

Procedure of Assessment of Environmental Impact

1. Crop intensification
2. Water Harvest & Management
3. Livestock Management

1. **Crop Intensification** ➡ Environmental Impact

The key objective of interventions in crop production is to increase crop productivity so that farmer income is also enhanced. The dominant and “business-as-usual” approach to achieving this is to intensify crop production by introducing hybrid seed varieties that respond well to chemical fertilizers and apply chemical pesticides to control pests and diseases that attack the crop.

However, use of such intense chemical based crop production technologies results in the long-run in decreased yield. Increased use of chemical pesticides leads to destruction of pest predators and increase in pest and diseases. Most, hybrid seeds are designed to respond to higher doses of chemical fertilizers and do not perform well if they are not provided.

“Negative externalities” of intensification through these kinds of technologies include soil degradation, over-extraction of groundwater, the build-up of pest resistance and the erosion of biodiversity.

Thus, if a “business-as-usual” approach is taken to increasing crop productivity under RACP, there is a high likelihood of use of agri-chemicals increasing substantially leading to deterioration of soil quality which would reduce crop productivity and thereby agricultural competitiveness in the long run. Further, these agri-chemicals would pollute the village ecosystem and affect the health of the farming families in the village and their livestock as well.

However, the RACP proposes to adopt “green” agricultural practices that would promote Integrated Nutrient Management and Integrated Pest Management and therefore, the possibility of excessive use of agri-chemicals is largely mitigated.

1.1 Suggested Mitigation Measures & Good Practices

A suggested “good practice” is Sustainable Crop Production Intensification (SCPI) which views agriculture as a part of a larger ecosystem and tries to reduce the eco-footprint of agriculture while at the same time enhancing productivity and returns to the farmer.

It is defined as producing more from the same area of land while reducing negative environmental impacts and increasing contributions to natural capital and the flow of environmental services. SCPI views farming as an ecosystem which uses inputs, such as land, water, seed and fertilizer, to complement the natural processes that support plant growth, including pollination, natural predation for pest control, and the action of soil biota that allows plants to access nutrients.

1.2 Farming based on an ecosystem

Approach has three underlying principles viz., simultaneous achievement of increased agricultural productivity and enhancement of natural capital and ecosystem services;

- Higher rates of efficiency in the use of key inputs, including water, nutrients, pesticides, energy, land and labour;
- Use of managed and natural biodiversity to build system resilience to abiotic, biotic and economic stresses.

In order to achieve these, the following farming practices need to be followed:

- Minimize soil disturbance by minimizing mechanical tillage in order to maintain soil
- Organic matter, soil structure and overall soil health;
- Enhance and maintain a protective organic cover on the soil surface, using crops, cover crops or crop residues, in order to protect the soil surface, conserve water and nutrients, promote soil biological activity and contribute to integrated weed and pest management;
- The use of well adapted, high-yielding varieties with resistance to biotic and abiotic stresses and improved nutritional quality;
- Enhanced crop nutrition based on healthy soils, through crop rotations and judicious use of organic and inorganic fertilizer;

- Integrated management of pests, diseases and weeds using appropriate practices and use of
- Bio-control agents and IPM strategy.
- Efficient water management, by obtaining “more crops from fewer drops” while maintaining soil health and minimizing off-farm externalities.

2. Water Harvesting & Water Management

Water harvesting and water management activities are expected to be implemented under 3 water regimes in the RACP, namely, rain fed, groundwater based and surface water based. The main objectives are to harvest and store water in rain fed systems, harvest and recharge in groundwater systems and under all water regimes to sustainably use water for cropping and livestock, reduce use of water in agriculture sector and increase water-use efficiency in cropping.

2.1 Environmental Impacts & Mitigation Measures

In addition, to water harvest and storage, the RACP seeks to actively manage the use of water in agriculture. RACP should incorporate at the design stage itself a water management strategy that is based on matching cropping pattern with sustainably harvestable/usable water. In the case of rain fed systems this may be treated as water harvest and storage of not more than a certain percentage of measured current runoff, while in groundwater systems it may be defined as less than or equal to the measured actual annual recharge. In canal based systems it may be defined as the targeted net savings desired from implementation of RACP in the command area of a distributary. In addition RACP should as a rule apply water wherever feasible only through micro irrigation devices. Other cultural means of conserving resources such as zero or minimal tillage, constant maintenance of green cover or soil mulching, etc., would be promoted.

As in the case of crop production, the RACP would mainstream the concepts of matching cropping pattern to water availability, use of micro irrigation system as a rule and adoption of water conservation techniques.

Overall, activities under this subcomponent are expected to reduce absolute quantity of water use in agriculture while increasing water-use efficiency. Therefore, environmental impacts are expected to be positive.

3. Livestock Management

RACP has recognized the importance of livestock in ensuring nutrient recycling in cropping systems. Accordingly, it has included a component that focuses on improving small ruminant livestock management, especially for goats. Further, the project proposes to provide health care through health camps and Rural Technology Centre-cum-Animal Health Centres.

3.1 Suggested mitigation measures include:

- Develop silvi-pasture (tree & grasses) lands on common and private land
- Bring in improved feed practices such as using chaff cutters
- Use of mineral supplements to increase productivity
- Herd and breed management techniques
- Inclusion of fodder crops in the cropping pattern to ensure year-round feed and fodder availability etc.