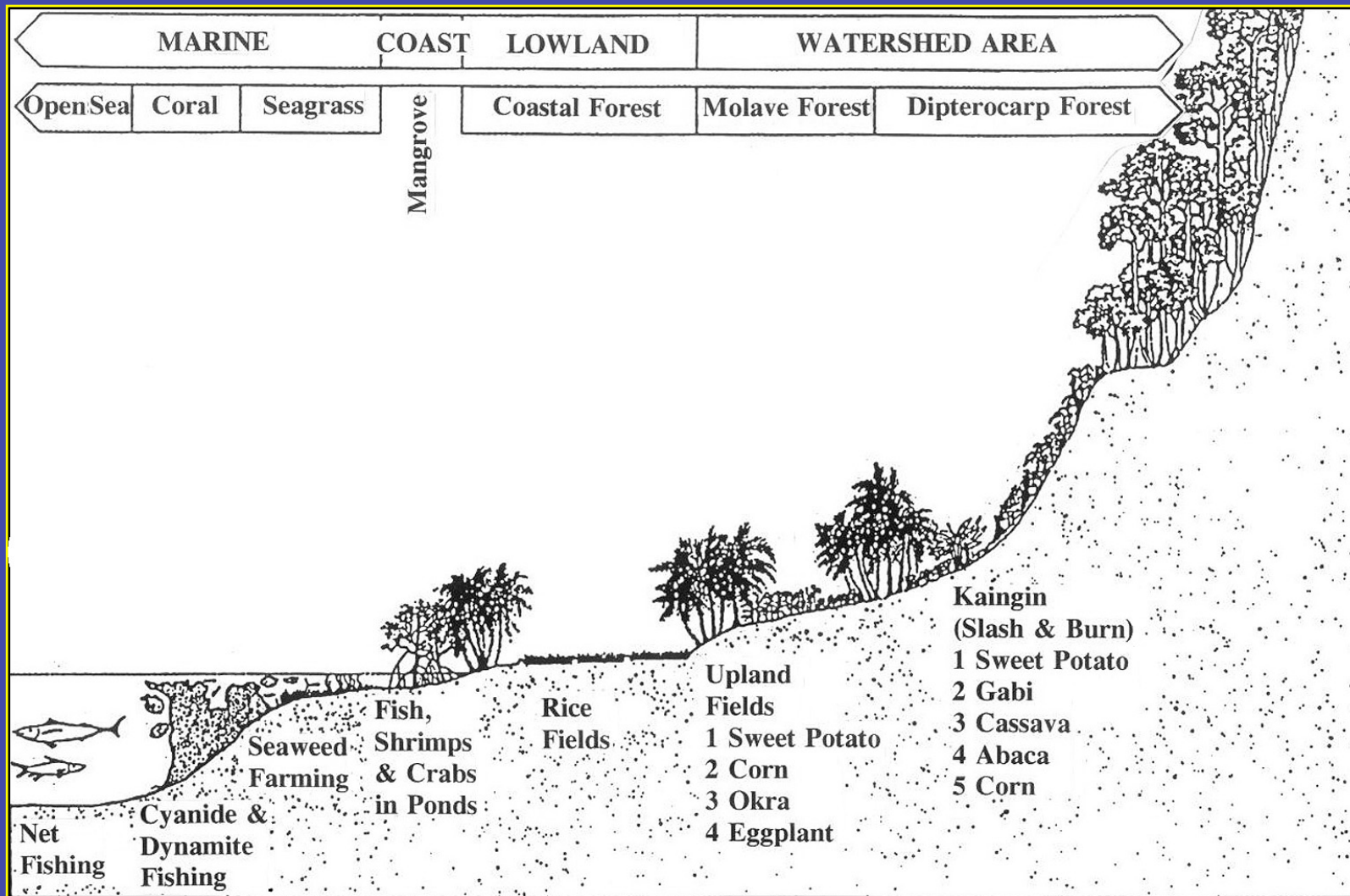




A Paradigm Shift in Forest Restoration

Paciencia P. Milan
University Professor
Visayas State University, Baybay, Leyte

