



Economic growth and watershed management:

Drivers of Research and Development Innovations

Delia C. Catacutan, Ph.D.




World Agroforestry Centre

TRANSFORMING LIVES AND LANDSCAPES

INTERNATIONAL CENTRE FOR RESEARCH IN AGROFORESTRY




Outline

- The issues
 - The context
 - R&D framework and innovations
 - Concluding comments
- 



Main issues

- Watershed conditions continuously change!!!
 - **Diversity**, **complexity** and **change** characterized Philippine watersheds
 - How can R&D innovations be more adaptive to changes in local realities? “adapt or die”
 - How quickly R&D organizations get feedback and make adjustments?
 - What implication does adaptive management have on R&D institutions?
- 



The context

The Philippines

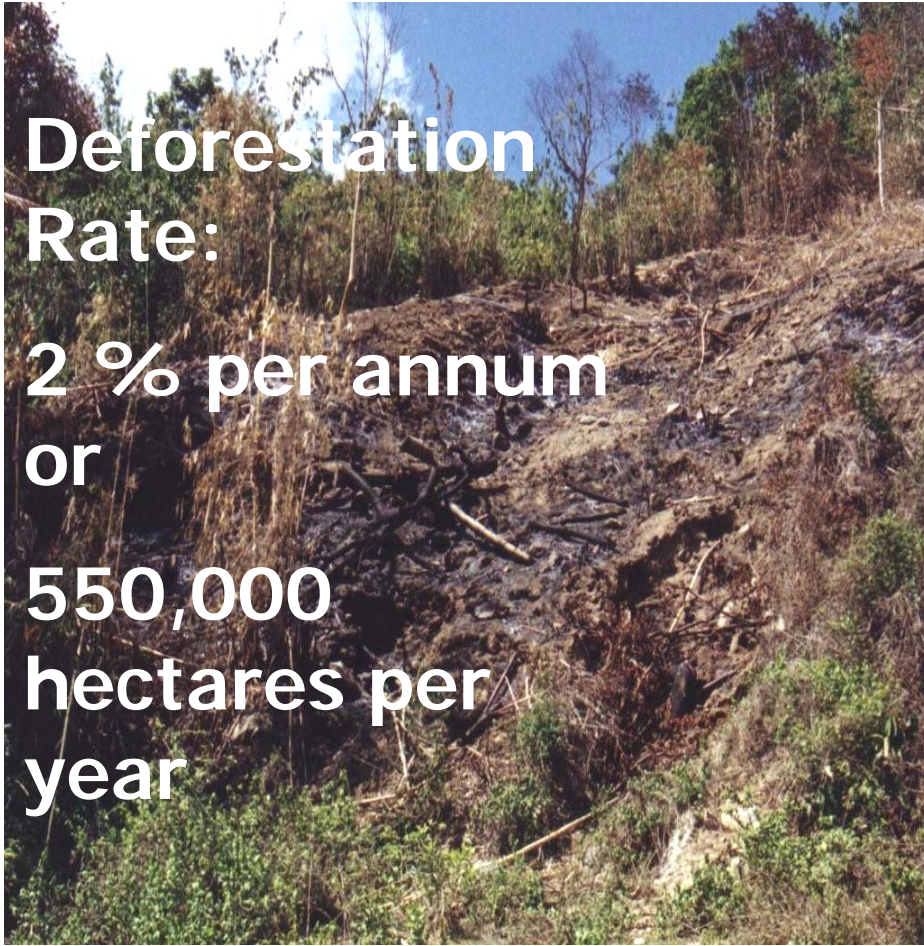




**Deforestation
Rate:**

**2 % per annum
or**

**550,000
hectares per
year**



1998

22.2%



Country Profile

30 M ha. Land area

LUZON

80 M + population

5.2 M ha. unproductive

70 % of land area is
considered watershed

49 out of 59
watersheds were
declared critical

20 M upland dwellers-
12 indigenous people



Republic of the Philippines

ICRAF-Philippines Liaison Office

VISAYAS

MINDANAO






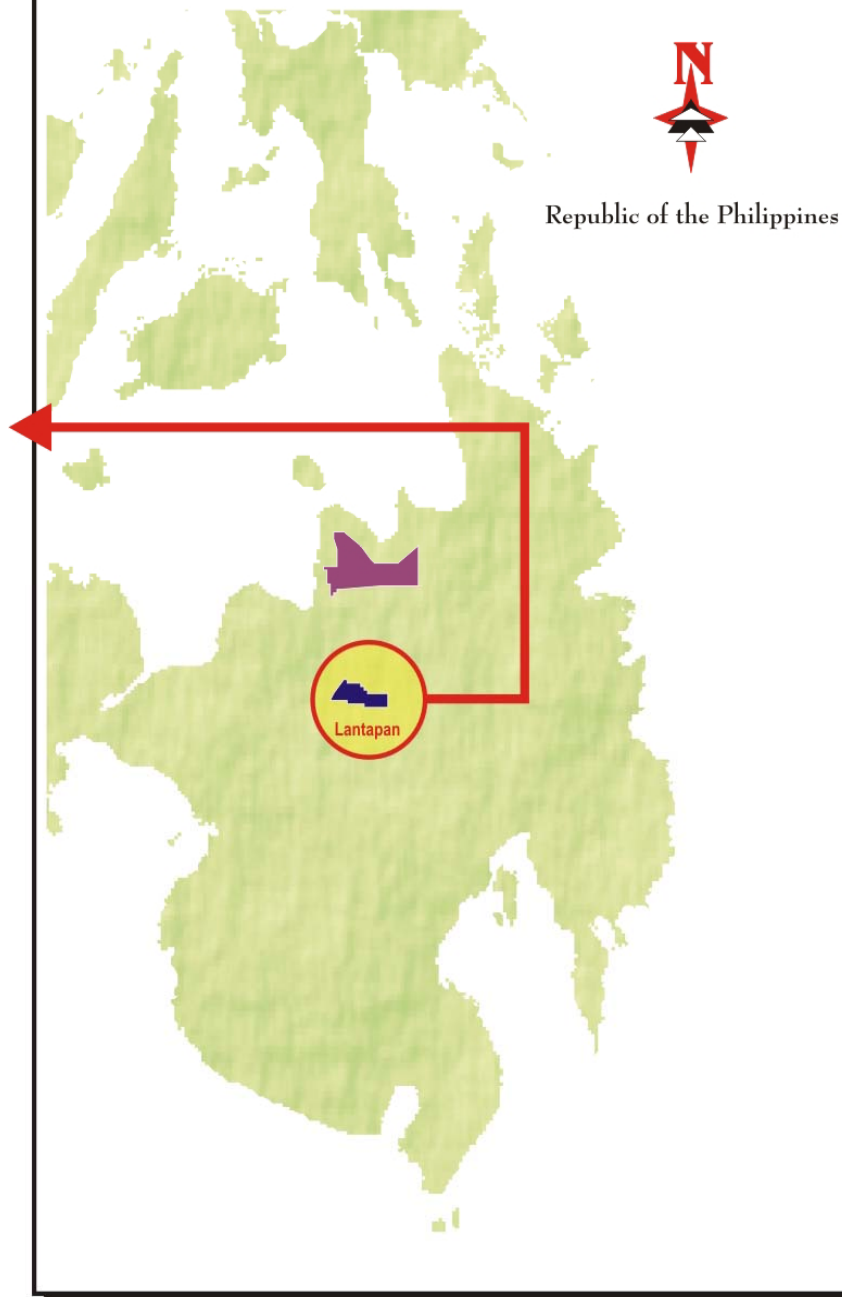
Main study site

Lantapan municipality, Manupali watershed,
Bukidnon province, southern Philippines.

Lantapan's economy, landscape, and political environment exemplified tensions between rapid population growth, economic changes, and environmental stress.

