they are manned only by the AVFOs.

The department has also trained local youth in every Panchayat called Gausevaks for larger coverage but most of them discontinue practice, partly due to inferior skills and partly because they don’t receive any salary or honorarium from the department. Most of them end up taking other jobs. Thus, by the department capacities, assured treatment and large scale vaccination is nearly impossible to deliver. Also, the official charges for treatment and vaccination by the department staff are nominal, but the actual charges from livestock rearers are high. The price is determined on the basis of the terms with the family and the distance travelled to reach the village. In most cases, it is difficult for a tribal family to save an animal during serious disease, with the formal system being far and not so affordable.

Samaj Pragati Sahayog (SPS) has been engaging with the tribal communities in precisely this region since the past 25 years. The foundation of all the work on rights and livelihoods is based on the federations of women’s SHGs that have evolved during this period. One such federation, the Udainagar Pragati Samiti (UPS), among its various initiatives, has undertaken the provision and management of basic animal healthcare services. This was possible after Dr. Gopal Barapatre, a committed veterinary doctor joined the organization in 2007 to provide basic treatment services and build general awareness on animal healthcare. He now leads a team of 10 para veterinary workers, or Paravets in the area, who provide these services on call and work hand in hand with the department staff during vaccination campaigns and health camps.
The paravets have been trained on the following aspects:

a. General diseases in animals (Bacterial and Viral), causes, symptoms and cure
b. Generic and brand names of medicines for these diseases, their dosage and method of administration
c. Pregnancy related disorders and their prevention, eg. Dystochia, Prolapse, Abortion, Infertility and medicines and equipment needed to diagnose and treat these diseases
d. Parasital disorders
e. Castration in large and small ruminants
f. Vaccination of large and small ruminants
g. Fodder and nutrition
h. Artificial Insemination

They provide the following services:

a. On-call treatment for diseases in cattle and goats
b. Preventive vaccination and deworming for large ruminants and goats
c. Animal health camps for infertility
d. Artificial Insemination services
e. Awareness programmes embedded with SHG platform- use of film screenings through pico-projectors as per season
f. Insurance for milch cattle purchased via SHG special loans

The paravets are mobile workers moving from one village to the other, equipped with medicines and basic equipment for animal treatment. The quality and impact of their work is such that while they are paravets in the organization’s language, they are called “Dr. Saab” in the villages. Paravets are paid a fixed salary of Rs. 4,000-8,000 per month plus Rs. 1,000 per month for travel. Each paravet covers an area of about 3-5 Gram Panchayats.
While treatment of animals continues year round, vaccination campaigns at critical periods for major diseases like Foot and Mouth Disease (FMD), Haemorrhagic Septicaemia (HS), Black Quarter (BQ) and Enterotoxaemia (ET) & Peste des Petits Ruminantes (PPR) are events in themselves. Vaccines are procured from the Department of Animal Husbandry, which charges Rs. 1 per vaccine for HS, BQ and FMD.

The department staff participates in the drives as well, but are not authorized to collect the membership fee and hence most of the times pull out of it. Allowing for collection of service charges officially or providing for a per vaccination charge to all those administering vaccines is a major advocacy agenda for the UPS and SPS, as implementing partners of the RRA Network.

Often, there have been issues with the quality of vaccines as well, which has led the UPS team to increasingly be dependent on the market for vaccine procurement. Although it ensures quality, the cost of vaccination increases considerably. The key gap has been lack of supply of ET and PPR vaccine for goats, for which the UPS relies solely on market procurement.

As far as vaccination of large animals is concerned, the TrioVac vaccine provides protection against HS, BQ and FMD in a single dose, while the government procures individual vaccines for all these diseases. People prefer that their animals are vaccinated only once instead of thrice. These are some practical issues in collaborating with the Department in vaccination. Nevertheless, through collective action led by the federation, about 12,000 animals (large and small ruminants) are vaccinated and dewormed in the 90 villages covered by the UPS annually.
POOL OF VACCINATORS

As the vaccination drives gained popularity, the demand for these services grew. A larger team of vaccinators hence became inevitable. The federation decided that they need more people to be working as vaccinators. Hence, local village youth, men and women were trained to vaccinate animals, fulfilling the key gap in achieving 100% vaccination for both large and small ruminants.

The paravets work with a team of 4-5 vaccinators, who cover as much as 70% of the animals in their villages. A pool of vaccinators has thus been equipped to provide the vaccination services. With increased capacities and more demand for these services, the vaccination coverage is expected to reach almost 90%.

COLLECTION OF CHARGES

All the services provided by the UPS are available for all rural households. Those who are SHG members are given a slight discount as the entire federation initiative runs on the surplus earned by individual SHGs, who make annual contributions to the Federation General Fund.

Charges from non-members are collected in cash on the day of vaccination campaign in the village while charges from SHG members are collected in cash at the next SHG monthly meeting by the SHG Mitan/SHG Community Resource person (Mitan is a Chhattisgarhi word that means ‘friend’). A ledger is maintained of the vaccine stock and charges collected at the UPS office. These accounts are audited by an external Chartered Accountant annually.

A receipt is provided to each member for vaccination or treatment service they availed of.

PPR VACCINATION DRIVE IN AGRA: WHO LET THE GOATS OUT?

"Tumhara ghar ketra bokda bokdi che?" (How many goats do you own?) asked Kaalu Singh and Ghudan Singh, while conducting a survey and publicizing the goat vaccination drive that was to take place in Agra. They insisted that every family get all their goats vaccinated (except kid goats less than a month old and pregnant goats as these two categories cannot be vaccinated).

1Please refer to the text box on page 50 to see charges for each service
PPR is a viral disease that spreads very quickly. Its symptoms are difficulty in breathing, diarrhea and it eventually leads to goat mortality. The PPR vaccine bottle, once opened, must be administered within 3 hours or it becomes ineffective. Hence, doorstep delivery of the vaccine was not feasible and people were asked to gather with their goats at the chowk outside the Agra milk dairy. Kaalu Singh and Ghudan Singh, paravets from Pankua and Imlipura villages, sincerely believe that prevention is better than cure.

Such were their commitment levels that at the end of the vaccination drive, they went door to door, requesting families that had not come, to get their goats vaccinated. In a span of 2 hours, 300 goats owned by about 100 households from two localities–Gobliyapura and Peepal Moholla in Agra were vaccinated and all these goats are now PPR resistant.

**WORD FROM A PARAVET**

Rajkumar Dewda, a paravet when asked about his work said, “*Before moving permanently to my home in Pandutalab, I used to be a hammal (manual loading worker) in Indore. I was lucky to find a job at SPS as a paravet and get trained by some exceptional veterinary doctors. The area I cover is vast and sometimes, I cannot make it in time to treat an animal. There are hits and misses but the love, respect and gratitude of various families when I save an animal is great!*”

Raju covers 23 villages that span across 23 kilometers and is found speeding on a bike from one village to another, answering calls, treating animals, going to dairy meetings, attending SPS review meetings, publicizing vaccination and disease treatment camps while being a son, husband and a father. The Udainagar Pragati Samiti has a livestock development account, where its revenue from vaccination, treatment and other services is collated and the Paravets continue to work. These accounts are audited annually by an external Chartered Accountant to maintain financial transparency.

**WAY FORWARD**

The Paravet model, although successful, still needs formal recognition from the Department of Animal Husbandry. With the coverage ever growing, the organization plans to make a strong case for this with the State level administration. The whole
system of service charges has to be followed to keep the revenue model working. However, the organization is aware that it is a public health issue and charges ought to be minimal. Through our experience, it is impossible without allocation for vaccinations by the government. All said and done, the key learning from the effort on providing basic healthcare and vaccination services is that a community organization platform like the UPS, which people trust readily, is key to the success of such an initiative.

VII. FISHERIES

India has traditionally had a rich base of inland fishery resources in the form of rivers and canals, reservoirs, tanks and ponds producing a range of indigenous fish species.

Over the years, seasonal water storage, poor investments, conflicting tenure rights and poor technical know-how have led to the deterioration of pisciculture in rain-fed areas. Therefore, special focus and support systems can help increase productivity and income considerably.

Numerous problems have been encountered while reviving pisciculture; some of which are- poor development of water bodies, lack of quality and timely fish-seed supply in adequate amount and high prices, poor backward linkages in the value chain, and constraints in mobilizing institutional finance. In addition, the dysfunctional role of the Fish Farmers’ Development Agencies of the government, absence of uniform policy for leasing rights to farmers, lack of policy framework for fisheries in rain-fed water bodies at national level, and above all, inadequate technical support created lots of challenges to RRN to bring about significant changes.

A synthesis of initial experiences across the country (WORLP in Odisha, OXFAM Agriculture scale up project in Tikamgarh, APDAI program of WASSAN in Telangana) suggested that the RRA-network should focus on establishing and strengthening the backward linkages in the supply chain. Specifically, the sub-markets of fingerlings or advanced fingerlings, producing low cost farm feed and creation of local feed systems were the key challenge areas.