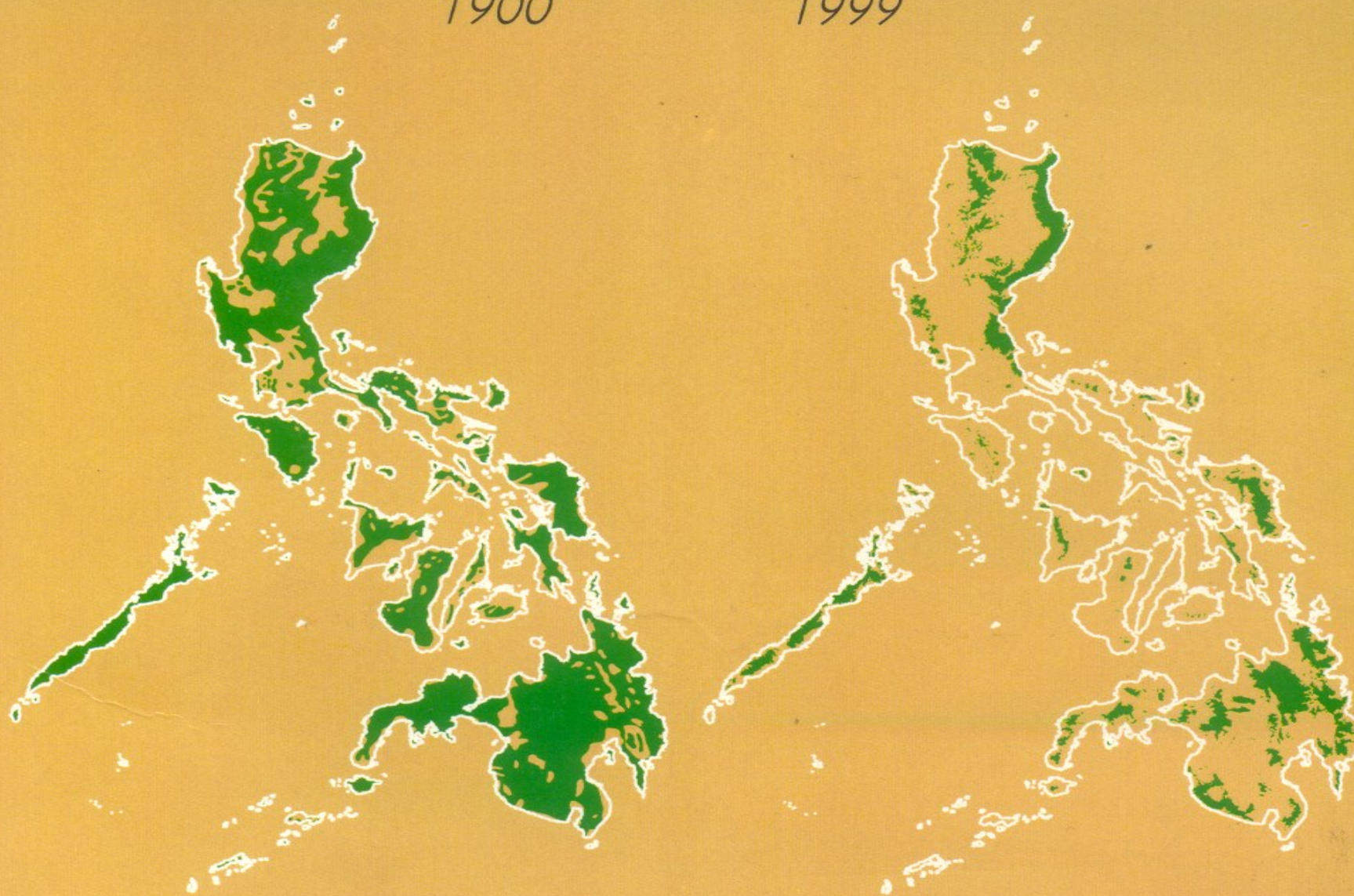


Ridge-to-Reef Approach

Changes in the forest cover of Philippines

1900

1999

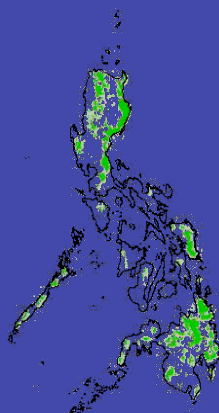
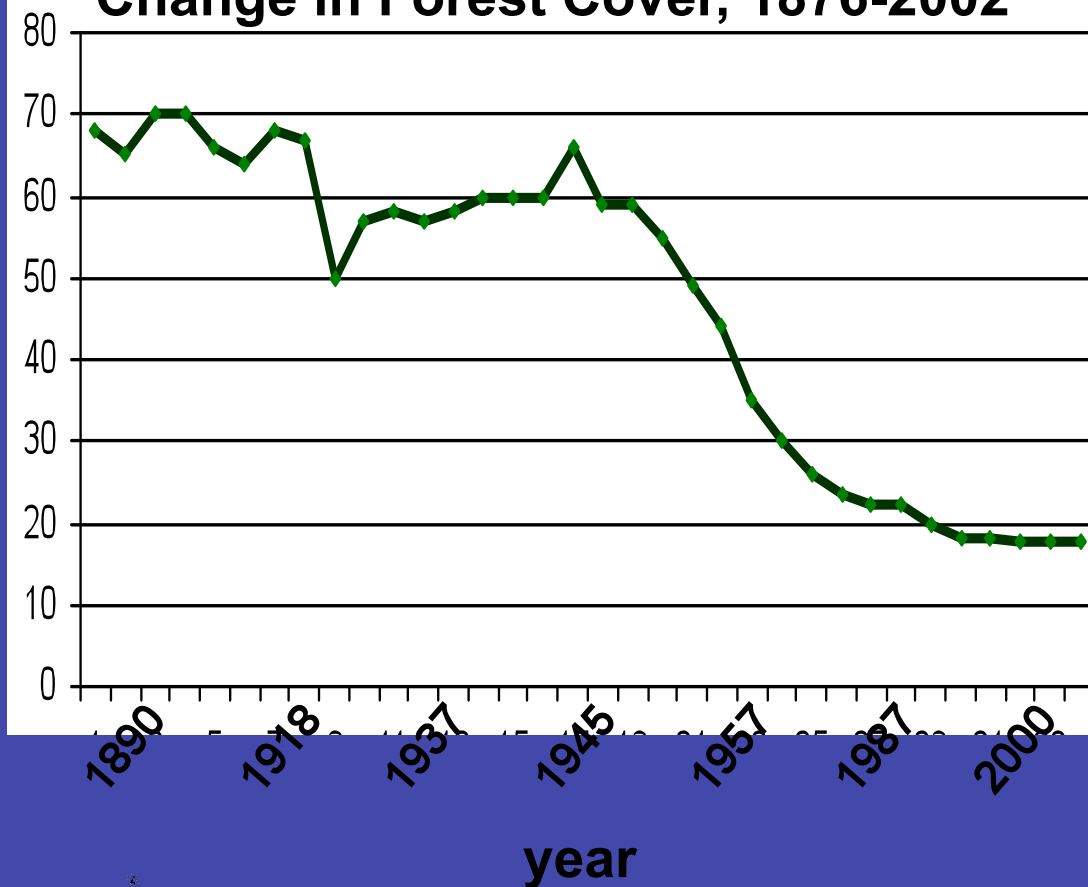


