



## Firebreaks/ Greenbreaks Philippines

**Gaps in vegetation or other combustible material that act as barriers to prevent and/ or control the spreading of forest fires to other areas.**

Fire breaks are 1,000-meter long, ten meters wide, located in the periphery/boundary and/or top of the ridge as barriers to slow or stop the progress of a fire. Green breaks are formed within the firebreaks by planting fire-resistant species in the gap portions such as kakawate (*Gliricidia sepium*), banana (*Musa*) abaca (*Musa textilis*), malunggay (*Moringa oleifera*), and cassava (*Manihot esculenta*). As a practice, fire breaks are established in every ten hectares to form a block, but it can vary depending on the slope of the area. Fires tend to spread quickly in higher slopes compared to flat areas, thus, more firebreaks are recommended.

Fire breaks/green breaks are established to protect the forest trees and wildlings from disturbances and wildfire. In case of forest fire, firebreaks/green breaks prevent the spread of fire from one block to another. Wildlings are seedlings derived from seeds scattered by birds, insects, animals and wind without human intervention, and allowed to grow naturally in the forest. The green breaks are planted with cash crops as immediate source of food and additional income for the land users.

The first step in creating fire breaks is the removal of all combustible materials such as deadwoods and cogon grasses (*Imperata cylindrica*) by using hoe or plow. Then, fire-resistant plant species such as kakawate (*Gliricidia sepium*) cuttings (i.e. 1 meter high) are staked at 1.5- meter spacing on both sides of the ten-meter wide firebreak. Kakawate is the preferred plant species because the leaves have high Nitrogen content and resistant to fire and drought. Maintenance of firebreaks/green breaks is done before the onset of the dry season. It is done through brushing of invasive weeds and plating of root crops. The pruning of kakawate is done every three years. "Bayanihan" (rotational schedule of labour), a traditional communal concept of voluntary work is practiced during the establishment of the technology.

The area is part of the forest reserve in Danao, Bohol primarily intended for nature conservation and protection. It is about 100-500 m.a.s.l with moderately rolling to hilly slopes. It is under humid tropics climate with an average annual rainfall of 1500-2000 mm per year. The soil is loam, shallow depth, low fertility, with good drainage and medium water storage capacity. The area has high biodiversity as indicated by the presence of different indigenous trees and plants species, and wild animals and birds. The land users who apply the technology are small-holder farmers. These are members of a local cooperative. The population density is about 10-50 persons per sq. km. Since extraction of resources from the forest is prohibited, off-farm income is very important to the land users. Access to basic services and infrastructures are low.

**left:** Firelines constructed along boundaries (Photo: For. Emma N. Castillo)

**right:** Firebreak with a width of six meters that serves as road network (Photo: Engr. Djolly Ma. P. Dinamling)

Location: Brgy. San Miguel

Region: Danao, Bohol

Technology area: 3.6 km<sup>2</sup>

Conservation measure: vegetative

Stage of intervention: prevention of land degradation

Origin: Developed DENR (Department of Environment and Natural Resources) protocol on reforestation, traditional (>50 years ago)

Land use type:

Forests / woodlands: Plantations, afforestations

Climate: humid, tropics

WOCAT database reference:

T\_PHI056en

Related approach: Assisted Natural Regeneration (A\_PHI010en)

Compiled by: Philippine Overview of Conservation Approaches and Technologies, Bureau of Soils and Water Management

Date: 2015-06-11

Contact person: Emma N. Castillo, Department of Environment and Natural Resources-Forest Management Bureau, Visayas Avenue, Diliman, Quezon


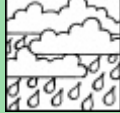

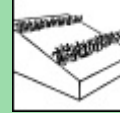
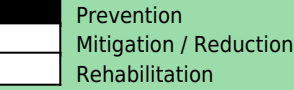
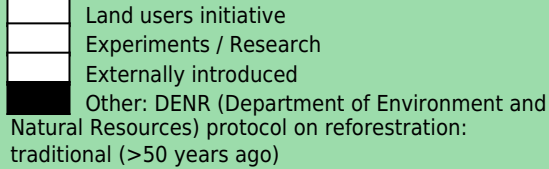
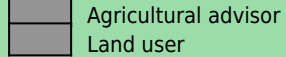
City, emmancastillo2014@gmail.com