The network also identified accessing investments for development of water bodies, intense training on production and value addition techniques, and organizing fish
farmers for backward and forward linkages as critical areas that need further policy attention. While private water bodies have good scope in high rainfall eastern zones, the access and control over common water bodies pose a significant challenge in dealing with the nuances of the interpretation of property rights and elite control over fish production.

Realising the benefits of inland fisheries programme in Comprehensive Pilot (CP) areas in different states, RRA Network recommends a national inland fisheries policy. It also suggests effective collaboration with the Mahatma Gandhi National Rural Employment Guarantee Scheme to develop tanks and ponds, and establishment of fisheries resource areas for technical support and strengthening of farmers’ fisheries institutions. Other recommendations include allocation of budget to establish hatcheries for quality fish seed production as well as involvement of women in various stages of the value chain.

The experience so far in agro-ecologically diverse RRA-CPs on fisheries focusing on rain-fed water bodies has provided valuable insights and information to develop appropriate scientific management protocols that increase the adaptive capacity of fishing communities. The numerous water bodies that dot the rain-fed landscape in the region could significantly enhance livelihood opportunities. Developing inland fisheries not only supplements farmers’ incomes, but also mitigates agricultural risk, improves nutrition and enhances women’s participation in the value chain.

The case studies that follow from states of Odisha and Jharkhand capture best practices and interventions. The network interventions were on the following areas: working with government mainstream programmes to restore existing water bodies as well as creation of new water bodies drawing funds largely from MGNERGS; following a market-based approach to strengthen supply markets of fingerlings by promoting local entrepreneurs with technical linkages to the local state government fisheries department; and last but not the least, supporting the civil societies such as the fish farmers’ institutions to sustain the interventions.

Displaced and deprived fishermen, hailing from rainfed hinterlands of Odisha and Jharkhand, had started looking for alternate sources of livelihood by either migrating to cities or taking up work in which they were traditionally unskilled. In addition, women and the physically challenged, who belong to some of the most marginalized sections of these rural areas were facing harsh circumstances.
Interventions by RRA network in these areas have given a fresh lease of life to the persons concerned, as exemplified by the case studies enumerated below. “Earlier I was a disabled boy. Now I’m someone who gives business and education to others”, said Mithun from Palamu district of Jharkhand. This entrepreneurship scope is now available to those who can hone it.

CASE STUDY - 1

Nursery Entrepreneur, Ramaguda, Mathili, Odisha

While fish seed remains the most crucial input in aquaculture, its timely availability remains elusive. Hence when the Revitalizing Rainfed Agriculture (RRA) Fishery programme commenced in 2012, the farmers’ ponds were stocked with seed brought all the way from Bhimavaram in Andhra Pradesh. While the quality was ensured, logistics seemed too difficult to repeat year after year.

In the second year, along with ITDA (Integrated Tribal Development Agency) a tender was issued for fish seed supply (to the farmers in the programme) from a local hatchery. This hatchery, however, was not actually a hatchery since breeding of fish did not take place there. It simply stocked fry (brought all the way from the famous
fish market of Naihati in West Bengal) in five to six of its stocking ponds and then sold them at a premium price to the farmers of Malkangiri.

Hence that year (2013) the supply chain was even longer than the previous year’s. The usual problem of seed quality and right quantity was beyond control after a certain point, due to practical reasons that arose from dealing with such a large number of farmers scattered all over the district. Another problem faced was the fact that the supplying ‘hatchery’ was at the block Head Quarters and some of the water bodies with which the RRA network was working as far as 70 kilometres away. High mortality rates during internal transportation continued to plague the program. Hence in 2014, planning and work began to establish a system that would ensure availability of quality fish seed and timely supply in a more decentralized process.

One might wonder what the Department of Fisheries was up to in a scenario where the demand for fish seed is so high and the availability so complex. The reason lies in the larger debate of how national policy and government discourse mainly views seasonal small water bodies and in turn the livelihood security of the communities that have access to such natural resources (who generally end up being the vulnerable tribal communities of rainfed regions).

The Fisheries Department usually begins the breeding process once the monsoons set in and thus their seed is ready only by mid-August at the earliest. However, those farmers who have water in their ponds for only six to eight months, cannot wait for that long and prefer stocking as soon as the first rains fall (which is usually in the month of July). Hence the seed produced by the Department is generally for the larger tanks and reservoirs in the district, that have the privilege of stocking at any time of the year. The entire value chain of fisheries in the district remains dominated by a certain progressive community. Though the tribal community has been engaged in fisheries traditionally, they have always been at the receiving end of poor quality inputs, in terms of fish seed.

Bhagwan Nayak of Ramaguda village of Mathili Block is one of the tribal fish farmers who is engaged through RRA Network’s programme. He was sent for a month long training on scientific fishery at Balugaon (Fishery Training Institute). He initially had a pond of an acre where he traditionally practiced fishery. After the training and some handholding from the RRA Network he carried out fishing activity in a slightly more scientific manner than before.
After a single season he was quite motivated to further improve his fishery practice and for the first time ever stocked his pond with yearlings. Though scientifically more profitable for rainfed water bodies, the nursery concept was not easily accepted by farmers. But Bhagwan saw an opportunity for a profitable business. The RRA Network was highly hopeful of the concept of nursery taking root.

The concept of nursery was already part of the planning of the RRA Network’s fishery programme. Bhagwan was explained the technicalities involved. The RRA Network felt Bhagwan was very keen to take up fisheries as a primary profitable livelihood activity. He was linked to the Fisheries Department FFDA (Fish Farmer’s Development Authority) scheme and started three more water bodies of an acre each. It was essential for Bhagwan to formulate a strategy by which he would soon see returns on the investment he had taken the risk to make.

The demand for fingerlings in Bhagwan’s panchayat was being met by a private hatchery situated almost 70 kms away and mortality and quality issues were consistent. Since all the neighbouring ponds were also part of RRA Network’s fishery programme, securing good quality fingerlings at the right time to the farmers, was part of the programme design. Bhagwan is a member of Dular Dei Fishery Producer Group (FPG) which was formed in 2013 when the fishery programme commenced.

The FPG is a common interest group whose main activities include savings, credit, maintenance and management of the group’s common assets. The area comprises a total of eleven members in the group. The group collectively decided that Bhagwan would produce and first sell fingerlings to the members’ ponds. After their requirement was met, they could be sold to non-members as well.

RRA Network provided him with an initial support of Rs. 20,000 as a revolving fund through Mathili’s Subhash Bose Anchalik Sheba Kendra (Cluster Resource Cell, a block level community institution for the farmers) for pond cleaning and stocking the pond with fry and supplementary feed. He released 30 kgs of fry worth Rs. 18,000 in the month of July 2015 and reared them for almost two months. While other costs such as labour, packing material and other supplementary feed were met by him. After 45 days of nursing the fry into fingerlings, he started selling them at the rate of 550/kg to his group members and farmers of other groups(approximately 22 farmers). The table below shows the income and expenditure of Bhagwan.
Table - 7: EXPENDITURE

<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>UNIT</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pond Preparation</td>
<td>Lumpsum</td>
<td>500</td>
</tr>
<tr>
<td>Fry</td>
<td>30 kg</td>
<td>18000</td>
</tr>
<tr>
<td>Feed</td>
<td>Lumpsum</td>
<td>600</td>
</tr>
<tr>
<td>Gas cylinder</td>
<td>15 kg</td>
<td>700</td>
</tr>
<tr>
<td>Polybag</td>
<td>2 kg</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>20300</strong></td>
</tr>
</tbody>
</table>

Table - 8: INCOME

<table>
<thead>
<tr>
<th></th>
<th>Kg</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingerlings produced</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Price / Kg</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td><strong>Gross Income</strong></td>
<td>29150</td>
<td></td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>8850</td>
<td></td>
</tr>
</tbody>
</table>

In September 2015, Bhagwan had 20 kg of fry left in his pond which he planned to grow into yearlings and then sell. The 20 kg of fingerlings which was expected to increase to 200 kg over an year with minimum or no input cost could be sold at Rs. 250/kg. Bhagwan’s net income would be around Rs. 50,000 from the yearling business.

Similar entrepreneurs were nurtured by RRA network. Soon these enterprises will be an alternative source of decentralised and reliable fish seed for the numerous small and seasonal water-bodies of the district.
Satyendra Kumar Singh, of Kharwar tribe, aged 32, is a resident of Sardamdag village, Panchayat Palheya, Block Manika of Jharkhand state. His village is located 25 Km. from Manika block headquarters and is influenced by left wing extremism. Despite financial difficulties, he completed his master’s degree at Daltonganj. He applied for various jobs but was unable to find employment. He continued to stay in his village and help his family in agricultural activities. He got married and it was becoming difficult for him to meet the financial requirements of his growing family.

One day, he came across a campaign vehicle of Vikash Sahayog Kendra (VSK) promoting fisheries activities in Manika Block. It was dispensing information through a load speaker playing folk songs and was covered with colorful banners and posters. The campaign attracted the attention of several of his friends and other farmers. He gathered a lot of information on fish nursery management, fish rearing, disease management, Farmer Producer Organizations and various government schemes on
fishery activity. He later got in touch with Mr. Lalit Oroan, a trained community resource person of Palheya panchayat.