Source: Environmental Science for Social Change, 1999

Philippines

Change in Forest Cover, 1876-2002

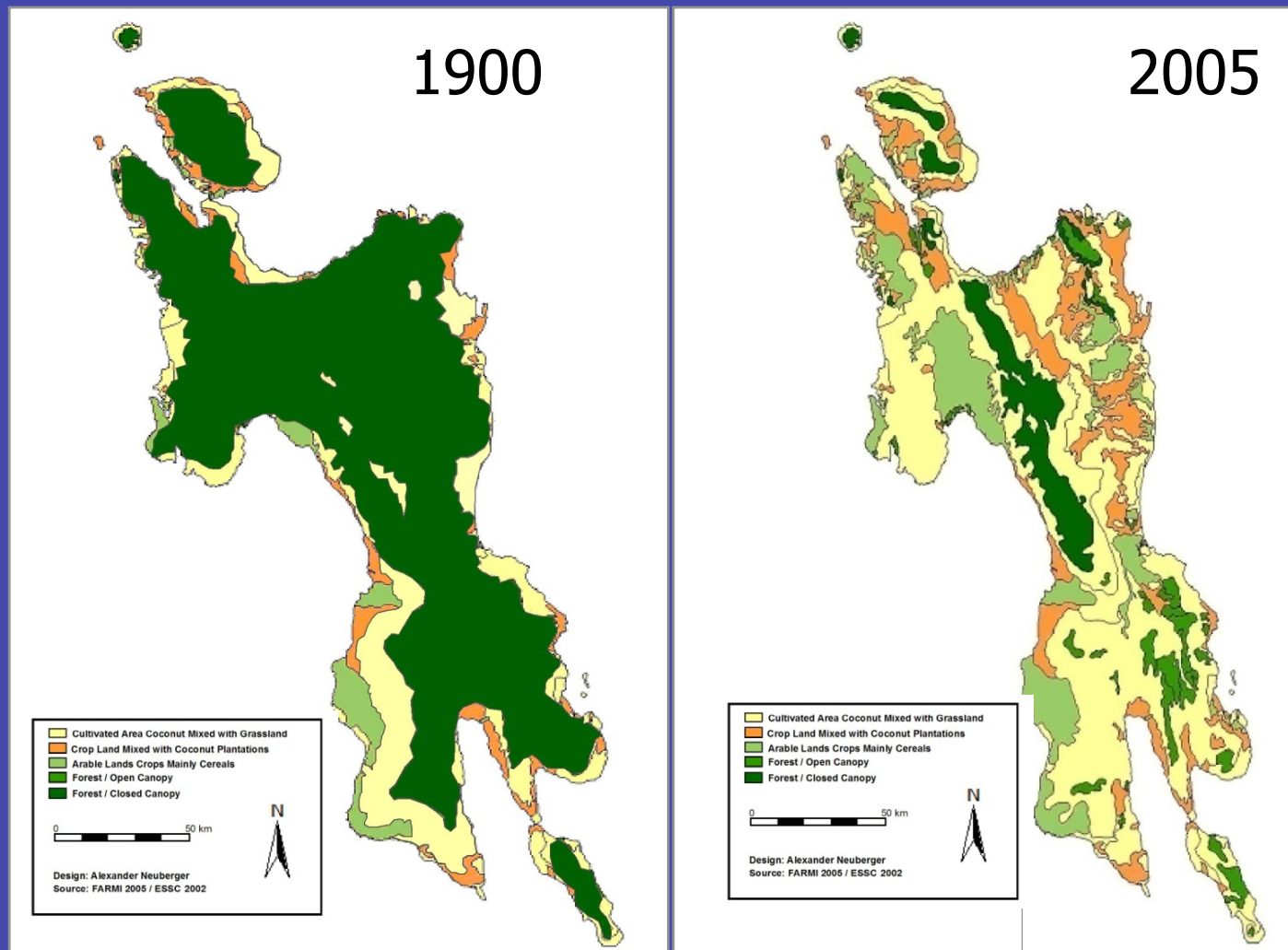
percent forest cover



Data Source: 1876-1987 from Garrity et al. (1993); 1990 from FAO (2001); 1999 from ESSC (1999); 1991, 1996, 2001, 2000 and 2002 from DENR-FMB (2005)

Source: Fernando, 2005

Forest loss in Leyte



Source: Nueberger, 2005

Most reforestation efforts in the Philippines focus on the development of forestry and agro-forestry system using tree species which are introduced because they are selected for their fast growth and easy germination. The species composition of the original forest that once covered the land prior to logging are rarely taken into account .

Milan and Margraf, 1996

Rainforestation

as an option for rural development and biodiversity conservation

- **uses native/local trees of the area to be reforested (biodiversity)**
- **gives importance on improvement of structural habitat to support wildlife (habitat restoration)**
- **restores ecological services (watershed)**

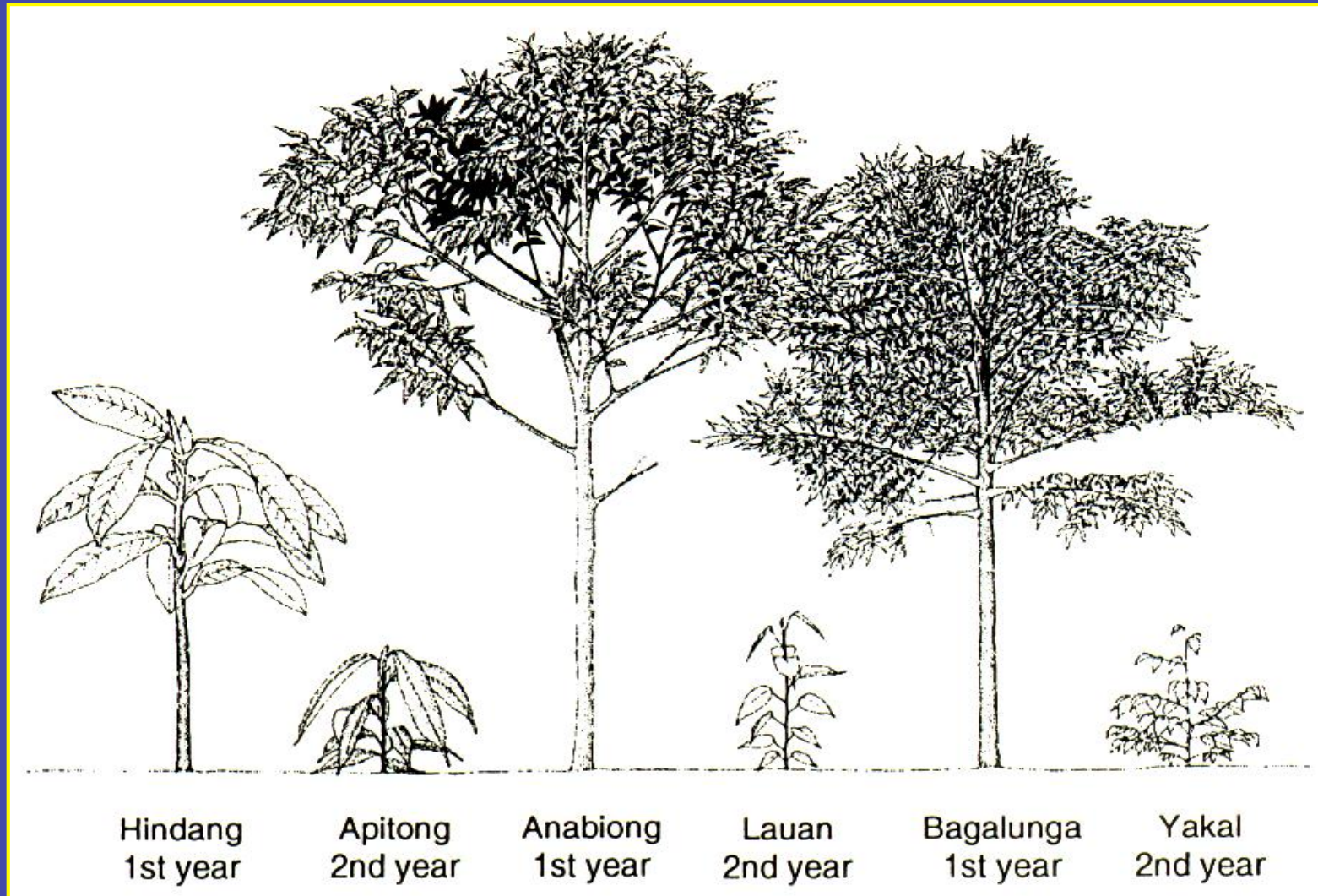
Operational Framework of Rainforestation