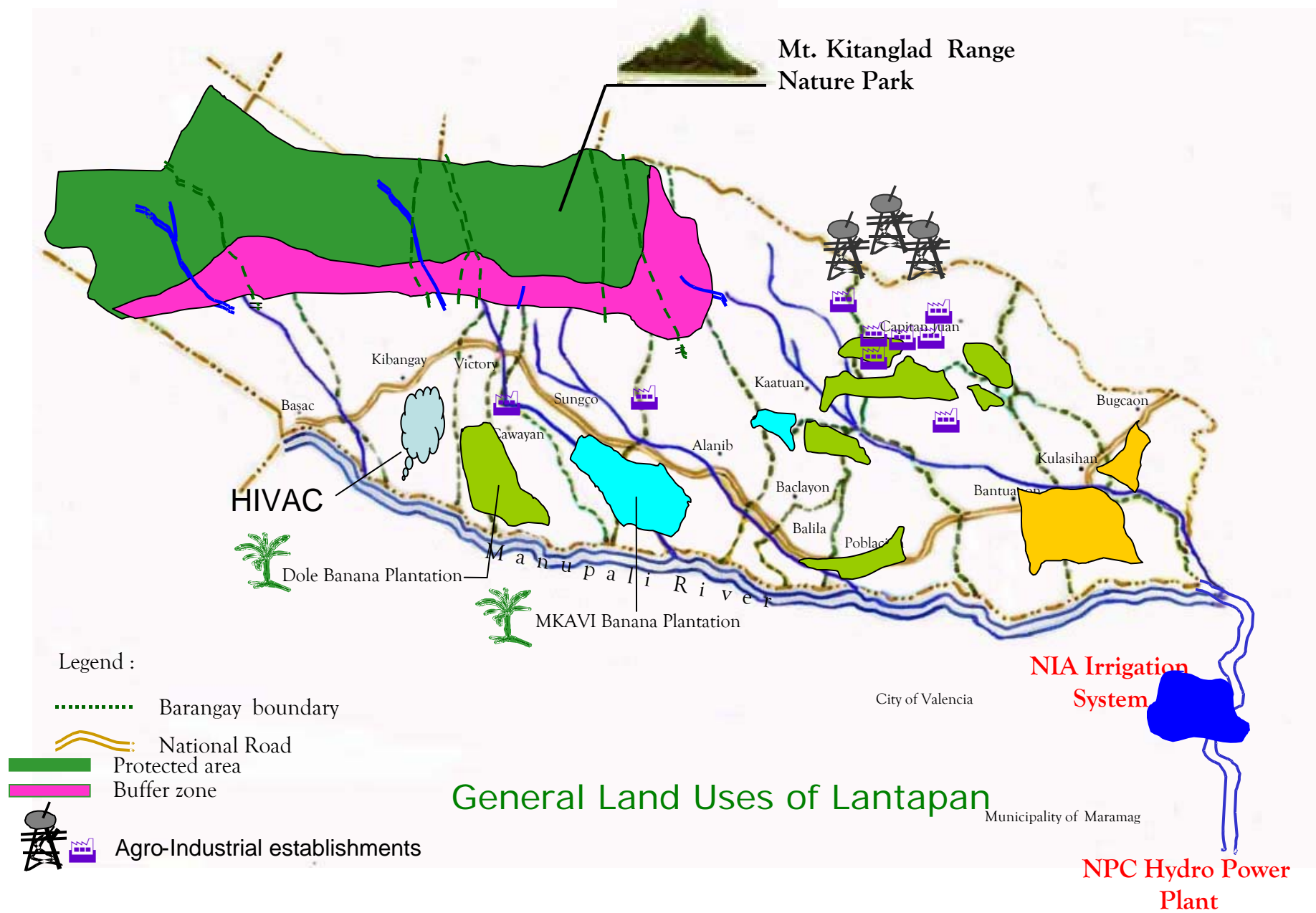


Philippine Study Sites




Key features of Lantapan municipality

- Declared critical in 1992
- 35,465 hectares land area
- Up to 2938 masl
- 70% of land area has slopes > 18%
- Average RH - 84.27%
- Average annual rainfall is 2,470 mm
- 6 rivers, 40 creeks and springs
- Soil pH 4.5 to 5.4
- Mt Kitanglad Range Natural Park
- Ancestral domain claim
- Accessible to market
- Available credit and financing
- Available off-farm employment
- Mosaic of landuse systems of production crops, grasslands, shrubs and trees, and industrial crops

