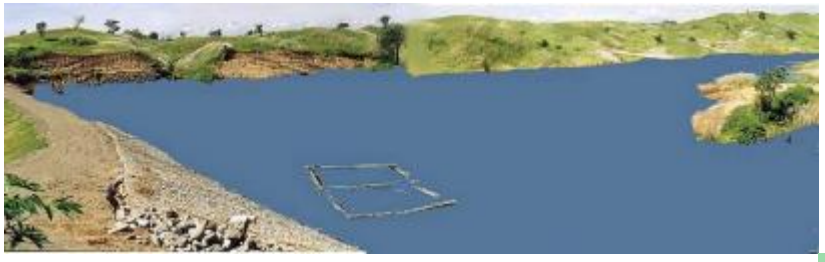


Small Water Impounding Project (SWIP)
Philippines

Development of micro-catchment for soil and water conservation and for the provision of supplementary irrigation during the dry season.

Small Water Impounding Project (SWIP) is a water harvesting and storage structure consisting of an earth embankment spillway, outlet works and canal facilities. It is designed for soil and water conservation and flood control by holding as much water as possible during the rainy season. The reduced volume and force of runoff subsequently reduced their eroding power of water thereby minimizing soil erosion and silting of fertile bottom lands. The reservoir with its stored water is an important supplemental source of water for agriculture and is also used for fisheries. SWIP development involves a holistic approach. The watershed is developed for land use that enhances water infiltration and minimizes soil erosion (for the long life of the reservoir). The most common use of the watershed is agro-forestry. The service area is used for high value crops that minimizes the use of water on a controlled basis. A holistic and integrated approach is done in managing the micro-watershed. The farmer-beneficiaries of the irrigation water and those of the watershed are organized into an association. They maintain the system and protect the watershed by advocating sustainable agriculture.

left: Typical Small Water Impounding Project (Villa Boado SWIP) showing the embankment (15 meters high) and the dominantly grassland watershed. Fish is raised in fish cages. (Photo: Jose D. Rondal)

Location: Nueva Ecija
Region: Nueva Ecija
Technology area: 10 km^2
Conservation measure: structural
Stage of intervention: rehabilitation / reclamation of denuded land
Origin: Developed externally / introduced through project, recent (<10 years ago)
Land use type:
Cropland: Annual cropping
Cropland: Perennial (non-woody) cropping
Climate: subhumid, tropics
WOCAT database reference: T_PHI004en
Related approach:
Compiled by: Not registered
Date: 2000-05-16
Contact person: Rondal Jose, Bureau of Soils and Water Management, SRDC Bldg., Elliptical Road Diliman, Quezon City, Philippines Fax: 923-04-59 Email: bswm@pwolrd.net.ph joron @pacific.net.ph

Classification

Land use problems:
- Long term sustainability of agricultural system is seriously in doubt. Because farmers cannot practice intensive agriculture, income is low. (expert's point of view)
Low yield and cannot raise two crops of rice in one year. High inputs required. Small farm area and lack of irrigation facilities. (land user's point of view)

Land use

Annual cropping
Perennial (non-woody) cropping

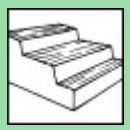
Climate

subhumid

Degradation

Water degradation: aridification

Conservation measure



Structural

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:

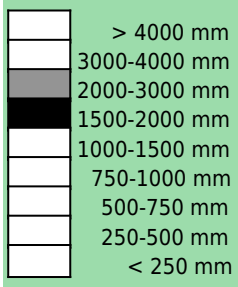
Main technical functions:
- water harvesting / increase water supply

Secondary technical functions:
- control of concentrated runoff: retain / trap

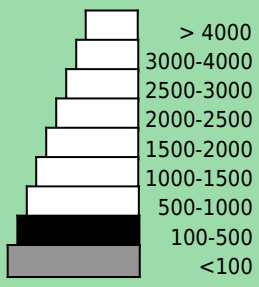
Environment

Natural Environment

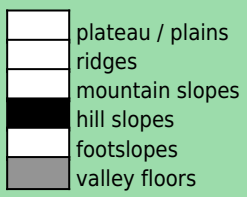
Average annual rainfall (mm)



Altitude (m a.s.l.)

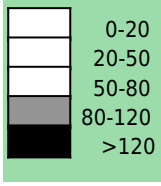


Landform



Slope (%)

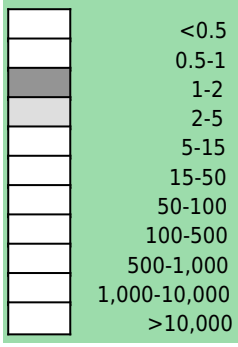
Soil depth (cm)



Growing season(s): 180 days(May - Oct), 120 days(Nov - Feb)
Soil texture: medium (loam)
Soil fertility: low
Topsoil organic matter: low (<1%)
Soil drainage/infiltration: good