- **Habitat restoration**
- **Biodiversity conservation**
- **Provision of ecological
functions/services**

Sun demanding local forest tree species recommended for RF on degraded limestone hills.

Local Name	Official Scientific Name
Kalumpit	<i>Terminalia microcarpa</i>
Anislag	<i>Securinega flexuosa</i>
Bagalunga	<i>Melia dubia</i>
<i>Bitanghol</i>	<i>Calophyllum blancoi</i>
Dao	<i>Dracontomelon dao</i>
Ipil	<i>Intsia bijuga</i>
Mntn. Agoho	<i>Casuarina nodiflora</i>
Kamagong	<i>Diospyros philippenensis</i>
Bahay	<i>Ormosia calavensis</i>
Molave	<i>Vitex parviflora</i>
<i>Malabayabas</i>	<i>Tristania decorticata</i>
Lingo-lingo	<i>Vitex turczaninowii</i>

PLANTING SCHEME



Shade loving local forest tree species of Leyte Leyte recommended for RF on volcanic soils

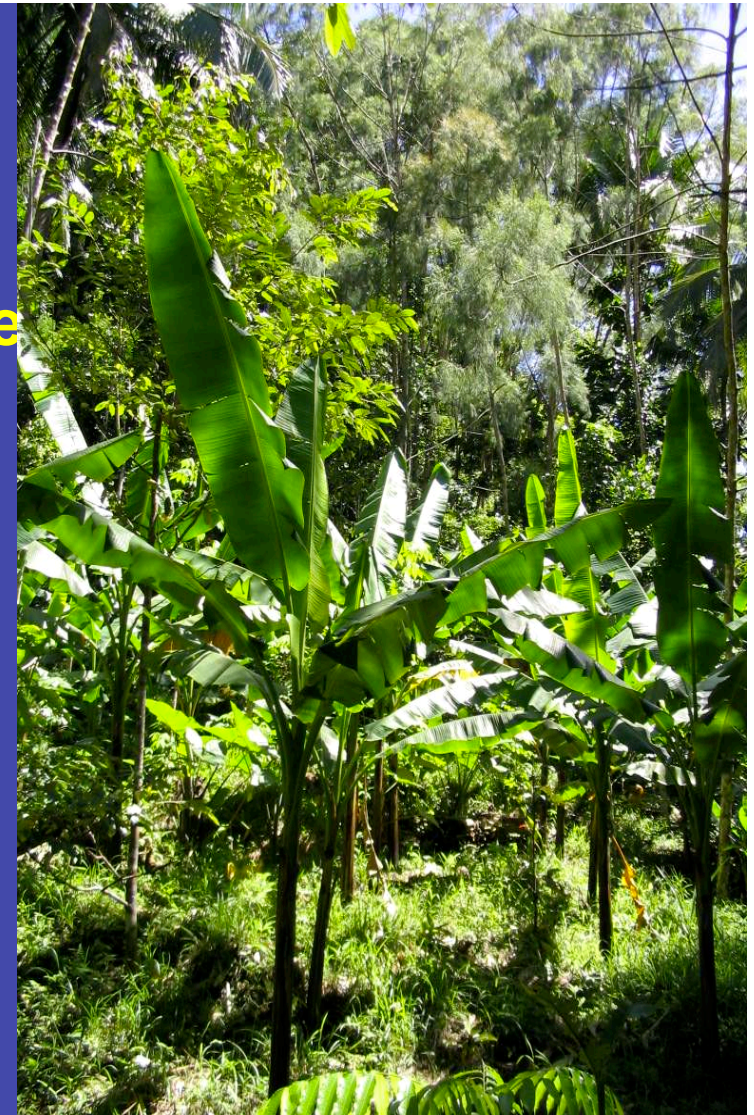
Local Name	Official Scientific Name
Palosapis	<i>Anisoptera thurifera</i>
Apitong	<i>Dipterocarpus grandiflorus</i>
HairyApitong	<i>Dipterocarpus philippinensis</i>
Hagakhak	<i>Dipterocarpus warburgii</i>
Manggachapui	<i>Hopea acuminata</i>
Dalingdingan	<i>Hopea foxworthyi</i>
Gisok-gisok	<i>Hopea philippinensis</i>
Yakal-kaliot	<i>Hopea malibato</i>
Bagtikan	<i>Parashorea malaanonan</i>
White Lauan	<i>Shorea contorta</i>
Almon	<i>Shorea almon</i>
Guijo	<i>Shorea guiso</i>
Yakal-malibato	<i>Shorea malibato</i>
Red lauan	<i>Shorea negrosensis</i>
Tangile	<i>Shorea polysperma</i>
Mayapis	<i>Shorea palosapis</i>
Kamagong	<i>Diospyros philippensis</i>
Talakatak	<i>Castanopsis philippinensis</i>
Ulaian	<i>Lithocarpus pruinosa</i>
Dungon	<i>Heritiera sylvatica</i>
Kulatingan	<i>Pterospermum obliquum</i>
Balobo	<i>Diplodiscus paniculatus</i>