## Classification

### Land use problems:

- Forest fire, competition with weedy species (expert's point of view)
- spread of invasive alien species (land user's point of view)

<b>Land use</b>  Plantations, afforestations tree regeneration	<b>Climate</b>  humid	<b>Degradation</b>  Biological degradation: detrimental effects of fires	<b>Conservation measure</b>  Vegetative: Others (Pruning of kakawate, root crop planting) Vegetative: Clearing of vegetation (eg fire breaks/reduced fuel)
<b>Stage of intervention</b> 	<b>Origin</b> 	<b>Level of technical knowledge</b> 	

**Main causes of land degradation:**  
 Direct causes - Human induced: deforestation / removal of natural vegetation (incl. forest fires)

**Main technical functions:**

- control of fires
- reduction of dry material (fuel for wildfires)

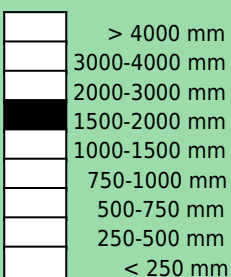
**Secondary technical functions:**

- stabilisation of soil (eg by tree roots against land slides)
- sediment retention / trapping, sediment harvesting
- increase of biomass (quantity)
- perimeter dirt road

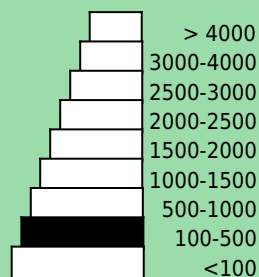
## Environment

### Natural Environment

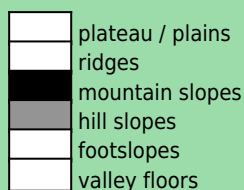
#### Average annual rainfall (mm)



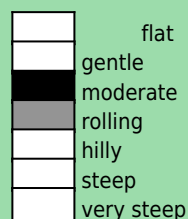
#### Altitude (m a.s.l.)



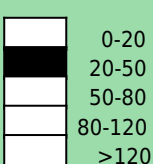
#### Landform



#### Slope (%)



#### Soil depth (cm)



**Growing season(s):** 0 days

**Soil texture:** medium (loam)

**Soil fertility:** medium

**Topsoil organic matter:** medium (1-3%)

**Soil drainage/infiltration:** medium

**Soil water storage capacity:** medium

**Ground water table:** < 5 m

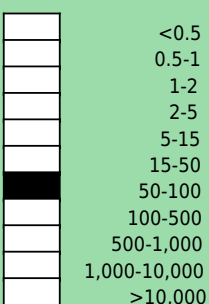
**Availability of surface water:** medium

