Revival of large cardamom cultivation

...through rhizomes and local traditional knowledge has been introduced in villages around Barsey Rhododendron Sanctuary, Sikkim. Rhizomes of cardamom are first planted in a nursery. The cardamom saplings are grown in the nursery to a certain height and then they are transplanted and sown in the fields. This has reduced disease infestation of the saplings which was happening when the saplings were directly planted in the fields. The new method had led to decrease in seeding cost in large cardamom. Programmes set up two nurseries which has helped to raise 30,000 saplings worth a total of Rs 1.5 lakhs in two villages.

System of Rice and Wheat Intensification (SRI/SWI)

...is a cultivation technique in which rice and wheat are planted while maintaining a constant distance leading to better productivity. A distance of 8 cm is maintained between plant to plant and a 20 cm distance is maintained between the lines. This kind of sowing allows for sufficient aeration, moisture, sunlight and nutrient availability which leads to a proper root system development from an early stage. This technique was introduced in areas with low water availability. The average increase in income per household from planting rice in 20 decimal of land was found to be Rs 1850 per season. While the average increase in income per household from planting wheat in 12 decimal of land was Rs 1486 per season.

Low Cost Polyhouse

Two types of polyhouse have been demonstrated for vegetable cultivation. One is the “A frame polyhouse” which was established in an area of 30 ft by 10 ft while the other is a “hoop shaped polyhouse” which has been established in an area of 20 ft by 10 ft. Off season vegetables like broccoli, lettuce, cucurbits have been grown in the polyhouses under controlled environment in hilly regions with extremely cold climate. Compost is also added to increase the productivity of the vegetable.

Integrated Farming

...was introduced to diversify agriculture in areas where agriculture was totally rainfed and irrigation facilities were poor. Inter crops of redgram, black gram and vegetables were done with the main crop of cotton. Demo plots of cotton along with redgram (inter crop), cowpeas, ladies finger (trap crop), sunhemp and castor as border crops have been established. Mixed cropping demo plots with green gram and black gram along with marigold, lady finger and sunhemp as border crop have been established. The farmers have used green manuring methods and vermi composting for improving soil fertility. Non Pesticide Management practices for pest management have also been used to save input costs as well as agriculture productivity enhancement. An additional 72 acres of fallow and cultivable wasteland was also brought under integrated farming as well as horticulture in 3 villages. The average increase of income per household by growing cotton and redgram in one acre was found to be Rs 14500 per season. The average yield of cotton was 415 kgs per acre and red gram was 215 kgs per acre per season. Green gram and black gram cultivation has also augmented income per household by Rs 12350. The average yield of green gram is 380 kgs per acre and black gram is 420 kgs per acre in a season.

System of Crop Intensification

...seeks to increase the food grain production by reducing the use of chemical fertilizers. The fields are ploughed three times manually after which the seeds are sown. Organic manure is used in the fields instead of the chemical fertilizers. Manual weeding is also done. The crops grown were wheat, corn, rice and finger millets. There was, however, no significant yield due to white grub infestation and poor winter rains. This practice needs to be refined further to see visible results on the field.

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Introduction of better quality seeds, scientific technology and techniques like LEISA, good treatment has led to enhanced farm productivity in 1820 HHs in 55 villages around 12 Protected Areas (PA).

On site training programmes have been conducted for farmers at the diverse sites. Some of techniques introduced at household level were:

1. Low External Input Sustainable Agriculture (LEISA)
2. System of Rice Intensification
3. System of Wheat Intensification
4. Zero tillage farming
5. Square meter vegetable cultivation
6. System of crop intensification
7. Scientific intercropping of cotton crop
8. Low cost polyhouse for seedlings and vegetable
9. Rhizome based cardamom cultivation

Capacity building of farmers was carried out to promote organic farming by introducing scientific techniques for preparation of compost especially vermicompost. Trichoderma, malka khad, cow pat, Naced compost and malka pesticide. Farmers were encouraged to use green manure to reduce usage of chemical fertilizers.

Adoption of farm based activities

Tribes who did not practice agriculture like the Kadaras, a particularly vulnerable tribe, have been encouraged to cultivate vegetables in home gardens and raise nursery of NTFPs and other forest species. Tuber cultivation was also introduced by Kunte tribal households to reduce collection from forests and also document the variety of tuber availability in their households. A total of 1335 HHs around 11 PAs have adopted cultivation of vegetables and tubers for the first time leading to enhanced food security.