Rainforestation Farming

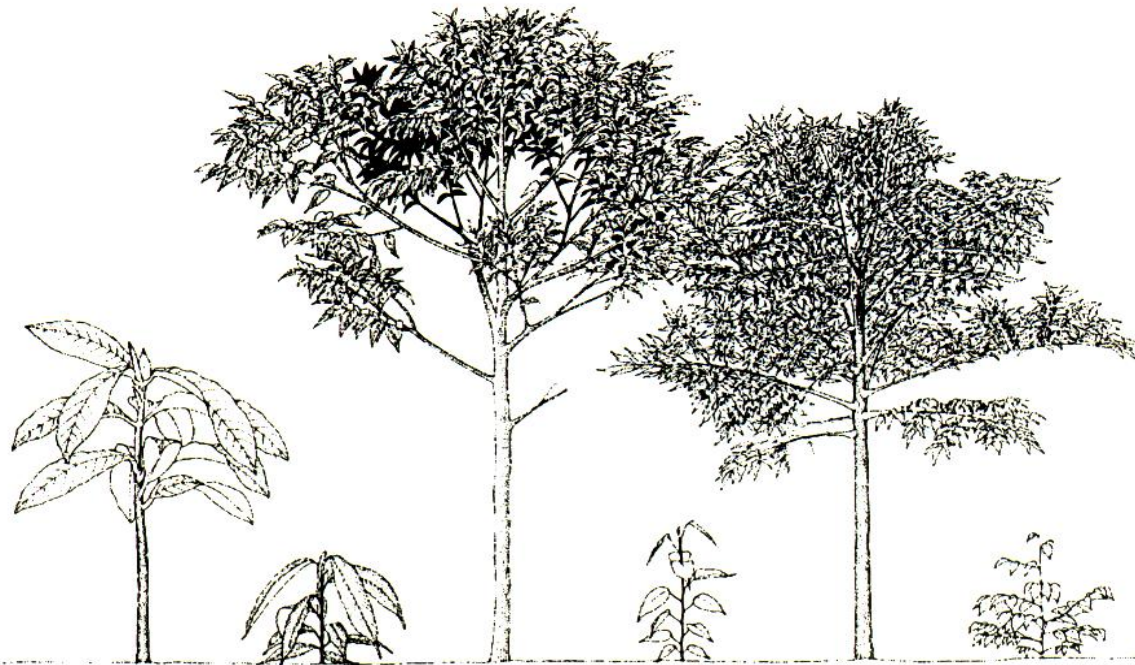
Rainforestation Farming is a sustainable farming system used as a strategy for forest restoration using native or indigenous tree species in combination with agricultural crops.

- ❖ A farming system that closely resembles the structure of a natural Philippine rainforest ecosystems or home gardens that promotes the use of native or local trees commonly growing in the area.



- ❖ It considers farming systems to support livelihood as an innovation.

PLANTING SCHEME



Hindang
1st year

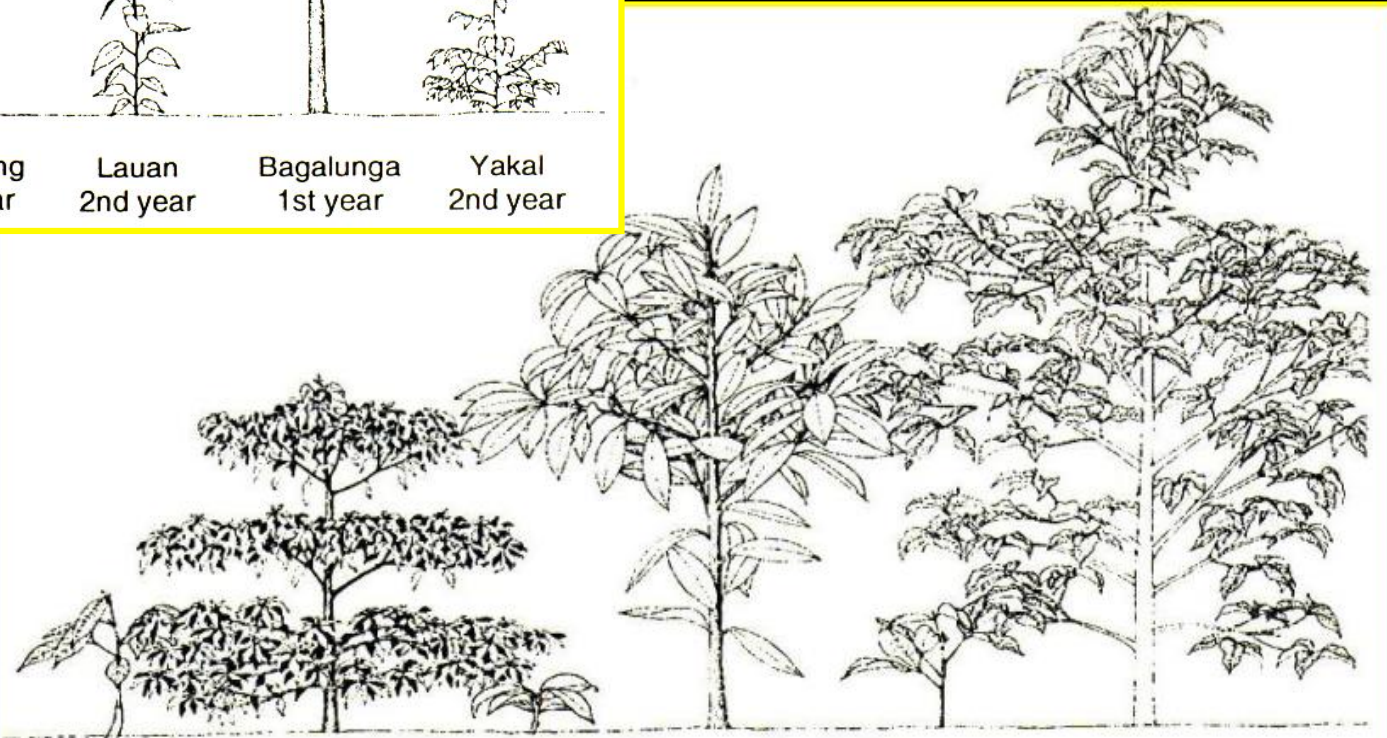
Apitong
2nd year

Anabiong
1st year

Lauan
2nd year

Bagalunga
1st year

Yakal
2nd year



Durian
2nd year

Kalumpit
1st year

Mangosteen
2nd year

Bitanghol
1st year

Lanzones
2nd year

Molave
1st year

Objectives:

Replace the more destructive forms of slash-and-burn or *kaingin* practices



Protect forest biodiversity

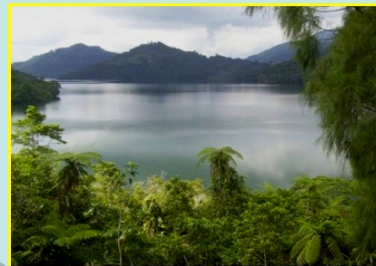


Form a buffer-zone around the primary forest



Rainforestation

Help maintain the water cycle



Provide farmers with a stable and high income

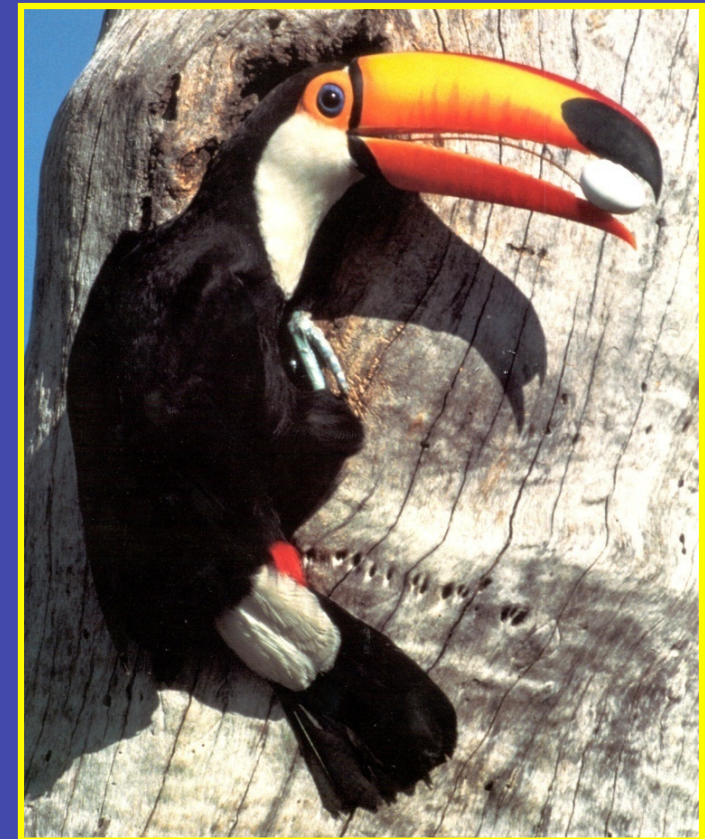
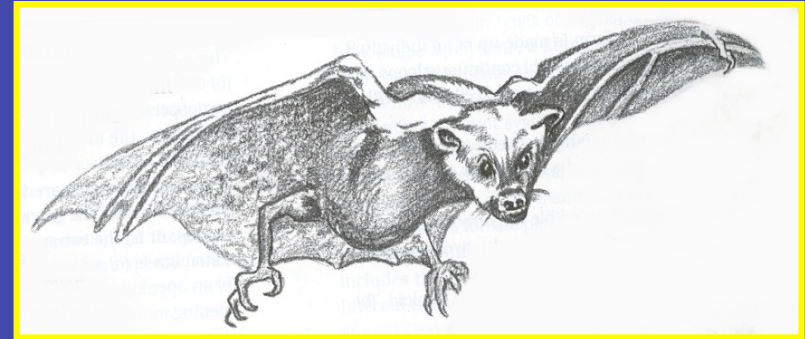


The use of Philippine tree species in reforestation programs have received very small support in the past decade because of the following reasons:

- a. native species especially dipterocarps grow slow**
- b. dipterocarps fruit only about every 3-5 years depending on species and locality**
- c. not enough seedling materials can be produced in a short time because nursery management of native species are not fully studied**
- d. some dipterocarp seedlings and other native species require shade and cannot be used to reforest open areas, e.g. grasslands**

Here are some effects that the exclusive use of non-Philippine species has on the remaining Phil. Forest ecosystems:

- The fast growing exotics have low wood quality; hence, high quality rainforest trees still need to be harvested in their natural environment, so timber poaching and illegal logging continue;
- The monoculture of exotic trees does not support the survival of wildlife species of the Phil. Rainforests some of which are important pollinators and distributors of seeds, which lead to the erosion of biodiversity and ultimately the extinction of species;



Effects of exclusive use of non-Philippine species (con't...)

- Local lumber species, as their wood quality is much higher, are sought after but not propagated, such that the mother trees become very rare and seed material is even less available;
- The fast growing exotics are mostly pioneer species with a short life span which support a management of repeated clear cutting and exhaustion of the soil nutrients, making reforestation more and more difficult;
- Growing of monoculture stand of forest trees are vulnerable to pest attack that can led to the complete failure of reforestation, sometimes on thousands of square kilometers as documented for Brazil and Indonesia.

Effects of Rainforestation on Forest Biodiversity

1. Restoring original vegetation structure of the forest;
2. Improvement of physical stand to support wildlife; and
3. Recruitment of wildlife in RF sites



Biodiversity Assessment

Table 1: Birds identified at the VSU Rainforestation site.