Considering his enthusiasm, he was selected for the three day Community Resource Person (CRP) training organized by the state fisheries department at Dhrurwa, Ranchi. He also attended regular block level training meetings organized by VSK. At the training, he realized that the fisheries department was promoting enterprise through a subsidy scheme. In consultation with his wife, Laxmi Devi, and having understood the Business Plan of Nursery Pond Enterprise, he decided to develop a fish nursery pond in their land.

The fisheries team of VSK provided technical support in terms of site selection, layout & design of two nursery pond and the budget for construction. The estimated budget for construction was around Rs. 40,000. As they did not have the capital to begin the work, Laxmi Devi approached Kishan Sansadhan Kendra (KSK), an informal institution at village level promoted by VSK (Laxmi devi is a member of KSK). KSK provided Rs. 37,000 loan at the interest rate of 2% to Laxmi Devi and they invested Rs. 3000 from their end. After receiving the money, they constructed two nursery ponds of dimension 70ft by 40ft.

Before the rainy season he took the support from VSK fisheries team for scientific management of nursery pond in terms of liming, manuring, feeding, eradication of aquatic insects etc. After the initial rainfall, he immediately approached the District Fisheries department and purchased 25 lakh spawn at Rs. 3460 and stocked it on in the second week of July 2015. They applied manure, liming, regular feeding as per schedule, and monitored it at regular intervals. After 21 days, the spawn developed into fry.
As seed is just available with him many farmers approached Satyendra Singh and his wife for supply of fry. They fixed the rate based on local market conditions. They started selling the fry at Rs. 300 per kilogram and earned Rs. 71,400 selling 238 Kilograms. They fulfilled the demand of 24 water bodies in Palheya Panchayat as well as other interested farmers of neighbouring panchayats. Satyendra Singh and his wife want to grow the remaining one lakh fry into yearlings, which will fetch them more money next year. They were able to repay the loan taken from KSK. Satyendra Singh and wife are happy that they earned additional income apart from agriculture and are now confident of fulfilling their aspirations for their family. They were also rewarded with a motor cycle from the district fisheries department. Presently, inspired by their nursery, a lot of young farmers have ventured into fisheries.

In the coming years, Satyendra Singh and wife plan to diversify their fisheries activities (sell of fry, fingerlings, yearlings, and table sized marketable fish) and develop yearlings’ ponds. They also wish to train other farmers from their panchayat and avail the subsidies available from the government.

Nursery ponds are small sized seasonal water bodies or summer ponds ranging up to one hectare and with a depth of 0.5 to 1.5 meter. Fry is obtained from spawn within 21 days and fingerlings (size of a finger) are obtained after 60 days.

Nursery Network is a strategy to promote enterprise among fish farmers. The series of nursery networks developed at the panchayat level play a vital role to ensure availability of quality fry and fingerlings at the local level.

This removes the bottleneck that farmers face in transporting spawn/fry from Ranchi at a distance of 225 km. Nursery Network at local level helped reduce transportation costs, mortality of fry; thereby ensuring more savings for fish farmers.
CASE STUDY - 3

Fish and Stay at Home, Resiyapa village, Palamu district, Jharkhand

Rajdev Mahto is a native of Resiyapa village in Palamu district of Jharkhand, Mahto had migrated for work at the young age of 12 years. From pulling cycle rickshaw in Varanasi to maintaining railway tracks and driving a transport vehicle in Mumbai, he experienced all the grim realities of a migrant’s life. Having contracted tuberculosis, he came back home after 20 years. The one acre farm the family possessed yielded little for sustenance. So, Mahto started selling trinkets and beauty products, moving from one village to another on cycle or by foot. Having experienced the city life, Mahto was willing to experiment with new livelihood options.

So, when fish farming came along, he decided to dive in, despite having no background in the field. A training conducted by fisheries department in Ranchi opened his eyes to the blue world. “At the training, we met people who narrated how they earned more money by turning their farms into ponds,” he says. Thankfully Mahto had a 5 acre ahar (area where rainwater collects due to natural slope of the land and embankment on three sides), owned jointly with his extended family. “In
the very first year, I bought spawn (three-day-old offspring) worth Rs 2,800 and earned Rs 70,000 profit by selling 7 quintals of fish. This was after giving out the share of my three uncles,” he proudly shares. The family also consumed 1 quintal fish.

In 2015, Mahto made Rs 1 lakh profit. Now he is getting a small pond dug with support under the rural job guarantee scheme. “People now prefer fish to poultry since it is local and naturally produced. They don’t like the big fish that is imported from Andhra Pradesh. So the market is ready, just the supply needs to be increased,” Mahto says.

The only drawback is the seasonal nature of water bodies. Palamu district falls under unassured rainfall zone receiving less than1200 mm of average annual rain. The sandy soils don’t retain much water resulting in high evaporation and seepage rate. “This means that the fish farming gets restricted to half-yearly practice. Still, people are willing to do this because it’s better than doing one-season crop,” says Ashrita Tirkey, the project coordinator at Vikas Sahyog Kendra.

Farmers have also found other fish-related livelihood options. For instance, Mahto also prepares fish feed which is a unique initiative as farmers in this region mostly put cow dung mixed with crop residue in the ponds. “The commercial fish farming has just started taking roots, so it will take time for people to shift from traditional practices,” Mahto says. He sold 25 kg of the fish feed to a farmer producers’ organisation, also supported by VSK, at Rs 24 per kg. Later, he’s planning to sell it in open market which fetches commercial rate of Rs 40 per kg. Mahto also prepares fertilizer with fish waste, like fins and bone, for use in fields, orchards and ponds.

Looking at his performance and enthusiasm, the fisheries department gave him subsidy to buy a moped, which he uses to sell fish in nearby Chattarpur town and other villages. Mahto was also named ‘Matasyamitr’ (friend of fish) by the administration to motivate other farmers. For him, the benefits can also be seen in the health of immediate family. “Earlier, every day one of the five children would be sick. Malaria, common cold, fever were so common. Now, as we consume fish on a regular basis, the immunity levels have improved,” Mahto chimes in. From a migrant in distant lands to a prosperous fish farmer at home, he has travelled a long distance and the journey has been fulfilling.
A New Identity through Fisheries in Palamu district, Jharkhand

When we were done talking with Mithun Paswan, the bag he had laid down, with a live hen in it, was found empty. He looked around bewildered and spotted the bird in nearby bushes. It did not take him more than a minute to catch the escapee, without any help. Mithun’s left hand is affected by polio, but he humbles you with his indomitable spirit to lead a happy and successful life. All of 24 years, the slim, ever-smiling Mithun runs three SHGs (self-help groups) which help poor families save money, is an expert craftsman at construction of brick kilns, gives maths tuitions and is soon going to set up an upper primary school in his village. And he got this firm footing from fisheries.
In India, people with disabilities are often perceived as unproductive and dependent. This perception is starker in rural India where lack of varied work options, poor public infrastructure and absence of assistive devices leave little scope for those with disabilities to realise their potentials. This is why Mithun’s story is unique and inspiring. His extended family used to breed fish in their 2-acre ahar (area where rainwater collects due to natural slope of the land and embankment on three sides) at Resyapa village in Palamu district of Jharkhand. He had started catching fish at the young age of 10 years.

However, they could only earn around Rs 10,000-15,000. “The practice was not at all professional. We would neither prepare the land for fresh rainwater and spawns, nor provide special feed but engaged fishermen from West Bengal, who would take half the produce as payment,” Mithun recalls.

It was a tiff with the hired fishermen once which led to the then teenage boy taking over fish farming. He had already saved some money from his work with brick kilns. The Rs. 660 scholarship he got from school was also pooled in to buy spawns. Though the lack of expertise in catching fish remained, he was keen to learn. “At least, now we were not dependent on outsiders and would get the whole produce. Since then, I have never engaged labourers,” he says. The family was still very sceptical and asked him to instead go out for work like other men. Mithun went to neighbouring Chhattisgarh state, but could not gain much acceptance in industrial work because of his limp left hand. He came back to continue studies and focus on fish farming.

The real push came in 2014 when he got in touch with Vikas Sahyog Kendra and got a specialised training in fish farming from the state fisheries department. “In the very first year, we saw a jump of income to Rs 50,000. After that we got another pond dug with financial support from the department and now the family income from fisheries touches Rs 1 lakh,” Mithun says. Of this, Rs 50,000 is given to Mithun as he manages all the work while rest of the money gets distributed among his four brothers.

