Multifunctional model of small farms: Case study from Pali, India

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Outline of this Presentation

• Why is Small multifunctional so Important for developing nations and Sustainable Rural Development?

• General Principles adopted by case study
  • What are objectives?
  • How to best accomplish them?
  • Principles for effective implementation
  • Narrate one way a farmer can impact sustainable agriculture through practice.
  • Identify one way of personal difference in the sustainability of our food system.

• Lessons learnt
• Conclusions drawn
Why is small multifunctional agricultural so important for developing nations?

- **63 percent** of population live in rural areas, **73 percent** of poor live in rural areas.

- Agriculture account for **30-60 percent** of GDP in developing countries.

- Even with rapid urbanization, **more than 50%** of the poor will be in rural areas by 2035.

- Agriculture, is largest source of livelihoods in India.

- **70 percent** of its rural households still depend primarily on agriculture with 82 percent of farmers being small and marginal.
Location of case study

- Pali district of Rajasthan, India
- Falls under arid-semi arid zone of Thar desert of India
- Soils are low in organic carbon and have salinity of medium to high values.
- Water is having high pH and TDS
- Water table is very low and poor in quality
- Annual Rainfall is less than 250 mm.
- Size of land holdings is mostly small and marginal.
NRM Principles applied

- Increase productivity on the “waste” land
- Diversify agroecosystems to protect food systems, improve diets, minimize risks, diversify incomes, and conserve agrobiodiversity
- Rehabilitate productivity and ecosystem functions of farm to enhance environmental roles
- Technologies include integrated soil fertility management, adapted varieties, crop rotations, conservation tillage, buffer strips, and organic farming
- Strengthen local institutions and facilitate community-driven land and water resource management for managing shocks and stresses
Rain water harvesting

- Irrigation has been successful in lifting many rural poor out of poverty...trick is to do it in a sustainable manner
- Reduce the vulnerability to climate change and variability
- Improve crop yields and increase water productivity for increased food production.
- Sustain crop production during the mid-season dry spells

Av income levels & irrigation intensity
Moisture conservation measures

- Deep summer ploughing
- Planking after ploughing
- Mixing of pond soil
- Making of sharp ridges and furrow
- Use of biomass and live mulch
- Creation of microclimate
- Trapping water of the field in the field itself
Maintain and sustain soil health

• Incorporating Livestock in the farming system
• Increase in soil organic carbon, microbial population and water holding capacity
• Increased retention and bioavailability of nutrients in soil.
• Milk and meat availability and generation of valuable waste for composting.
• Utilization of farm waste and crop residues
  ✓ Composting and vermicomposting
  ✓ Use of urine for preparing bioinsecticides and pesticides
• No additional cost
• Recycling of the farm waste

Farm waste and extra material is used for animals rather livestock being the focal point
Other Interventions

- Application of gypsum as per GR value
- Green manuring with Mung (*Vigna radiata*), guar (*Cymopsis tetragonoloba*), dhaincha (*Sesbania aculeata*) and sunhemp (*Crotalaria juncea*) during summer and rainy season.
- Night penning of sheeps and goats
- Growing trap crops like napier and safflower at boundaries
- Incorporation of forestry plants like kair (*Capparis decidua*) and kumat (*Acacia arabica* and *acacia nilotica*).
Turning to Spices and medicinal plants

- Wealth of arid zone
- Requires minimum water and nutrients
- Short time period and easy to harvest
- Highly ruminative and productive
- Can be kept for long
- Resistant to insects and pest
- Increases soil fertility and microbial population
Cropping systems

- Agro-horti cropping system
- Agro-horti –Silvi cropping system
- Agro-horti –Silvi –pastoral cropping system

✓ Bajra-Wheat
✓ Green gram-wheat
✓ Cotton wheat
✓ Bajra-Cumin
✓ Clusterbean-Wheat
✓ Sorghum fellow
Fruits of Success

- Green gram
- Rapeseed
- Chickpea
- Mustard
- Sesame
- Wheat
Olericulture
Product diversification of Aonla

- Pickles
- Candy
- Dry Aonla
- Powder
- Whole Fruit Pickle
- Fruit Preserve
- Jam
- Laddoo
- Churan
- Juice
Outcome of Sustainable Development Principles

- Economic sustainability: sustainable livelihoods and improved well-being through growth and poverty reduction

- Environmental sustainability: Target agricultural land, forests, water resources, protected areas, and biodiversity, so that opportunities and options of future generations are not degraded

- Fiscal and institutional sustainability: realistic and cost effective
Elements of Natural Resources Management: Multiple objectives, multiple levels

**Recycle nutrients**

- Cover crops
- Fodder grasses
- Summer Ploughing/Minimum tillage
- Crop Rotation
- Compost
- Manure and crop residues

**Conserve soil and water**
Food web of small farm

Food systems

Production

Processing

Distribution

Use

Access

Recycling and composting

Natural Resources

Technological Innovations

Society
Multifunctionality of small farms

- **Production** of food and fibers
- **Protection** of environment
- **Conservation** of land and resources
- **Development** of rural communities'
- **Preservation** of traditions, agriculture and rural heritage
Conclusion and lesson learnt

• Instead of focusing on one particular component of the agroecosystem, small farms emphasize the interrelatedness of all agroecosystem components and the complex dynamics of ecological processes.

• Uses approach that transcends the use of alternative inputs to develop integrated ecosystems that do not depend on external, off-farm inputs.

• The design of complex agroecosystems is such in which synergisms between biological components replace inputs by promoting processes that through proper management, allow farmers to naturally sponsor the soil fertility, productivity and crop protection of their farming systems.
Thanks