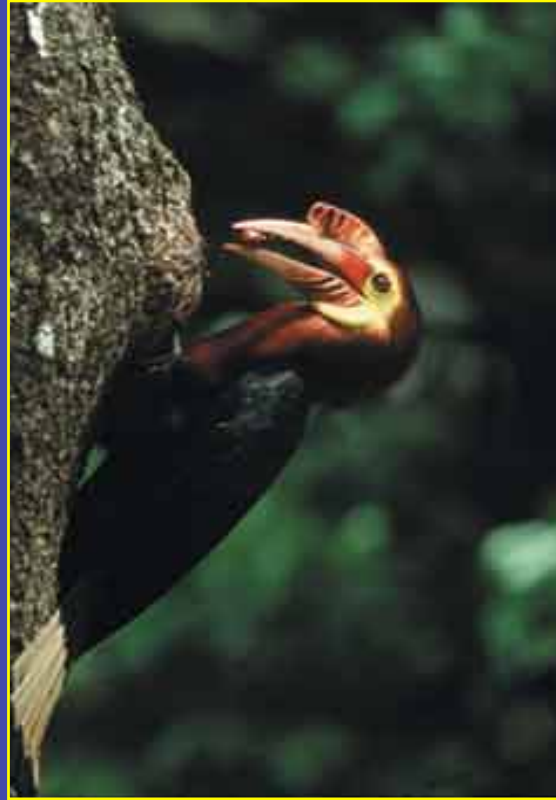
Family Name	Scientific Name	Common Name
Alcedinidae	<i>Halcyon smyrnesis</i>	White-throated kingfisher
	<i>Halcyon chloris</i>	White-collared kingfisher
Apodidae	<i>Collocalia esculenta</i>	Glossy swiftlet
	<i>Mearnsia picina</i>	Philippine needletail
	<i>Hirundapus celebensis</i>	Purple needletail
	<i>Cypsiurus balasiensis</i>	Asian palm-swift
Bucerotidae	<i>Penelopides samarensis</i>	Samar tarictic hornbill
Capitonidae	<i>Megalaima haemacephala</i>	Coppersmith barbet
Caprimulgidae	<i>Eurostopodus macrotis</i>	Great-eared nightjar
Cuculidae	<i>Cacomantis merulinus</i>	Plaintive cuckoo
	<i>Centorpus bengalensis</i>	Lesser coucal
Columbidae	<i>Treron vernans</i>	Pink-necked green pigeon
	<i>Phapitreron leucotis</i>	White eared brown dove
	<i>Ptilinopus occipitalis</i>	Yellow-breasted fruit dove

Source: Ceniza *et. al.*, 2004

Table 1: (cont...)

	<i>Macropygia phasianella</i>	Reddish cuckoo dove
	<i>Streptopelia chinensis</i>	Spotted dove
	<i>Chalcophaps indica</i>	Common emerald dove
Dicaeidae	<i>Dicaeum bicolor</i>	Bicoloured flowerpecker
	<i>Dicaeum australe</i>	Rekeeled flowerpecker
Laniidae	<i>Lanius cristatus</i>	Brown shrike
Meropidae	<i>Merops philippinus</i>	Blue-tailed bee-eater
Muscicapidae	<i>Hpothymis azurea</i>	Black-naped monarch
Nectariniidae	<i>Anthreptes malacensis</i>	Plain-throated sunbird
	<i>Nectarinia sperata</i>	Purple-throated sunbird
	<i>Nectarinia jugularis</i>	Olive-backed sunbird
Oriolidae	<i>Oriolus chinensis</i>	Black napped oriole
Psittacidae	<i>Loriculus philippensis</i>	Philippine hanging parrot
Pycnonotidae	<i>Pycnonotus golaver</i>	Yellow-vented bulbul
	<i>Hypsipetes philippinus</i>	Philippine bulbul
Sturnidae	<i>Apionis panayensis</i>	Asian glossy starling
	<i>Sarcops calvus</i>	Coleto
Timaliidae	<i>Macronous striaticeps</i>	Brown tit babbler

Source: Ceniza *et. al.*, 2004





CHRYSOMELID BEETLES

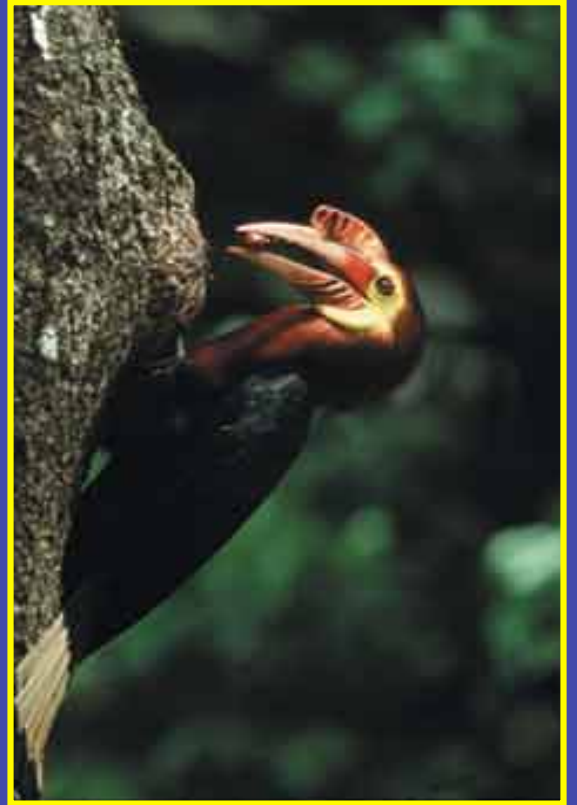




CURCULIONID BEETLES



SPIDERS





Philippine tarsier (*Tarsius syrichta*)

Flying lemur (*Cynocephalus volans*)



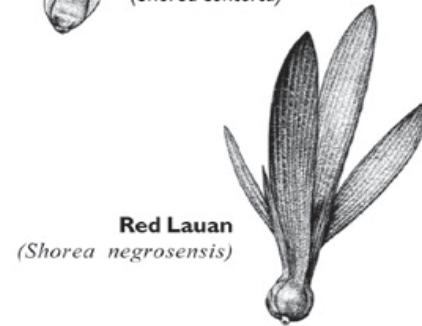
Seeds of valuable trees in the Phil.:



White Lauan
(*Shorea contorta*)



Almon
(*Shorea almon*)



Red Lauan
(*Shorea negrosensis*)



Bagtikan
(*Parashorea plicata*)

OTHER DIPTEROCARPS



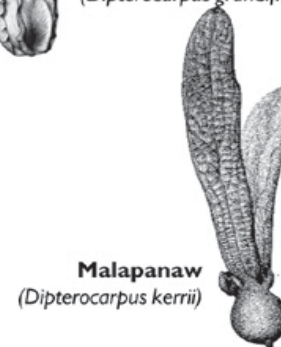
Apitong Hagakhak
(*Dipterocarpus validus*)