Now the attitude of people towards his disability has completely changed. “Earlier, I was a disabled boy, now I am someone who gives business and education to others. They look at me with respect, not pity,” the 24-year-old says. In a region where fish farming is a new occupation, Mithun has already taken a big lead with his drive to succeed.
Nursery of Profit, Latehar, Jharkhand

Satyendra Kumar Singh comes across as a man with pleasing personality. He can put you at ease with his charming smile and easy conversation style. The 33-year-old has become the go-to source for all the fish at Palheyapanchayat in Manika block of Latehar district, Jharkhand. Satyendra runs a nursery which supplies fry (21-day fish offspring) at local level. A unique initiative on the part of Vikas Sahyog Kendra (VSK), a nursery is especially suited for those interested in pisciculture but have little land.

Nursery ponds are small sized water bodies ranging upto one hectare and with a depth of 0.5 to 1.5 meter. Spawn, a three-day old fish offspring, is put in a nursery and nurtured into a fry or fingerling (a 60-day old fish). These are purchased by the farmers who rear them till maturity. VSK has been trying to develop a nursery at each panchayat to ensure availability of quality fry and fingerlings at the local level. This reduces transportation cost and the risk of fish mortality during travel.

Showing his two ponds of 70x40 feet each, Satyendra recalls how fish farming caught his attention: “The 0.16 acre land I had used to yield only 3 quintal rice fetching
around Rs 3,000. Due to non-availability of water, there’s no rabi crop. I used to do odd jobs but it was very difficult to make ends meet. When the campaign vehicle of VSK came to our village in 2014, I got very excited but was unsure if a small landholder like me can also participate in this activity.” Thankfully, pisciculture does not differentiate between big and small land-holding farmers.

At a training organised by the state fisheries department, Satyendra got information about the possibilities his land had, provided he was willing to take the first step. The nursery ponds were to cost Rs 40,000. Fortunately, his wife, Kamla Devi, was the member of a women’s farmers’ group. The group, also supported by VSK, had been involved in sustainable farming practices and was willing to extend a loan of Rs 37,000 at interest rate of 2 per cent. With money secured, it was Satyendra’s turn to show his commitment. In 2015, he got the two ponds dug, used lime to eradicate predatory insects and possible infections and started waiting for rain. After the first shower, he rushed to the district fisheries department and purchased 25 lakh spawns at Rs 3,460. Since spawn is a three-day old offspring, it requires special conditions like calm water, special feed and monitoring at regular intervals. “Older fish can find food from aquatic vegetation, but spawns need special diet consisting of a mix of mustard shell, egg yolk, gram flour, jiggery and mustard oil. And it should be given at the right time,” Satyendra informs. Thankfully, all this effort pays off well. Satyendra had already informed all the 24 fish farmers in his panchayat area about his nursery. Bonhomie was built as he shared his knowledge, including preparation of a pond for new fish, disease control and neutralisation of acidic waters through natural remedies. After 21 days, the spawn developed into a fry and were sold at Rs 300 per 1,000 pieces. The two nursery ponds met the demand of all the 24 fish farmers with total 34.5 acre pond area in Palheya panchayat. Satyendra Singh and Kamla Devi earned Rs 74,400 by selling 2.38 lakh fry from their small land in just 1.5 months. “We had invested Rs 6,600 to buy spawns. This is a windfall as compared to the meagre Rs 3,000 we earned from paddy cultivation,” the couple brims.

The remaining spawns were released into a pond they co-own with 25 neighbours. From this, all shareholders consumed 2 quintal fish and Satyendra also sold 2 quintal of the produce. The benefit for local fish farmers was also evident as they did not need to procure fry from dealers coming from West Bengal. “They sell spawns at Rs 3-4 per piece. The farmers also claim that these dealers cheat them as the number of fry released into a pond is always found to be less than that paid for,” says Satyendra.
If ordered from far-off nurseries, mortality rate among fry is high. “With nurseries at local level, farmers can transport fries in big vessels without any need for a special container with an oxygen pump,” says BidhyaDutta, a fisheries expert with VSK.

The husband-wife duo was able to repay the loan and got a subsidised motor cycle, a fishing net, life insurance cover and monthly mobile recharge as rewards from the district fisheries department for their entrepreneurial spirit. They now aspire to diversify into sale of fingerlings and yearlings (a year-old fish). They also wish to train other farmers who are willing to avail the subsidies available from the government. One complaint they have is about poor survival rate of spawns during transport.

Due to lack of efficient hatcheries in Jharkhand, the spawns are procured from West Bengal. Many of the spawns get killed due to leakage of oxygen from the containers. “The survival rate is only 25 per cent. We have to pay upfront for all the spawns even if not many of them survive. A hatchery is direly needed in Jharkhand,” Satyendra says. With the network of nurseries getting strengthened, the day may not be far off when hatcheries also sprout at decentralised locations in the region.
Like Fish takes to Water, Latehar, Jharkhand

Sitaram Singh is a lucky man. The 20-acre land he owns with his six brothers lies in the narrow alluvial belt of otherwise granite-infested Latehar district. Groundwater is available at 5 feet depth. This is the reason why his 3-acre aharin Sadhwadi village holds water the whole year. This is a rarity in north-west Jharkhand which is infamous for isolated rainfall, sandy soils and hence seasonal water bodies.

The joint family, comprising around 40 people, lived off the land, consuming most of the harvested grain. Only Rs 50,000 worth of produce would be sold in the market.

That did not help with the needs of education, health and special occasions like marriage. The children used to study only up to middle school at the village school. Today, five of them are staying and studying in district town Latehar. “Two are in college while three go to school. We also had three weddings recently,” Sitaram says proudly.
All this was made possible because of the money earned through fish farming. Pisciculture is not a traditional occupation in this region. People usually catch fish from rivers or ahars during monsoon for self-consumption. Fishing lines, tyre tubes as floats and make-shift wooden platforms are very commonly used while professional equipment like nets, boats etc. are still seen as luxury. This is why, when Sitaram and his brothers decided to go for fish farming in 2010, they were sceptical.

“We had only seen a few farmers in nearby villages, so did not know the technique but we were sure there’s not much to lose. An investment of Rs 3,000 in the first year brought the return of Rs 45,000. Second year, the earnings rose to Rs 65,000. We knew this is just a tip of the iceberg until we turn professionals,” the 38-year-old shares.

In 2013, Sitaram got the opportunity to attend a training programme on fish farming from the state fisheries department. “It was an eye opener. I got to know how we were doing so many things wrong. The very next year, we started using lime to control diseases, went for special, on-time feeding and ensured timely inspection. All this has led to rise in income to Rs 1.50 lakh,” he informs. This year, the family supplied fish for five weddings in nearby villages. In fact, they have become one of the biggest suppliers of local fish. “In the Latehar market, people usually go for home-grown fresh fish rather than those big varieties imported from other states even if the former is costlier. Dealers have already booked their quota with us for this year’s produce,” says Sitaram.

The fisheries department has been all help, offering spawns at subsidised rate of Rs 138 per lakh, a 30-feet long fishing net and 10 kg feed for free. ARs. 2 lakh personal insurance cover and Rs 20,000 subsidy to buy a motorcycle have also been extended to Sitaram. The family is now planning to dig three small ponds which can be supplied with the abundant groundwater. The canals running through their fields will also be used to breed spawns by using small nets on both ends. “We want to make best use of the natural resources available through the skills acquired over last couple of years. From a simple farmer growing grains, we have taken to pisciculture literally like fish takes to water,” Sitaram brims.
When Women take over, Palamu district, Jharkhand

We had never tasted a ‘good’ fish. “All we had during my childhood were the small varieties which come to rivers during monsoon. They are rarely seen now,” says the 65-year-old. Therefore, when her family reared the commercial variety fish last year, she was delighted. The fish also tasted good because the fry (21-day-old fish offspring) were bought locally and were fresh. She bought with the money she got as loan from a self-help group (SHG).

In Jharkhand, women SHGs are gradually venturing into fish-related work through their enterprising members who see in it an opportunity to break through the circle of poverty. At Sildag village of Palamu district, low rainfall leads to very poor
agricultural output. Wild animals also destroy standing crops leaving little for the locals to sustain on. This is why fish farming is now making inroads.

Six families, belonging to one clan, have started breeding fish in a jointly-owned pond on turn basis. Since 300x250 feet pond can’t sustain all six families, they have decided to work in groups of three in alternate years. Dhanmaniya and Geeta Devi were the ones who did it last year. They got Rs 4,000 as loan from the SHG to buy fry.

Of the 80 kg fish yield, half was consumed by the three families and rest sold in the market. “It was such a delight to catch the big, fat fish we had reared for the first time. We are going to do this on a regular basis now,” says Dhanmaniya Devi. Her relatives, Anila Devi and two other women belonging to another SHG, are planning to breed fish in the pond this year. “It’s a six-month occupation and we get so much fish for family consumption besides earning a few bucks. Otherwise, the diet is not good enough for the children and household income very low,” she says.

Initially, these women faced a lot of resistance from men who refused to support their efforts. But they were not the ones to cower. In 2015, Geeta and Anila went to state capital Ranchi for training in fisheries. Thanks to their determination, the incomes of families have risen, even if marginally for now. The four SHGs of the village are now planning to make fish feed for sale to farmers.

