Organic-Based System of Rice Intensification (SRI)

Philippines

left: farm practicing the System of Rice Intensification technology (Photo: Engr. Jemar G. Raquid)
right: rice duck integration in the SRI technology (Photo: Engr. Djolly Ma. P. Dinamling)

Location: Marabut, Samar
Technology area: < 0.1 km2 (10 ha)
Conservation measure: agronomic, management
Stage of intervention: prevention of land degradation
Origin: Developed externally / introduced through project, recent (<10 years ago)
Land use type:
Cropland: Annual cropping
Climate: humid, tropics
WOCAT database reference: T_PHI062en
Related approach:
Compiled by: Philippine Overview of Conservation Approaches and Technologies, Bureau of Soils and Water Management
Date: 2016-03-17
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Intensifying the irrigated rice production while at the same time reducing farm inputs including seeds, fertilizer, and water.

The Organic-based system of rice intensification modifies the usual rice farming system in terms of seedling condition, planting distance, irrigation time and water requirement, and with the incorporation of organic fertilization scheme. Furthermore, integration of rice duck is carried out. This makes the farming system reduce its farm inputs leading to a lower production cost. With the utilization of organic fertilizers and natural concoctions, soil fertility and soil structure is improved. It was also observed that rice grown under SRI can tolerate strong winds. This type of rice production management is currently part of the Caritas Foundation's project, a non-government organization, called Sustainable Learning Agricultural Farm which promotes diversified-integrated organic farming systems. With this, other practices (i.e. rice-duck farming) are being integrated in some SRI areas. Integration of ducks helps in the weeding since it eats weeds as well as harmful insects. In addition, its droplets/manure served as organic fertilizer in the rice field.
The purpose of this technology is to promote better soil management as well as more efficient water management.
Under SRI, the following practices were implemented: In the land preparation stage, 25cm x 25cm plant spacing is made using the man-made implement. Intermittent irrigation is applied up to the panicle initiation stage with the following irrigation schedule: (1) 3 days after transplanting, (2) 9 days after transplanting, (3) 14 days after transplanting, and (4) 19 days after transplanting. The field is irrigated up to 5-cm water depth level per schedule. Fertilizer application includes compost and natural organic concoctions. This is applied on different crop stages.
The existing project sites are located in Samar experiencing Type IV climate wherein rainfall is more or less evenly distributed throughout the year. Most of the farmer practitioners of this technology belongs to the small scale and average type of land user.

Classification

Land use problems:

- soil fertility deterioration, water-use management (expert's point of view)
soil fertility deterioration (land user's point of view)

Land use

Annual cropping

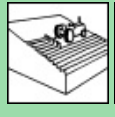
Climate

humid

Degradation

Chemical soil deterioration: fertility decline and reduced organic matter content

Conservation measure



Management: Major change in timing of activities
Agronomic: Organic matter / soil fertility

Stage of intervention

- Prevention
- Mitigation / Reduction
- Rehabilitation

Origin

- Land users initiative
- Experiments / Research
- Externally introduced: recent (<10 years ago)

Level of technical knowledge

- Agricultural advisor
- Land user

Main causes of land degradation:
Direct causes - Human induced: soil management
Indirect causes: population pressure

Main technical functions:
- increase in organic matter
- increase / maintain water stored in soil

Secondary technical functions:
- improvement of ground cover
- improvement of surface structure (crusting, sealing)
- improvement of topsoil structure (compaction)

Environment

Natural Environment

Average annual rainfall (mm)

- > 4000 mm
- 3000-4000 mm
- 2000-3000 mm
- 1500-2000 mm
- 1000-1500 mm
- 750-1000 mm
- 500-750 mm
- 250-500 mm
- < 250 mm

Altitude (m a.s.l.)

- > 4000
- 3000-4000
- 2500-3000
- 2000-2500
- 1500-2000
- 1000-1500
- 500-1000
- 100-500
- <100

Landform

- plateau / plains
- ridges
- mountain slopes
- hill slopes
- footslopes
- valley floors

Slope (%)

- flat
- gentle
- moderate
- rolling
- hilly
- steep
- very steep

Soil depth (cm)

- 0-20
- 20-50
- 50-80
- 80-120
- >120

Soil texture: medium (loam)
Soil fertility: medium
Topsoil organic matter: medium (1-3%)

Soil water storage capacity: medium
Ground water table: 5 - 50 m
Availability of surface water: good
Water quality: good drinking water