Apitong from Palawan
(*Dipterocarpus grandiflorus*)



**Yakal
Kaliot**
(*Hopea malibato*)

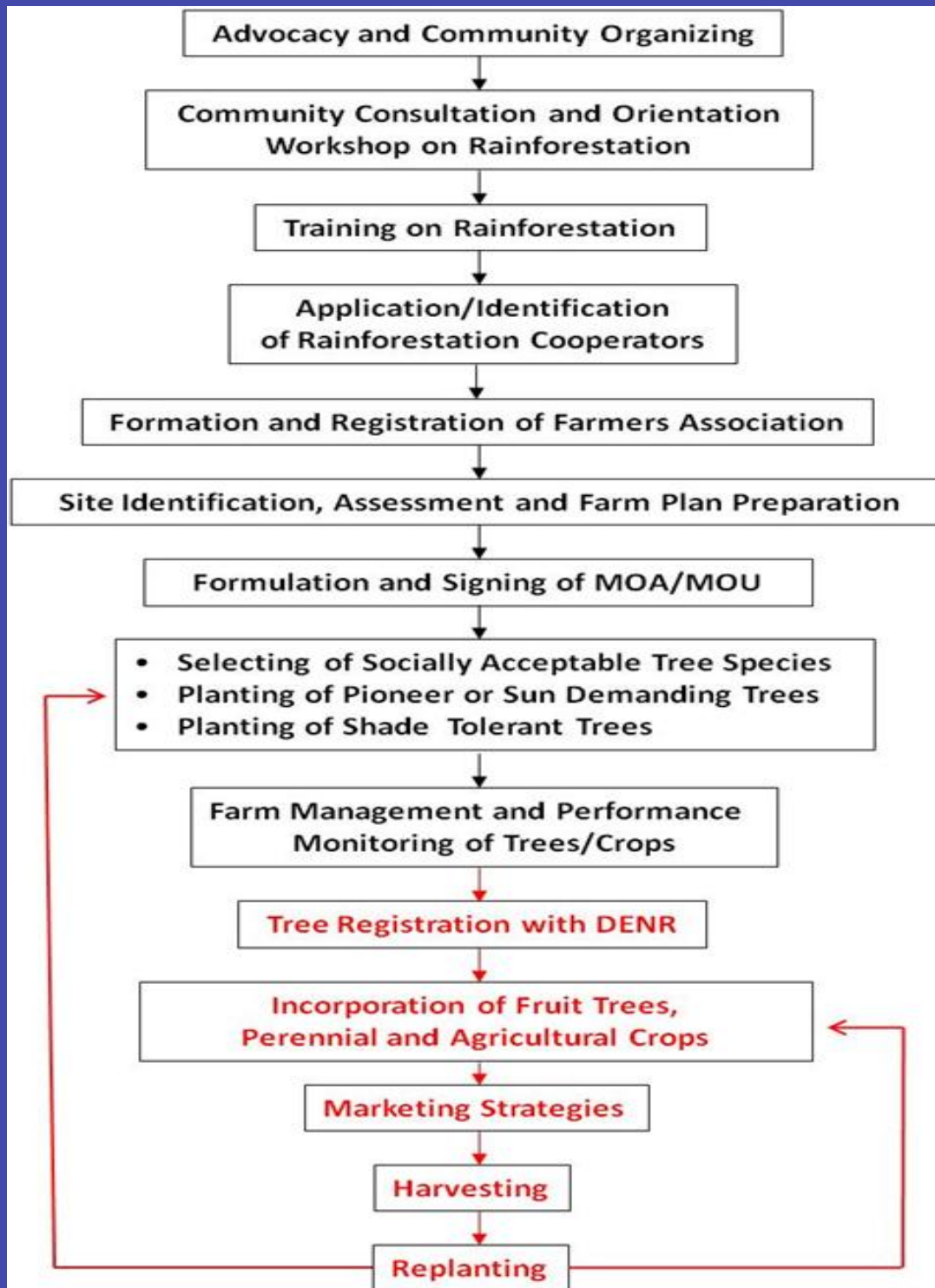


Malapanaw
(*Dipterocarpus kerrii*)

Global Warming



Rainforestation in degraded forest can also increase our carbon sink thus mitigating climate change .



Diagrammatic flow of strategies in implementing a Community-Based Watershed Restoration and Biodiversity Conservation through Rainforestation

RAINFORESTATION SITES IN THE PHILIPPINES



Major Accomplishments

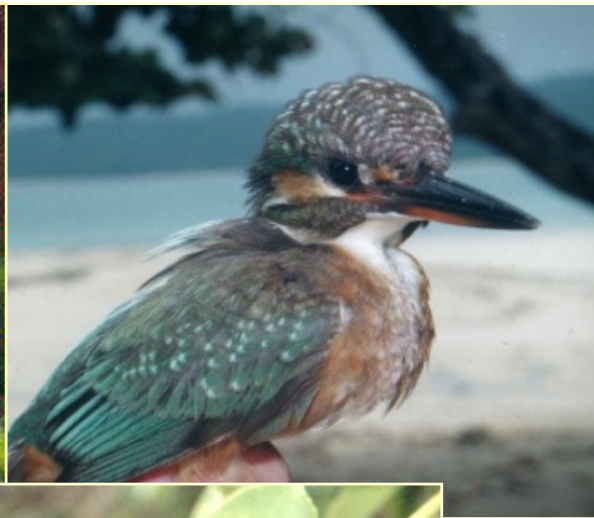
- After 16 years of Rainforestation advocacy and implementation, a total of 183.34 hectares were established
- Issuance of DENR MC 2004-06
- Rainforestation is used as a strategy in establishing biodiversity corridors in existing national parks and certificates of ancestral domain claim or title
- Rainforestation is used as a strategy for the implementation of ROAD 2020
- Rainforestation evolved in different typologies

Geographical distribution of Rainforestation Farms in the Philippines

Partners in Forest Restoration



- Daimler
- NatureLife-International
- University of Hohenheim
- University of Goettingen
- DENR
- ELTI
- Haribon
- LGU's
- CHED-SUC's
- EENP
- FPE
- PTFCF



Daghang Salamat!