A special machine to prepare the feed using rice straw, maize bran and mustard bran has already been set up with support from Vikas Sahyog Kendra (VSK). “There’s a huge demand for fish feed among farmers in our network. Currently, they buy imported feed at high rate from the dealers. We are planning to connect them to these women groups for mutual benefit,” says Ashrita Tirkey, the project coordinator at VSK. We need more women at the helm for better progress, whether it’s agriculture or fisheries.
CASE STUDY - 8

Fight to finish for ‘Right to Fish', Chattarpur, Jharkhand

Sadma village represents all that’s wrong with government policies and right with people’s movement. The settlement is known for Sukhnadiya dam, which was constructed in 1985 and submerged 25 hectare of the village area displacing around 100 families, mainly tribals. People moved to their fields and the present habitation is concentrated on western edge of the dam. The perennial nature of the reservoir helps with breeding of plentiful fish which villagers consumed and sold in nearby Chattarpur town, fetching anywhere between Rs 200-300 per day.

This turned out to be a good livelihood option for the displaced that had earlier been wary of the dam. But that was only till 2007 because that year the district administration decided to grant three-year fishing contract on auction, without any
information to the villagers. “We got displaced and hence we have the first right to the natural resources. How an outsider could be given this contract?” asserts Prakash Uraon, one of the villagers.

A cooperative comprising people from far off villages won the contract to harvest fish. The locals, however, did not allow the Cooperative to take the fish by blocking the path resulting in conflict. By 2012, villagers had decided to fight for their resources through a new strategy. With help of Vikas Sahyog Kendra, they formed a cooperative of their own by the name of Sadma Matysa Jeevi Swalambi Sahyog Samiti Limited under The Jharkhand Self Supporting Cooperative Societies Act, 1996. Under this Act, while granting contracts to a water body, preference has to be given to the natives of the area.

The village Cooperative participated in the auction held in 2012, but could not challenge the highest bid of Rs 81,000. Villagers again decided not to let the highest bidder harvest the fish and a violent fight broke out forcing the police to take action against locals. After a round of consultations, a consensus was reached to divide the harvest among the villagers and the highest bidder in 60:40 ratio, respectively.

Of the Rs 5 lakh worth fish, 40 per cent went to the fishermen hired from Bihar and rest was divided as per the agreed terms fetching the villagers around Rs 1.80 lakh. In 2016, the villagers again raised the demand for allotment of contract to their Cooperative. “Sadmavillage is entitled to 100 per cent rights rather than just 40 per cent because it’s their land that the reservoir submerged,” says Ashrita Tirkey, project coordinator of VSK.

A long protest, involving sit-ins at the district fisheries department, was held. Finally, the department yielded and granted the contract to the village Cooperative with fee of Rs 86,000. Villagers chipped in with the contributory amount and finally got what was rightfully theirs. “By mid-2016, the Cooperative had already netted fish worth Rs 1 lakh while releasing 50 lakh fry (21-day fish offspring) for rearing in the reservoir. Around 25 members have also attended the training in commercial fish farming,” informs Prakash.

Since the villagers are not traditional fishermen, the training may help reduce dependence on outsiders to harvest fish. “The reservoir is around 15 feet deep and our nets of 200-300 feet are not very efficient. We need at least a 1,000 feet net, which traditional fishermen own,” Prakash offers. They are also planning to acquire
fish cages since the government is already offering them at subsidised rate of Rs 30,000. “A cage of 36x24 feet can easily sustain 10 families without need of big nets. A nursery to prepare fry and fingerlings out of spawns is also being planned,” Prakash says.

Taste of success is always sweet when it comes through long struggle. Thankfully, it has prepared Sadma to weather any new storm.
VIII. STRENGTHENING INSTITUTIONAL CAPACITIES AND DECENTRALIZED PLANNING

The RRA network, a system-based approach (soil, seeds, water, millets, fisheries, and livestock) addresses the gaps in rain fed systems in convergence with government programmes through strengthening capacities of farmers organizations. For more effective products, processes, services, technologies, or business models are renovated and made available to local markets, local governments, NGOs, and farmers. However, for the sustainability of the above processes, services and products, the role of institutions at various levels is of utmost importance. Therefore effective continuity and access to public and civic institutions such as government departments, banks, cooperatives, self-help groups, and NGOs have been very critical in many of the CP areas for effective delivery of services such as extension, research, inputs, credit and agro-processing.

Some NGOs led-local institutional capacity building is remarkable: SPS has strong community institutions focused on NRM activities; VSK has SHG as a foundation programme and works on rights-based issues; WASSAN focuses on aggregation of small farmers groups for federating into larger cooperative/producer company for marketing of its agricultural produces; At PARIVARTAN-Malkangiri, the support is on providing efficient service delivery in livestock, fishery, and seed bank.

There were efforts also to draw support from government agencies (institutions) in helping them to improve service delivery to farmers: In Mahabubnagar, provision of protective irrigation through MGNREGS have helped 46 farmers, spanning over 101 acres, to get good yield from their crops despite erratic rainfall and long dry spells. Similarly, preparation of compost, vermi-compost and green manure was promoted in Daulatabad, Bagli and Chhatarpur blocks under MGNREGS programme and Department of Agriculture.

Similarly, and specifically in agriculture, the DOA in Anantapur channelled Rs. 97.84 lakh subsidy through the groundnut programme. In Malkangiri, SRI was promoted in convergence with the DOA in extending this method of cultivation to 400 farmers. All these efforts saw a good working relationship between two sets of institutions: community level institutions (PRIs / SHGs / Cooperatives) and government agencies (DOA, offices of mainstream government programmes). The following case studies elaborate on it in details.
Voicing the Rights of Adivasis over Water Resources, Palamu district, Jharkhand

Suknadiya dam located 3 Km. from Chhattarpur block of Palamu district, Jharkhand was constructed in 1985 by the irrigation department. The reservoir of the dam is spread across 12 acres. Forty families lost their land to the reservoir. Of these thirty are adivasi families belonging to Sadma village. The proposed purpose of the dam was to ensure water for irrigation for the nearby villages.

The adivasis of Sadma village gave up their land hoping to get water for irrigation. But neither proper irrigation nor adequate compensation was provided. Over the years, during the kharif season the farmers from Sadma village used outflow of water from the canal of the dam for minor irrigation. Local fish from the reservoir were utilized for household consumption.
In 2006, a person from Hariharganj Block (15 Km from Chhattarpur) formed a cooperative (Chhattarpur Matsaya Jivi Sahyog Samiti Limited) under the Cooperatives Act 1935. This block level co-operative comprised members from the dominant community outside Sadma village. Only one member (from the non-Adivasi community) whose land was submerged was part of the co-operative. Once in every three years the Fisheries department conducts an auction and rights are given to the highest bidder.

For two successive terms (2006 – 2011) Chhattarpur Matsaya Jivi Sahyog Samiti Limited co-operative managed to win the auction and get the rights over fish rearing in Suknadiya dam. It was easy for them to win the bid as the cooperative members were not just politically influential and from the dominant community, but also had contacts within the department.

The villagers were unaware of the value of the fish being harvested in their land. However, in 2012, with the efforts of Vikas Sahyog Kendra (VSK) the villagers realized the potential income they could earn from fisheries. VSK mobilized and motivated the adivasis from Sadma village to form their own co-operative (Sadma Matysagivi Swalambhi Sahyog Samiti Limited) under the Co-operative Act 1996. Under the Co-operatives act 1935, only one co-operative can exist in a block. But under the Co-operative act of 1996, many co-operatives based on a water body or certain geographical territory can be formed.

It also gives preference to native residents of the particular water body, in which the co-operative is proposed to be formed. Additionally, according to ‘The provisions of Panchayti Raj extended to Schedule Area’ (PESA Act.), panchayats have right over natural resources and can derive income from them. Keeping the provisions in mind, VSK advocated for the rights of the adivasis of Sadma village. Several rounds of mobilization and meetings were organized.

In 2012, the Fisheries department called for another auction. But Sadma Matysagivi Swalambhi Sahyog Samiti Limited lost the bid as it did not have the bid amount of Rs. 81,000. However, the villagers did not allow Santosh’s cooperative to harvest. A violent fight broke out and the police were called. The villagers proposed that since they had given their land for the reservoir, they should have rights over it. After a lot of argument, a consensus was reached to divide the harvest among the two parties in 3:2 ratio.
Thus the members of Sadma Matysagivi Swalambhi Sahyog Samiti Limited earned Rs. 5,50,000 in one year, selling their 40% share. VSK advocated that the villagers from Sadma were entitled to 100% rights rather than just 40%. The villagers decided to approach the District collector and put forth their concerns. They demanded the District Collector to stop the auction to be held in 2015. Owing to the dispute, the auction was cancelled by the district collector. Presently, the case is pending with the state Fisheries department.