Tolerant of climatic extremes: floods, strong winds

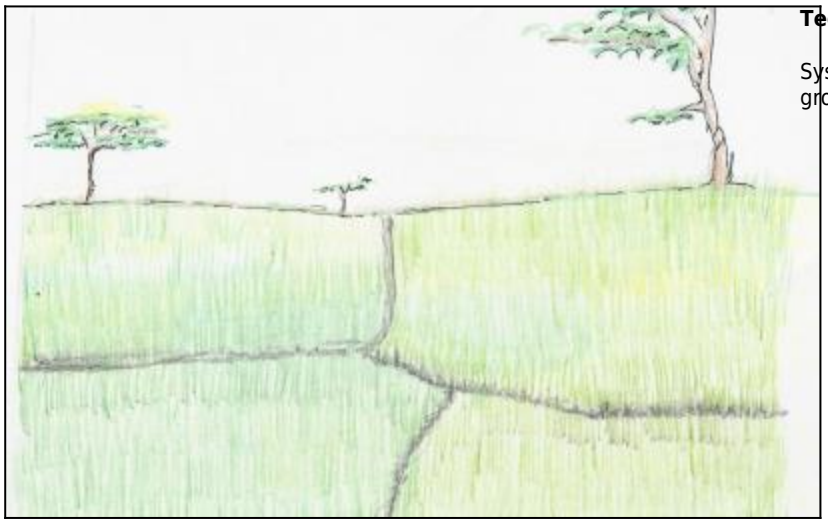
Human Environment

Cropland per household (ha)

- <0.5
- 0.5-1
- 1-2
- 2-5
- 5-15
- 15-50
- 50-100
- 100-500
- 500-1,000
- 1,000-10,000
- >10,000

Land user: groups / community, Small scale land users, common / average land users, men and women
Population density: 10-50 persons/km2
Annual population growth: 1% - 2%
Land ownership: individual, titled
Water use rights: communal (organised)
Relative level of wealth: average

Importance of off-farm income: 10-50% of all income:
Access to service and infrastructure: moderate: technical assistance, employment (eg off-farm), drinking water and sanitation; high: education, roads & transport
Market orientation: mixed (subsistence and commercial)
Mechanization: manual labour, animal traction, mechanised
Livestock grazing on cropland:



Technical drawing

System of rice intensification for lowland rice growing. (Patricio A. Yambot)

Implementation activities, inputs and costs

Establishment activities

- Planting of rice seeds
- ducks

Establishment inputs and costs per ha

Inputs	Costs (US$)	% met by land user
Equipment		
- ducks	177.78	%
Agricultural		
- seeds	18.67	100%
TOTAL	**196.45**	**100.00%**

Maintenance/recurrent activities

- fertilizer application (compost)
- harvesting
- weeding
- first plowing
- spraying of natural concoctions
- organic fertilizer application
- clearing
- transplanting
- second plowing

Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US$)	% met by land user
Labour	213.32	100%
Equipment		
- machine use	133.34	100%
Agricultural		
- fertilizer	66.67	100%
TOTAL	**413.33**	**100.00%**

Remarks:

Assessment

Impacts of the Technology

Production and socio-economic benefits	Production and socio-economic disadvantages
+++ increased crop yield	
+++ reduced demand for irrigation water	
+++ reduced expenses on agricultural inputs	
+++ increased farm income	
++ reduced risk of production failure	
++ increased water availability / quality	
++ diversification of income sources	
++ decreased labour constraints	

Socio-cultural benefits	Socio-cultural disadvantages
+++ community institution strengthening	
++ improved conservation / erosion knowledge	
++ improved food security / self sufficiency	

Ecological benefits	Ecological disadvantages
+++ increased soil organic matter / below ground C	
++ improved excess water drainage	
++ reduced soil compaction	
+ reduced evaporation	
+ reduced salinity	
+ increased beneficial species	

Off-site benefits	Off-site disadvantages

Contribution to human well-being / livelihoods

+++ Farmers become knowledgeable to a better rice farming management.

Benefits /costs according to land user

Benefits compared with costs	short-term:	long-term:
Establishment	positive	positive
Maintenance / recurrent	positive	positive

Acceptance / adoption:

100% of land user families have implemented the technology with external material support.
0% of land user families have implemented the technology voluntary.
There is little trend towards (growing) spontaneous adoption of the technology.

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Increase production yield → Intensify their Sustainable Learning Agricultural Farm program	Need for an adequate supply of organic inputs → Sustainable production of organic inputs through composting methods
Improvement in crop growth and development →	
Soil fertility improvement →	
Ease on weed management →	