Demonstration done for 421 HHs Improved Techniques Adopted in 1060 HHs

<table>
<thead>
<tr>
<th>Partner Name</th>
<th>Protected Area</th>
<th>Agro Ecological Regions</th>
<th>Activity</th>
<th># of HHs</th>
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<tbody>
<tr>
<td>Centre for People Forestry</td>
<td>Kewai Wildlife Sanctuary, Faridabad</td>
<td>Decisan (Changaral) Plateau and Eastern Himalayas</td>
<td>Horticulture Plantation Mountain Farming Vegetable Cultivation</td>
<td>103</td>
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<tr>
<td>Girnar Rural Environmental Action Group</td>
<td>Girnar Wildlife Sanctuary, Bhavnagar</td>
<td>Eastern Plain</td>
<td>LEISA Farming Kitchen Gardening, Zero Tillage Farming, Terrace Planting</td>
<td>321</td>
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<tr>
<td>Hiral Prakti</td>
<td>Askot Wildlife Sanctuary, Uttar Pradesh</td>
<td>Western Himalayas</td>
<td>Low Cost Polyhouse, Crop Inter-cropping</td>
<td>29</td>
</tr>
<tr>
<td>Japaj Jan Vikas Samiti</td>
<td>Jasojam Wildlife Sanctuary, Papenahen</td>
<td>Western Plain, Korkhah, and Western Lowlands Peninsular</td>
<td>Tuber Cultivation, Fruit Plantation, Vegetable Cultivation</td>
<td>250</td>
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<tr>
<td>Jan Swa Parshad</td>
<td>Haroribagh National Park, Eastern Plateau and Eastern Himalayas</td>
<td>SRI, SW, Vegetable Cultivation</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Jharkhand Co operative Forest and Agriculture</td>
<td>Benagni Rolhdodendron Conservation Society, Sikkim</td>
<td>Eastern Himalayas</td>
<td>Large Cardamom Nursery</td>
<td>140</td>
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<tr>
<td>Laya</td>
<td>Pappionina National Park’s, Anima Pradesh</td>
<td>Dacian Plateau</td>
<td>Tuber Cultivation, Vegetable and Fruit, Nursery Development</td>
<td>249</td>
</tr>
<tr>
<td>Mysore Evergreen Village Society</td>
<td>Mysore National Park, Balla Bes</td>
<td>Bengal and Assam Plains</td>
<td>Lenon-Plantation</td>
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<tr>
<td>WFW India</td>
<td>Ramnabhum Tiger Reserve, Rajmahal Hills</td>
<td>Northern Plain and Central Highlands</td>
<td>High Value Organic Farming, Vegetable Cultivation</td>
<td>150</td>
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<tr>
<td>River Research Centre</td>
<td>Pembumbzul Tiger Reserve, Kenya</td>
<td>Western Ghats and Coastal Plains</td>
<td>Vegetable Cultivation, Vegetable Nursery</td>
<td>130</td>
</tr>
<tr>
<td>Society for Rural Development and Action</td>
<td>Nangru Wildlife Sanctuary, Hisralchad Pradesh</td>
<td>Western Himalayas</td>
<td>Vegetable square meter gardening, Reinroduction of sugar millets, okra etc.</td>
<td>284</td>
</tr>
<tr>
<td>Shikumbi Wildlife Conservation Trust</td>
<td>Shikumbi Wildlife Conservation Trust, Emmanuel</td>
<td>Western Ghats and Coastal Plains</td>
<td>Tuber Cultivation, Nursery Development of Pome and fruit saplings</td>
<td>110</td>
</tr>
</tbody>
</table>

Total 1820

Low External Input Sustainable Agriculture

...has been demonstrated to reduce the farmer’s dependency on products that are purchased from markets (pesticides, fertilizer, urea) and decrease the input costs of the farmers. Introduction of composting and recycling like vermicompost, pit compost, Cow Pat Pit, Nadep Compost has been done depending upon the area available and the crops grown by farmers. Capacity building of farmers has been done to develop and use biofertilizers and bio-pesticides like Trichoderma. The biofertilizers used on the crops instead of the market bought fertilizers and pesticides has led to enhanced productivity and reduced the pest attacks. The farmers are also adding PSB (Phosphate Stabilizing Bacteria), culture, rice culture, and other biofertilizers to the seeds for treatment before sowing to prevent fungal attacks. The core of the LEISA technique is effective use of local resources to bring down input costs of the farmer. Some of the crops cultivated under this technique are sugarcane, banana, and cauliflower.

Adoption of farm based activities

Tubers who did not practice agriculture like the Kadaras, a particularly vulnerable tribe, have been encouraged to cultivate vegetables in home gardens and raise nursery of NTFPs and other forest species. Tuber cultivation was also introduced by Kunte tribal households to reduce collection from forests and also document the variety of tuber availability in their households. A total of 1335 HHs around 11 PAs have adopted cultivation of vegetables and tubers for the first time leading to enhanced food security.

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<table>
<thead>
<tr>
<th>PAs</th>
<th>HHs</th>
<th>Yield Increase from 200 quintals to 250 quintals/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1335</td>
<td>11</td>
<td>10600</td>
</tr>
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</table>

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Field Demonstrations

Demonstration of scientific technique for LEISA and vegetable cultivation has been done with 421 HHs. This has been well received by farmers and an additional 1060 HHs have also adopted these techniques in the project villages around Valmiki Wildlife Sanctuary, Bihar and Hazaribagh National Park, Jharkhand on their own.

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Square Meter vegetable cultivation

...has been introduced in villages located in the mountain to maximize land utilization in areas with small and terraced land holdings. This has also led to increase in food security and augmented HH incomes. This technique requires only 20% of the space of a conventional row garden and can produce a variety of vegetables at the same time. A standard size plot of 9 by 4 feet was established for vegetable cultivation. Compost is also added to these plots to get high yield. The vegetables cultivated in these plots were Radish (Red and White Varieties), Squash (Green and Yellow varieties), French beans, Cucumber, Spinach, Spring Onion and broccoli. The produce harvested has been used mainly for self consumption.