The villagers are determined to carry on the struggle for their rights which they are entitled to. There are several other cases of violation of the rights of Adivasis in the tribal region of Palamu and Latehar. Adivasis are being deprived of access to natural resources that are traditionally and historically part of their life due to inappropriate actions by the bureaucracy over outsiders. Through state and national level advocacy, VSK is determined to safeguard the interest of the Adivasis that they are entitled to under our constitution.
PRADAN was established in the year 1983 and works in 32 districts across 7 states. It works in the SHGs, clusters and federations, promotion of livelihoods. Over the years we have realised that most of the decision making at the village level happens without the involvement of women and other marginalised sections of the community.

The Gram Sabha is mostly only on paper and it is only in very few instances that it actually takes place. When it does take place, most often than not, the developmental activities to be taken up in the village are decided by the panchayat and sansad members, and other influential members of the community. Hardly ever are inputs taken from the larger community.

The result is implementation of large schemes that are of no immediate or long-term consequence to the larger community. Corruption creeps in as the community is not even aware of the minimum wage rate under the Mahatma Gandhi National Rural
Employment Guarantee Scheme (MGNREGS) and the budgets allocated to each Gram Panchayat. In this scenario, the larger community did not have any place in the scheme of things.

They were dependent on the whims and fancies of the supervisor for work to be allocated to them under the MGNREGS. They were not even aware of their right to work under the MGNREGS. Their idea about MGNREGS was as a way to receive labour at an individual level. The idea of MGNREGS being an instrument of implementing development activities most required by the village and decided by the people of the village is something that they were not aware of. This is the situation that PRADAN wanted to change.

PRADAN has observed that women are one of the most deprived sections of the society. In all issues related to money or earning, most often women do not have any say. They are dependent on men, either husband, father or brother, as the case may be. The idea that women are dependent on men for all requirements is strong in society. PRADAN felt that there was a need for women to not look at themselves as just a primary caregiver. It felt that they need to broaden their involvement outside the home. It felt that the community would benefit from women’s involvement by having a different perspective to problems and issues in the village. It wanted women to move from predetermined gender roles to a larger role as a citizen of society. Also change the mind-set that women are dependent on men for everything.

MGNREGS is an opportunity for villagers to get involved in the development of their village and decide what developmental projects they need. PRADAN got involved in the Cluster Facilitation Team (CFT) project. But PRADAN wanted the women-based institutions i.e. SHGs, cluster and sub-cluster to be the primary actors in the MGNREGS National Rural Livelihood Mission (NRLM) CFT convergence project.

PRADAN now had the added responsibility to guide the women-based institutions as well as the stakeholders like GP, block and build their capacities to enable them to take up this new role. It was also an opportunity to show the villagers and the apprehensive GP, what the women of the village were capable of.

In SHG, sub-cluster and cluster meetings, PRADAN discussed the need for involvement of women in MGNREGS planning, monitoring and implementation. But it was found that most of the women were unaware of their basic rights under the act and lacked confidence in their ability to take up the planning processes. To get a
AWARENESS GENERATION

The PRADAN team got involved in the different village-based SHG and Upa Sangh meetings to create awareness about MGNREGS. But we also felt that an event around MGNREGS was necessary to make the whole village aware of it and start a discussion around MGNREGS among the people. The objective was to get the message across to every household. This was planned in two phases. In the first phase, there was an in-house training of Sangha/ Upa-Sangha members orienting them about the responsibilities of various stakeholders of the MGNREGS, in the presence of GP members.

The women were familiarized with the different forms involved in the MGNREGS process, like demand generation form, beneficiary application form, process of addition or deletion of members from Job Card and issuance of new Job Card form etc. The idea was that once they understood the importance of each of these forms, they would educate the other villagers about the same. In another event, the Upa-Sangha members organized a rally at the sansad level, to make people aware of their
right to demand for a job, rather than just take up the job when the supervisor asked them to.

**CAPACITY BUILDING OF SHG, CLUSTER AND SUB-CLUSTER MEMBERS**

PRADAN has continuously been engaged with SHGs through the CFT to enable women to take charge of participatory planning. To strengthen the SHGs, PRADAN organized an in-house training of SHG members on concept seeding, norm setting and accounts. They organized a three day Training of Trainers (TOT) to help cover all the SHGs. The idea was to strengthen the SHGs and make sure they are able to handle the additional responsibilities of the MGNREGS.

The SHGs, cluster and sub-cluster members were trained on CFT roles and responsibilities, the cluster’s right to review the work of the CFT, better utilization and maintenance of the assets created under the MGNREGS. The idea was to take this information down to the last member in the village. PRADAN arranged several exposure visits for SHG members and Panchayti Raj Institution (PRI) functionaries along with the CFT team, to Bandudih village of Purulia district on watershed approach. The idea was to help them visualize the result of proper planning and implementation.

**TECHNICAL TRAINING OF SHG AND CFT TEAM MEMBERS**

PRADAN organized a three day in-house training for 37 women (nominated by the cluster to be Community Resource Persons (CRP)) from five GPs. The training focused on helping them understand the watershed approach and its applications in different land followed by a field trip to Salghata village of Molian Panchayat, where every aspect learnt could be practically verified. The training helped the CFT team and women CRPs to read the revenue map of the village, the process of identifying and marking different lands in the map and participatory planning.

After these different in-house training and exposure visits, the CFT team along with the community (especially women from SHG) have a better understanding of

- Watershed Approach
- Village level participatory planning
- MGNREGS & different forms and their importance
- CFT teams role and responsibilities
Most of the trained women excelled at their job. They were able to prove their capabilities to the villagers and show them first-hand what patch-wise micro level planning on their fields could do to enhance production. Going one step further, PRADAN organized a meeting with block and GP officials, members and cluster representatives at Hirbandh to discuss the possibility of involving the women clusters in the MGNREGS.

Apprehensions were raised about involvement of women in the MGNREGS by several members. The Cluster members were confident and took it as a challenge. They also convinced the officials and GP about their capacities and easy access to SHG members.

Three GPs (Molian, Bharamuri and Moshiara) agreed to involve the women clusters in the MGNREGS. They also planned to have women supervisor for the MGNREGS works in their villages. In Moshiara and Molian GP, 12 MGNREGS works were efficiently carried out by 23 women supervisors, with support from the CFT. Ashtami Munda, is a tribal woman supervisor from Tentulia BirBirs Munda SGSY Mahila Sayambar Gosti of Tentulia village of Molian GP.

She discussed the advantages and scope of developing a Mango plantation in her village and was successful in developing one hectare mango orchard on an unused piece of land that belonged to three members of the SHG families, which was leased from them. Other women supervisors Sarbani Mandi, Soma Mudi, Suchana Bauri and others have successfully implemented vegetable trench, small pond and social forestry with the support from CFT as part of the MGNREGS in their respective villages.

The women discussed all issues that arose during the implementation within their SHGs and clusters to resolve them. They stood united at all times to ensure their issues were resolved. They did not deter in going to the GP or the Block officials to have their problems redressed.

**INTENSIVE PARTICIPATORY PLANNING EXERCISE II (IPPE II)**

PRADAN influenced the state team to incorporate women as part of the block planning team for sansads. This was made possible as a result of the successful experiences of women’s involvement in the micro level planning at the village level. On their own initiative, the five clusters decided to plan for the next year 2016-17 at
the SHG level. A training programme was organized to help them with the process. It was decided that a *gram sabha* would be organized to make people aware of the impending IPPE II.

The idea was to help every household make their plan in consultation with the SHG members. The plans were deposited at the cluster and sub-cluster level too. The whole process was facilitated by PRADAN along with the CFT team. Huge changes were observed in planning process after the engagement of women in the process.

- Participation of villagers increased
- As women SHGs were involved, the importance of the planning process was understood by every household and micro level planning took place.
- A Resource map and social map based on the revenue map was drawn with increased participation of villagers.
- Transect walk with villagers, took place for patch wise planning
- Socio Economic Caste census based survey took place properly
- The involvement of cluster and SHGs has mitigated the influence of GP members and influential members of the village.
- Finalization of plan in the *gram sabha* (demanded by the cluster members) in the presence and in consultation with the villagers as opposed to happening in the confines of the GP office.
- Enabled the consolidation of micro-level household plans into the sansad level register for IPPE II
- Prioritization of plan depending on availability of job card holders as per the GP budget (which is limited) in the presence of cluster representative and CFT team

All these activities are a motivation to the other women to come forward and get involved in not just SHGs but also in MGNREGS planning, monitoring and implementation. The villagers are becoming more involved in the implementation of the MGNREGS Act. Women are also now capable of demanding work under MGNREGS, as women members are part of the implementation. Villagers of Saluni say, “*Now we take every discussion to the SHGs. They have done a lot of things for the village. They developed a pond in our village, which is very useful. Now we trust them to take decisions that will be of benefit to the larger village.*” Villagers have now began to believe that “women can”.

CASE STUDY - 3

Revival of Jowar Cultivation through SHGs, Bagli block, Dewas district, Madhya Pradesh

In the late 1980s, the tribal belt of Bagli block of Dewas district in Madhya Pradesh was a predominantly rainfed region. Subsistence rainfed farming was prevalent and entire villages migrated for work post monsoon. During the kharif season farmers cultivated an array of millets. Jowar was the major crop followed by maize, and other millets were sown according to taste. Jowar was also preferred as it was easier to grind by hand than Maize. Thus, jowar had a special place on their plates and in their lives and was revered as a Goddess by the Barela and Korku Thakur communities. There were diverse desi varieties that were cultivated, some of which were high on nutritional value and made for good fodder.