**Biodiversity:** high

**Tolerant of climatic extremes:** temperature increase, droughts / dry spells

### Human Environment

#### Forests / woodlands per household (ha)



**Land user:** employee (company, government), medium scale land users, common / average land users, men and women

**Population density:** 10-50 persons/km<sup>2</sup>

**Annual population growth:** 1% - 2%

**Land ownership:** state

**Land use rights:** open access (unorganised)

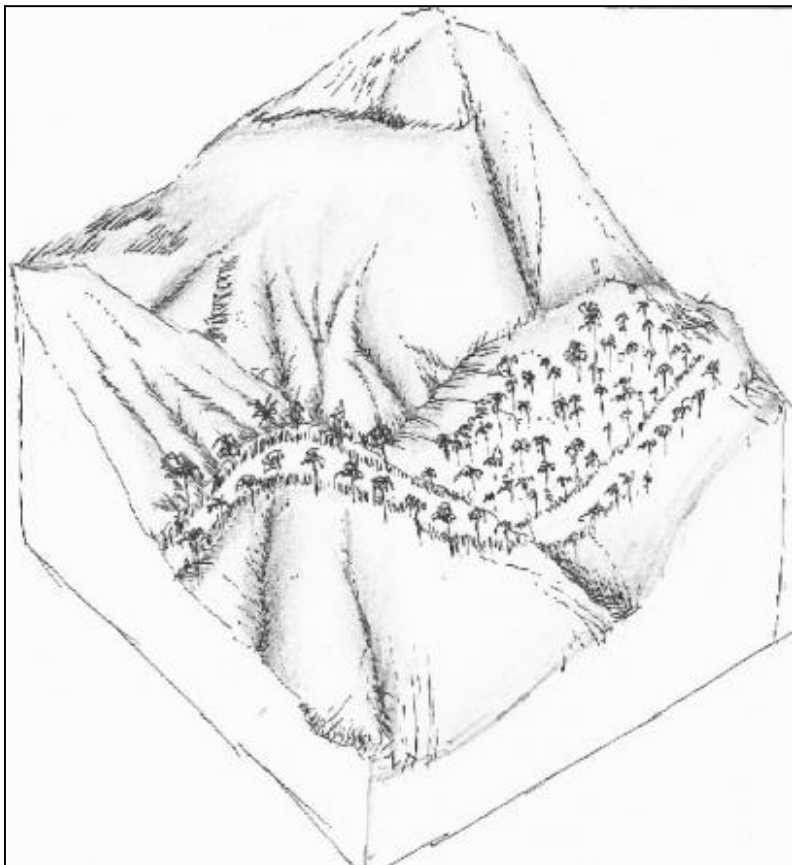
**Relative level of wealth:** poor, which represents 100% of the land users; 100% of the total area is owned by poor land users

**Importance of off-farm income:** :

**Access to service and infrastructure:** low: technical assistance, employment (eg off-farm), market, roads & transport, drinking water and sanitation; moderate: health, education, energy

**Market orientation:** subsistence (self-supply)

**Purpose of forest / woodland use:** fruits and nuts, other forest products / uses (honey, medical, etc.)



### Technical drawing

Firelines established in the ANR site. (Mr. Patricio A. Yambot)

## Implementation activities, inputs and costs

### Establishment activities

- clearing of cogon grass in the firelines
- Planting of kakawate cuttings

### Establishment inputs and costs per ha

Inputs	Costs (US\$)	% met by land user
Labour	26.67	100%
<b>TOTAL</b>	<b>26.67</b>	<b>100.00%</b>

### Maintenance/recurrent activities

- brushing/clearing
- Pruning of kakawate/per year

### Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US\$)	% met by land user
Labour	4.44	100%
<b>TOTAL</b>	<b>4.44</b>	<b>100.00%</b>

Remarks:

## Assessment

Impacts of the Technology	
<b>Production and socio-economic benefits</b> ++ increased fodder production ++ decreased labour constraints	<b>Production and socio-economic disadvantages</b> ++ reduced wood production
<b>Socio-cultural benefits</b> ++ community institution strengthening ++ improved conservation / erosion knowledge	<b>Socio-cultural disadvantages</b>
<b>Ecological benefits</b> +++ reduced hazard towards adverse events +++ reduced fire risk ++ reduced surface runoff ++ reduced emission of carbon and greenhouse gases ++ increased plant diversity ++ increased / maintained habitat diversity	<b>Ecological disadvantages</b>
<b>Off-site benefits</b> +++ reduced damage on public / private infrastructure	<b>Off-site disadvantages</b>
<b>Contribution to human well-being / livelihoods</b> + Through the technology, People Organization (PO) members were encouraged to plant cash crops as greenbreaks as an immediate source of food and additional income.	

Benefits /costs according to land user			
	<b>Benefits compared with costs</b>	<b>short-term:</b>	<b>long-term:</b>
	<b>Establishment</b>	slightly negative	positive
	<b>Maintenance / recurrent</b>	positive	positive

#### Acceptance / adoption:

100% of land user families have implemented the technology with external material support. The Department of Environment and Natural Resources (DENR) provided financial and technical support in the establishment of the technology. 0% of land user families have implemented the technology voluntary. No spontaneous adoption was recorded without the support of the government (DENR) or private agencies.

#### Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Relative small financial input in the establishment of the technology → Regular clearing of firebreaks  The technology does not require heavy equipment and instrument during the establishment → Use of indigenous tools during establishment such as hoe and plows	Fires could cross on the firebreaks because of big and overlapping canopies. → Regular trimming on the canopies of trees near the firelines and brushing of weeds/grasses.



Copyright (c) WOCAT (2016)