Increasing Nutritional Security and Doubling Farmers Income Through System of Crop Intensification and Half Acre Model Farm

Koraput District, ODISHA
Implementing Agency : PRAGATI, KORAPUT
Geographical Outreach : 48807 Small and marginal Farmers in Koraput District of South Odisha.

Objectives:
✓ Enhance the nutritional security at household level.
✓ Increase production per ha
✓ To increase the annual household income of small and marginal farmers

Summary:
Land is a shrinking resource for agriculture. Hence, a rational land use plan is needed to increase agricultural production by achieving higher yields per ha through improved technologies, multiple cropping and increasing cropping intensity. More than 80% of farmers in the aspirational district of Koraput own less than 1 ha land. Over time, due to population growth that caused a division of land holdings, and a very slow growth rate of the rural economy, the pressure on land has been steadily increasing and the number of small and marginal farmers has been growing. Further, with the traditional cropping system, small and marginal farmers are finding it difficult to produce adequate food to feed their families. The only way to produce food and increase income from family farms is through the intensive use of land through improved technologies and diversification of crops. So, in order to improve the sustainable food and nutritional security along with increased income from family farms of these targeted groups of farming community, an effort was made by Pragati, Koraput to develop models of system of crop intensification and half acre horticulture-based farming system in Koraput District.
**System of Crop Intensification:**

As land and water resources are becoming less abundant relative to the human populations that depend on them, there is pressing need of improving the management of the soil systems, water, and biotic resources still available. Pragati has promoted the agro-ecological innovation called System of Crop Intensification—a modification of successful SRI and applied to millets and pulses that seeks not just to get more output from a given amount of inputs, but aims to achieve higher output with less use of or less expenditure on land, labor, capital and water.

SCI methods are particularly relevant for resource limited, nutritionally vulnerable households because SCI like SRI relies minimally on purchased inputs. Pragati’s model of SCI covers paddy and finger millet in the rain fed lands followed by pulses in the rice fallows for food plus nutrition security. Due to adoption of SCI, the yield of paddy and millet has almost increased by 60-80% ensuring nutritional food security and also generating surplus that helps farmer to earn additional income.

The main elements of SCI include:

- **Seed selection** to establish plants that have vigorous early growth, particularly of their root systems.
- **Providing optimally wide spacing of plants** to minimize competition between plants for available nutrients, water, air, and sunlight. This enables each plant to attain close to its maximum genetic potential.

- **Keeping the topsoil around the plants** well-aerated through appropriate implements or tools so that soil systems can absorb and circulate both air and water. Usually done as part of weeding operations, this practice can stimulate beneficial soil organisms, from earthworms to microbes, at the same time that it reduces weed competition.

- **If irrigation facilities are available**, these should be used but sparingly, keeping the soil from becoming waterlogged.

- **Application of organic matter**, as much as possible, to enhance soil fertility so that it can retain and provide water in the root zone on a more continuous basis, reducing crops’ need for irrigation water.

- **Reducing reliance on inorganic fertilizers and pesticides**, and to the extent possible, eliminating them. This will minimize environmental and health hazards and avoids adverse impacts on beneficial soil organisms, which are essential for SCI success.
Impact of SCI

- Increased crop yield by 60 to 80% leading to nutritional food security
- Reduced inputs and labour costs by 40%.
- Improved soil health due to application of organic manures.
- Increased resilience to climate change effects.

The Half Acre Model Farm:

The half acre model farm was first introduced by Pragati, Koraput in 2014 in Nandapur block of Koraput District under its eco-friendly irrigation project. Initially two progressive farmers were selected from a village where irrigation structures have been created/existed. These farmers were trained, crop plans were prepared and input support like seeds, fencing, organic manures were provided for the demonstrations. The land was divided into three parts i.e. one part (0.10 decimal) with crops like banana/papaya, (0.10 decimal) with creeper crops and 0.30 decimal with seasonal vegetables.

The unit cost per farmer was Rs 45000/-, out of which Pragati provided support of Rs 22,500 and the other 50% was contributed by the farmer. As the farmer starts selling his crops, he would repay the amount which was to be invested for another farmer. Since then half acre model farms have been replicated by the farmers and also they have added innovations.

The following steps are adopted for the purpose:

- **Area allotment to crops**: Allot cultivation area to each crop as per the food requirements of the farm families keeping in view the average productivity of crops in the region, giving maximum acreage to cash crops.

- **Layout and Planning of field**: Plan the types of crops to be grown as per the resources and suitability of crops to the region.

- **Crop calendar**: The crop calendar to be planned for the whole year. (Follow appropriate crop rotations; intercropping, multiple cropping and guard cropping).

- **Selection of crop varieties**: Select improved varieties that have resistance to major diseases and insect pests.

- **Crop Production Technology**: Follow the improved package of practices for planned crops.
In the half acre model, the cropping pattern being followed by the farmer was changed. The planning and layout of field was done on the basis of food requirement of the family and the market demand. The area under each crop was allotted on the basis of average productivity of crop in the region. Crop calendar for the whole year was prepared to enable the farmer to perform various inter cultural operations timely. Besides, the farmers are also mobilized to adopt only organic farming practices in their half acre models which is good for health as well as soil.