Around this time, the face of this belt began to change. As the village was electrified, there was an increased availability of pumps and watershed interventions took place extensively. All of this led to a tremendous increase in the irrigated area, reversal of distress migration and the coming of the second crop, mostly wheat and chana. Meanwhile, soyabean was being heavily promoted by the government. Many new and improved varieties were introduced in the market for soyabean as well as Maize. Jowar was not as suitable as the shorter duration Soyabean and Maize as the kharif crop anymore.

A shift away from jowar was catalyzed due to two reasons. There were very limited varieties which were introduced as opposed to the other crops. The desi varieties of jowar and other millets could not compete in output with these new varieties. Markets also favoured soyabean and maize. Secondly, when it was cultivated in isolated patches, there were major losses due to the attack of birds on the grain. The only birds that attacked Maize were parakeets, while jowar patches were favoured by a variety of small and large birds. In addition to this, a perception that it reduced soil fertility for the second crop led to its fall.

By the early 1990s, there were villages that grew no jowar anymore. Very small rainfed pockets remained. Maize was not at par with jowar for nutrition and made for a much lesser and inferior fodder. However, the disappearance of jowar from the region was such that there was none available to be consumed even for Sakranti and
Chot festivals, for which its laddoo and khichda were integral. The monsoon had been inconsistent in the recent past. Soyabean has suffered repeated crop failure. Maize has also proved to be susceptible to damage due to erratic weather being a short duration crop.

There was a growing demand for change and Samaj Pragati Sahyog considered jowar to be the most appropriate alternative. Old productivity issues were to be addressed by introduction of newer, improved varieties. In consultation with the Millets node of the Revitalizing Rainfed Agriculture Network, CSV -15, CSV-20, JJ-1022 and JJ-1041 varieties were procured from Directorate of Sorghum Research. These improved varieties were distributed to Self Help Group members for varietal trials in Kharif 2013 which proved to be successful. In the next season, the need of collective decision making for viable production of jowar was addressed through the SHG platforms.

Farmers decided to grow jowar in clusters of neighbouring farms to distribute the consumption by birds. A total of 4 quintals of CSV-15 jowar was distributed to 165 SHG members in Kharif 2014. The variety was very successful, led to much positivity for Jowar and provided an opportunity for its cultural revival. For this, the SHG Federation platform was utilized to conduct a jowarutsav in the village of Unhel.

Some jowar preparations such as laddoos were served to the entire village. A variety was also served to the children in the village anganwadi. This tapped into the nostalgia of the older generations, helped the youth reconnect with traditional recipes and associated conversations flowed under pandals. This event was followed by a millet recipe workshop where SHG leaders from different federations came together to learn old and new recipes. Apart from jowar, other millets and locally available plants and leaves were also used for these creations.

The kharif season of 2015 saw a distribution of 3 quintals to 175 new SHG members. In this manner seed multiplication was carried out once again through collective planning. Being another year of erratic rainfall, the performance of maize and soyabean was visibly lower than that of jowar. From nearly no land under jowar cultivation three years ago, there is a clear resurgence in the region. The return of jowar mata is being celebrated in the kitchens of ghat-neeche.
CASE STUDY - 4

Story of Women from Nowhere to Everywhere, Jharia Kocha village, Khatra Tehsil, Bankura district, West Bengal

With monetary coverage available under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and institutional and technical support from PRADAN, more than 144 landless households of Jharia Kocha in Gopalpura panchayat have established a sprawling mango orchard over 20 hectares of erstwhile barren land. In early 2008, the landless SC and ST households accustomed to migrating every summer in search of labour succeeded in securing tenure over a single contiguous plot of barren land.

This was achieved by affecting a lease arrangement with the landowner families of the same village, organizing landless families into SHGs and their capacity building. The landless SC/ST households were either engaged as agricultural labourers or domestic help in the landowning homes. On occasions, they would be hired for measly amounts in house building or shed construction activities, or to harvest the fish produce from the village water body (pukur). The landowners exercised exclusive rights even over the water of the pukur.
The resource-poor landless households, having limited avenues for earning money to save the alternative to migrate, regularly approached the landlords for loans to celebrate occasions, fulfill social obligations or even to meet the need for food and clothing. PRADAN, an NGO, organized the women of these landless families into 12 SHGs and built their capacity by providing different type of training like membership training, maintaining accounts and account books. PRADAN tried to motivate them by preparing a plan of their village and improve their livelihood by using available resources.

During the planning, a big plot of barren land was identified. The plot had received little attention from the landowners because they held substantial stretches of fertile and more productive land elsewhere. PRADAN suggested that a mango orchard could be grown in this barren land by the landless families. But this suggestion was rejected by the SHG members as they felt it was not only impractical, but also impossible. Due to the undulating topography and heavy surface runoff, soil depth here was minimal and vegetative cover was completely absent. The only saving grace was the presence of a nearby village water body (pukur).

PRADAN organized an exposure trip for the SHG members along with owners to another project location in Bandhudi in Purulia district, where a similar effort had yielded magnificent results. The farmers then began to take PRADAN’s suggestion a little more seriously. SHG members quickly identified the owners to whom the contiguous plot of barren land belonged.

They then approached the landowners and discussed the possibilities of acquiring the land by way of a lease agreement, and further developing it into an orchard, the produce from which would be shared in an agreed ratio. PRADAN’s professionals also started talking with landlords, panchyat and block officials informally. Finally, SHG members called a meeting. GP pradhan, elected members, landlords and PRADAN professionals were present in this meeting.

After several rounds of bargaining and negotiating, a binding lease agreement was finalized between the 144 landless households of Jharia Kocha, the 66 landowners and the panchayat. The lease was finalized for a period of 25 years. It was decided that the returns from the orchard would be shared between the landowners, the landless households (organized as the 12 SHGs) and the panchayat in a fixed ratio of 2:1:1. This agreement was passed in gram sabha and forwarded for sanction. Then the matter was brought up before the Gram Unnayan Samiti (GUS), constituted...
under rule 73 of the West Bengal Panchayat (Gram Panchayat Administration) Rules 2004.

The proposal of establishing a mango orchard was approved by the GUS of Gopalpura panchayat. Without any delay, the proposal was forwarded by the GUS to the gram panchayat with the purpose of planning and making the estimate. At this stage, PRADAN played the vital role of facilitating the process of decision-making and approval. PRADAN assisted the nirman sahayak, or works engineer, appointed under NREGS, to prepare a thorough estimate for the mango orchard. The plantation work started in the 2008.

By February 2010, Rs 39 lakhs had been dispensed under NREGS for the purpose of procuring the saplings, pitting and planting. A total of 48,148 employment days were generated in the process. With assistance from NREGS, community members additionally adopted the ‘30 x 40’ (thirty by forty) model of water conservation, as evolved by PRADAN. A contiguous plot was squared with field bunds that measure 30 ft (along the slope) and 40 ft (against the slope).

Pits measuring about 7 ft wide, 5 ft long and 3 ft deep were dug in the lowermost corner of these plots. All the rainwater that falls in the 30 x 40 plots is collected in these pits, which helps in enhancing the local availability of water for watering the saplings, thus reducing the labour involved in carrying the water all the way from the nearby pukur. The pits also enhanced the soil and moisture regime over a sustained period of time. The farmers acknowledge that the ‘30 x 40’ model was very helpful in ensuring the growth of mango saplings. It is also responsible for the lush grass cover that spans the length and breadth of the plot.

Today, the mango saplings stand a good five to six feet tall and the farmers collect the excess fodder grass to feed their animals. Confident at having successfully tapped the resources of NREGS, the SHGs approached the National Horticulture Mission (NHM) in 2009 for assistance. The SHGs had a deep bore well-constructed in the orchard. In order to optimize the utilization of ground water, a drip irrigation network was simultaneously established. Earlier, the orchard owners had to lift water from the nearby pukur.

A diesel pump set had to be hired for this purpose. The villagers were fortunate that during the initial months, the fish produce had already been harvested from the pukur and the landowners did not need the surplus water. The surplus water was
diverted to the orchard. As the right of the landowners over the water of the *pukur* for fisheries was final, the farmers realized that this was not a reliable agreement. If the landowners faced a shortage of water for their own purposes, the sapling would be compromised. Now with access to ground water and the drip irrigation facility in place, the possibility of facing water shortage has been greatly reduced and there is no possibility of a conflict over the water from the *pukur*.