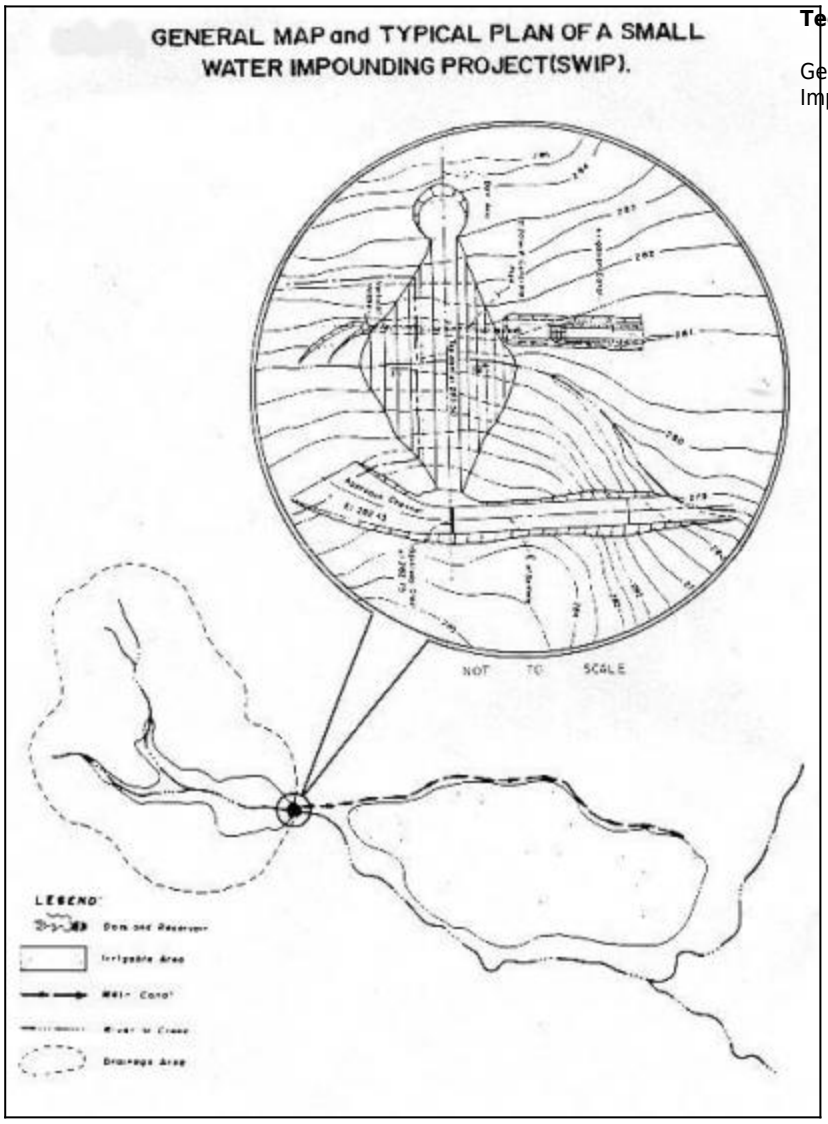
Human Environment

Cropland per household (ha)



Population density: 50-100 persons/km2
Annual population growth: 1% - 2%
Land ownership: individual, titled
Land use rights: individual
Relative level of wealth: average, which represents 50% of the land users; 40% of the total area is owned by average land users

Importance of off-farm income: 10-50% of all income:
Access to service and infrastructure:
Market orientation: mixed (subsistence and commercial)



Technical drawing

General map and typical plan of a Small Water Impounding Project (SWIP) (Jose D. Rondal)

Implementation activities, inputs and costs

Establishment activities

- clearing
- basal fertilization
- planting
- layout/staking
- digging of holes

Establishment inputs and costs per ha

Inputs	Costs (US$)	% met by land user
Labour	39000.00	%
Equipment		
- machine use	55000.00	%
TOTAL	**94000.00**	**0.00%**

Maintenance/recurrent activities

- Weeding
- Irrigation
- Fertilization

Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US$)	% met by land user
Labour	900.00	100%
Equipment		
- animal traction	375.00	100%
TOTAL	**1275.00**	**100.00%**

Remarks:
The source of materials like stones/gravels affect the cost. Usually, these are hauled from long distances. Also the construction of access roads adds substantially to the cost.
Length, height and width of structure and the source of materials like gravels and stones.

Assessment

Impacts of the Technology

Production and socio-economic benefits

+++ increased crop yield
+++ increased wood production
+++ increased farm income
+++ Fish production
++ fodder production/quality increase

Production and socio-economic disadvantages

+ loss of land

Socio-cultural benefits

+++ community institution strengthening
+++ improved conservation / erosion knowledge

Socio-cultural disadvantages

Ecological benefits

+++ increased soil moisture
+++ improved soil cover
++ reduced soil loss
++ biodiversity enhancement
+ increase in soil fertility

Ecological disadvantages

Off-site benefits

++ increased stream flow in dry season
++ reduced downstream siltation
+ reduced downstream flooding
+ Increased groundwater recharge

Off-site disadvantages

+ reduced river flows

Contribution to human well-being / livelihoods

Benefits /costs according to land user

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

Acceptance / adoption:

100% of land user families (180 families; 1% of area) have implemented the technology with external material support. survey results

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
It is a holistic and integrated approach to watershed management/development → Strengthening of the existing Farmers' Association	High initial investment cost → Cost-sharing among different agencies. Beneficiaries to subsidize labor
Immediate economic impact → Diversify into high value commercial crops other than rice	Loss of productive land (reservoir area) → Compensation of affected farmers
Institutional strengthening → Farmers should be continously trained on new cropping technology.	High establishment cost →
ncrease in farm income → price support for farm inputs and outputs	
Opportunity for other farming opportunities (fish including shell farming) →	