The model has increased crop diversity with long term crops like banana, papaya and creeper crops (both seasonal and long term like pointed gourd), seasonal vegetables, roots and tubers as border crops which has demonstrated improvement in nutrition status through dietary diversification, greater nutrition awareness, change in food intake behaviour and income enhancement.

### Year round Integrated vegetable cultivation plan (0.5 acre Model)

<table>
<thead>
<tr>
<th>10 Cent</th>
<th>10 Cent</th>
<th>20 Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(80 to 100)</td>
<td>Temporary Trellis</td>
<td></td>
</tr>
<tr>
<td>Banana/ Papaya</td>
<td>Ridge Guard,</td>
<td></td>
</tr>
<tr>
<td>Trees</td>
<td>Bitter Guard &amp;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cucumber</td>
<td></td>
</tr>
<tr>
<td>10 Cent</td>
<td>Kharif</td>
<td>Brinjal + Beans</td>
</tr>
<tr>
<td>Permanent Trellis</td>
<td>Tomato + Beans</td>
<td>Chilly + Beans</td>
</tr>
<tr>
<td>(Pointed Guard/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spine Guard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rabi</td>
<td>Onion &amp; Pea</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>Ladies finger &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chilly</td>
</tr>
</tbody>
</table>

### Return from Half acre Model farm:

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Description</th>
<th>Qtr.1 (July-Sept)</th>
<th>Qtr.2 (Oct-Dec)</th>
<th>Qtr.3 (Jan-Mar)</th>
<th>Qtr.4 (Apr-Jun)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Return to a farmer from Banana Cultivation from 10 decimal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9750</td>
</tr>
<tr>
<td>2</td>
<td>Return to a farmer from seasonal Vegetable from 20 decimal (Tomato + Beans; Onion + Pea; Okra + Chilli)</td>
<td>17000</td>
<td>7500</td>
<td>6000</td>
<td>17000</td>
<td>47500</td>
</tr>
<tr>
<td>3</td>
<td>Return to a farmer from Pointed gourd cultivation 10 decimal</td>
<td>8000</td>
<td></td>
<td>8000</td>
<td>15000</td>
<td>15000</td>
</tr>
<tr>
<td>4</td>
<td>Seasonal Gourds in 10 decimal land (Bottle gourd, Bitter gourd etc.)</td>
<td>7500</td>
<td>5000</td>
<td>9000</td>
<td>7000</td>
<td>28500</td>
</tr>
<tr>
<td>5</td>
<td>Total Return</td>
<td>32500</td>
<td>12500</td>
<td>15000</td>
<td>41750</td>
<td>101750</td>
</tr>
</tbody>
</table>

The return from the half acre model shows that the farmer has regular harvest of vegetables throughout the year which is used for consumption and the farmer gets an opportunity for earning cash through sale of the surplus vegetables.
Testimonial of Farmers:

Balaram Pangi is a young tribal farmer of Modeiguda village in Nandapur Block. He depends on 2.5 acres of land to feed his family of 5 members. He earlier used to grow only paddy and millets during the Kharif season. After getting support from Pragati, Balaram has started adopting SCI in paddy, millets in 1 acre each and established a half acre model farm. He also grows pulses in the rice fallow in Rabi season. Now Balram has enough paddy, millets, pulses for his own consumption. He produces vegetables throughout the year in his half acre model farm and therefore improved the diet of his family along with earning additional income of Rs 85000 per annum. Earlier his family did not consume many vegetables as they had to buy from the market. Besides, he also gets organic, fresh vegetables from his own farm. Balaram has also started fish farming and a plan to invest in poultry rearing so that he can provide nutritional food for his family. “Every farmer should have a proper land use and crop plan both for nutritional food security and income,” says Balaram.

Harischandra Gadaba is a tribal farmer of Jhilimiliguda village in Borigumma block. He depends on agriculture for his livelihood. He has 4.5 acres of land, out of which 4 acres are rain fed where he grows paddy and millet during the Kharif season. Harischandra has now become a progressive farmer after participating in trainings on system of crop intensification and half acre model. He now adopts SCI in rice, millets and also grows pulses in rice fallow during Rabi season. He has established a half acre model with different crops i.e. papaya (0.10 decimal, little gourd (0.10 decimal), pointed gourd (0.10 decimal) and seasonal vegetables like brinjal, tomato, chilly (0.20 decimal) as per the crop calendar. Earlier he used to grow only a single vegetable crop in half acre and sold in the market. “My family is now both food and nutrition secure, as we have rice, millet, pulses and vegetables for our daily diet” says Harischandra. He also earns Rs 65000/- to Rs. 80,000/- per annum by selling surplus vegetables and Rs 50000 by selling rice and millets.

Prabhakar Adhikari
Secretary,
Pragati, Koraput
Mob: 9437025045,
Mail ID: pragatikoraput@gmail.com