Table - 9: FUNDS LEVERAGED ACTIVITY - WISE

<table>
<thead>
<tr>
<th>Name of Programme</th>
<th>Nature of Activity</th>
<th>Funds Leveraged (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NREGS</td>
<td>Procuring plants, pitting and planting</td>
<td>39 LAKHS</td>
</tr>
<tr>
<td></td>
<td>Inter-culture and watering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fencing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cattle trenching</td>
<td></td>
</tr>
<tr>
<td>NHM</td>
<td>Submersible pump</td>
<td>14 LAKHS</td>
</tr>
<tr>
<td></td>
<td>Drip irrigation network</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>53 LAKHS</strong></td>
</tr>
</tbody>
</table>

There are around 9566 saplings of Amrapali mangoes in the orchard. Amrapali — a cross between Dashehri and Neelam—is a dwarf variety that promises to yield 10 to 15 tonnes per hectare per year. It is a late-bearing variety, which has the added advantage that the produce reaches the market when the supply of other varieties is reducing, resulting in a price hike. A conflict started between the SHGs and landlords in 2012, when the plants bore fruits for the first time. The landlords tried to deprive the SHG and claim 100% of the product without accepting the lease agreement contract.

When the SHG showed resistance, the owners started vandalising the orchard, damaging the bore well and destroying the drip system. The orchard was set on fire several times. The earnings from the sale of mangoes were kept stored in panchayat without distribution due to the conflict during both the first and second years. In spite of all this, the SHGs never gave up their hope and protected the orchard and continued to nurture it round the year. To keep away any vandals, the SHG members kept watch on the orchard during day and night on a rotation basis.

In 2014, the SHGs organised themselves into a movement that rose out of the conflict to fight the politically and economically powerful landlords. In the same year, the landlords called a meeting under the BDO of Hirband block development office in
presence of SDO of Khatre. Only six women representatives of the SHG were invited by the BDO to the meeting, without even explaining the context. During the meeting, a decision was ruled in favour of the landowner without hearing the SHG members' case. An order was issued saying that, “The orchard belongs to landlord. No SHG member can enter the orchard patch as they have no ownership.”

An SHG leader reached out to PRADAN and asked for guidance. A strategy was developed with the women, and they met panchayat pradhan. A written letter opposing the BDO's (Block Development Officer) decision was submitted and a receipt copy was collected. The women then proceeded to meet the BDO, who refused to meet with them. When SDO (Sub-Division Officer) also didn’t agree to meet them, they met the nodal officer of MGNREGA and ADM (Additional District Magistrate). Finally, the SHGs met the DM and explained the issue of deprivation by government officials.

They warned the DM that if the issue couldn't be resolved in one month, they would meet the SHG minister. The DM responded and called for a meeting at the SDO's office. Women from 12 SHGs, landowners, ADM, panchayat pradhan, BDO, DNO also participated in the meeting. The DM ruled in favour of the SHG based on the written lease agreement and issued an order around it. The mango orchard is being maintained by the reinvigorated women, who are confident that they will win through collective action.

**CASE STUDY - 5**

**Linking Rural Producers to Urban Markets through Women SHGs, Siwanpani village, Dewas district, Madhya Pradesh**

This story is from Ghatneeche region of Dewas district of Madhya Pradesh. This is a predominantly tribal population. Small and marginal farmers have agriculture and wage labourers their main source of livelihood. Erratic monsoons have caused many shocks to household incomes in the past 3-4 years. In June 2014, Ramkubai, of Siwanpani village, along with 25 other SHG women decided to experiment with poultry rearing of Satpuda Desi breeds. Fifty two-week-old chicks were distributed to each of these SHG members at Rs.45 per chick. Initially, she was able to realize good profits, by selling birds in the range of Rs.300 to 400, in the local village bazaar.
Seeing this, more households began to raise these birds. Soon, the local markets became saturated as more such birds entered the market. Gradually, the local bazaar rates began to drop.

“At first, many of us waited for the prices to comeback, but as the birds grew larger with time, eating more maize, it became even harder to sell them profitably.”

The need for a permanent and accessible market was felt. Other options were explored like hotels, and markets in Indore, but there was disagreement over the purchase prices. That was when Animesh Mondal, the Programme Head at Samaj Pragati Sahayog (SPS) thought of the rural-urban market linkage model. SPS also promotes SHGs in Dewas city where there are many urban SHG members who operate in the informal poultry meat business. They sell both cut meat as well as whole birds.

In January 2015, an exposure visit was organized for 10 such members among the poultry farmers in Siwanpani village. The urban members mostly sold broiler chicken previously, and were thrilled to see the Satpuda birds. Members such as Shakila Bi and Kamrul Bi readily agreed to trade these birds. They were confident of selling them at the own shops in the city. Some others did raise apprehensions about the spread of disease among these birds. But SPS’ poultry professional, Om Prakash Rawat dispelled these doubts by elaborating on their regular vaccinations.

The pricing strategy was also crucial. In the Dewas market, the going rate for broiler was around Rs.150 per kilo. The rural SHG members justifiably demanded more as they were also used to selling on a whole-bird basis, and not on a per-kilo basis. Though the weight of an average bird hovered around 2 kilos, the actual consumable meat content was around 1.5 kilos. In addition, for the urban members, once the bird is cut and a client buys only half the bird, the rest of the meat would be sold at a lower rate. During negotiations between both parties, facilitated by SPS, a consensual rate of Rs. 300 per bird was arrived at. The transport costs and other overheads were decided to be included within this amount, borne by the rural producers.

The other important aspect was that of timing. Urban demand in Dewas was more a continuous trend, with no drastic daily changes. But production in rural areas was not so. Flocks of birds from a village get ready for sale together; and once in 2 or 3 months. Thus, it was also decided to stagger the production timing of different
members in different villages. This was to ensure that the weekly demand could always be met. Going forward, this calls for very precise supply side management, as the operations grow larger. The SHGs being federated at a cluster level provides an institutional mechanism to manage such operations.

**Table - 8**

<table>
<thead>
<tr>
<th>FOR THE URBAN MEMBERS</th>
<th>FOR THE RURAL MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average weight of bird</td>
<td>2 kg</td>
</tr>
<tr>
<td>Cost</td>
<td>Rs 250</td>
</tr>
<tr>
<td>Weight of Meat per bird</td>
<td>1.5 kg</td>
</tr>
<tr>
<td>Per Kilo cost</td>
<td>Rs 166</td>
</tr>
<tr>
<td>Average Selling Price per Kilo</td>
<td>Rs 240</td>
</tr>
<tr>
<td>Average Profits per Kilo</td>
<td>Rs 74</td>
</tr>
<tr>
<td>Average cost of rearing per bird</td>
<td>Rs 150</td>
</tr>
<tr>
<td>Transport, Overheads per bird</td>
<td>Rs 10</td>
</tr>
<tr>
<td>Selling price</td>
<td>Rs 250</td>
</tr>
<tr>
<td>Surplus per bird</td>
<td>Rs 90</td>
</tr>
</tbody>
</table>

Today, rural members are able to raise 50-100 birds at ease and sell them through this channel, earning over Rs.8,000 within 10 weeks. This has assured the rural members of continuous sales and also ensured supply for the urban members. They could now sell flocks as a whole, and not have to spend whole days haggling in the weekly village bazaars to sell each bird. These steps have encouraged Ramkubai and others like Bhuribai of Punjapura to further expand their stocks to 300 in the future. This stability has helped the activity grow.

Today, over 250 rural members have been linked to 15 urban members. Urban demand too steadily grows. The clear difference in taste between the broiler and the Satpuda has also created a unique market for its urban connoisseurs. A minimum of one flock of 100 birds are shipped every week. On some busy weeks, there are even 200 birds getting shipped. SHG members here are able to sell them at around Rs.230-250 per kilo, realizing good profits. The availability of such an SHG platform in both places helps provide a robust institutional infrastructure to carry out such linkages. Many financial transactions are seamlessly carried out through them. The necessary working capital for the urban members is provided by the SHG, and timely payments to the rural members are also assured. This has also meant zero cash transactions, as all the SHG transactions are through banks reducing potential leakages. But the biggest advantage is the absence of middlemen, who normally perform this role of
intermediaries between producers and consumers. Women collectives themselves play that role. This takes the idea of collective action further. Such an SHG based linkage model could be used for several other activities, like eggs, goats, fish, and agricultural produce too. The diversity of livelihood choices among the urban poor means a variety of products could be produced to meet the expanding rural aspirations. Rural women collectives can indeed come together with urban ones to create strong synergies that benefit all.

CONCLUSION

From the themes enumerated above along with the supporting case studies, it is understood that RRA network aims to reconfigure public systems, policy and investments for productive, prosperous and resilient rainfed agriculture by building synergies between diversity of ecosystems and the development of good programmes.

Designing of good programmes require a transformation in the nature and design of public policies and systems, to foster resilience and a participatory adaptation, truly reflecting the enormous social and agro-ecological diversity of rainfed areas.
SPECIAL THANKS TO EVERYONE WHO SUPPORTED AND CONTRIBUTED

AGA KHAN RURAL SUPPORT PROGRAMME (INDIA)

YUVA RURAL ASSOCIATION

PARIVARTTAN - RRA Malkangiri

WASSAN

REVITALISING RAINFED AGRICULTURE (RRA) NETWORK

www.rainfedindia.org