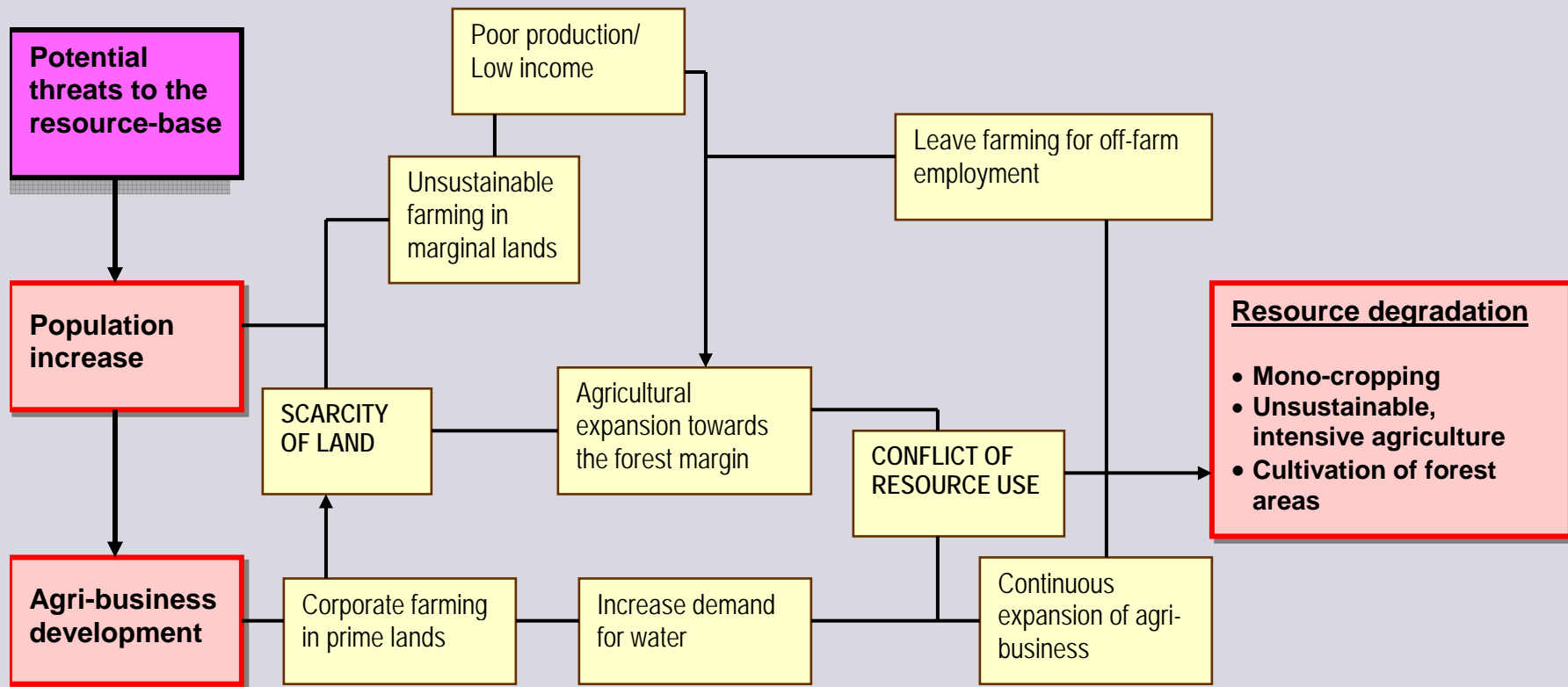


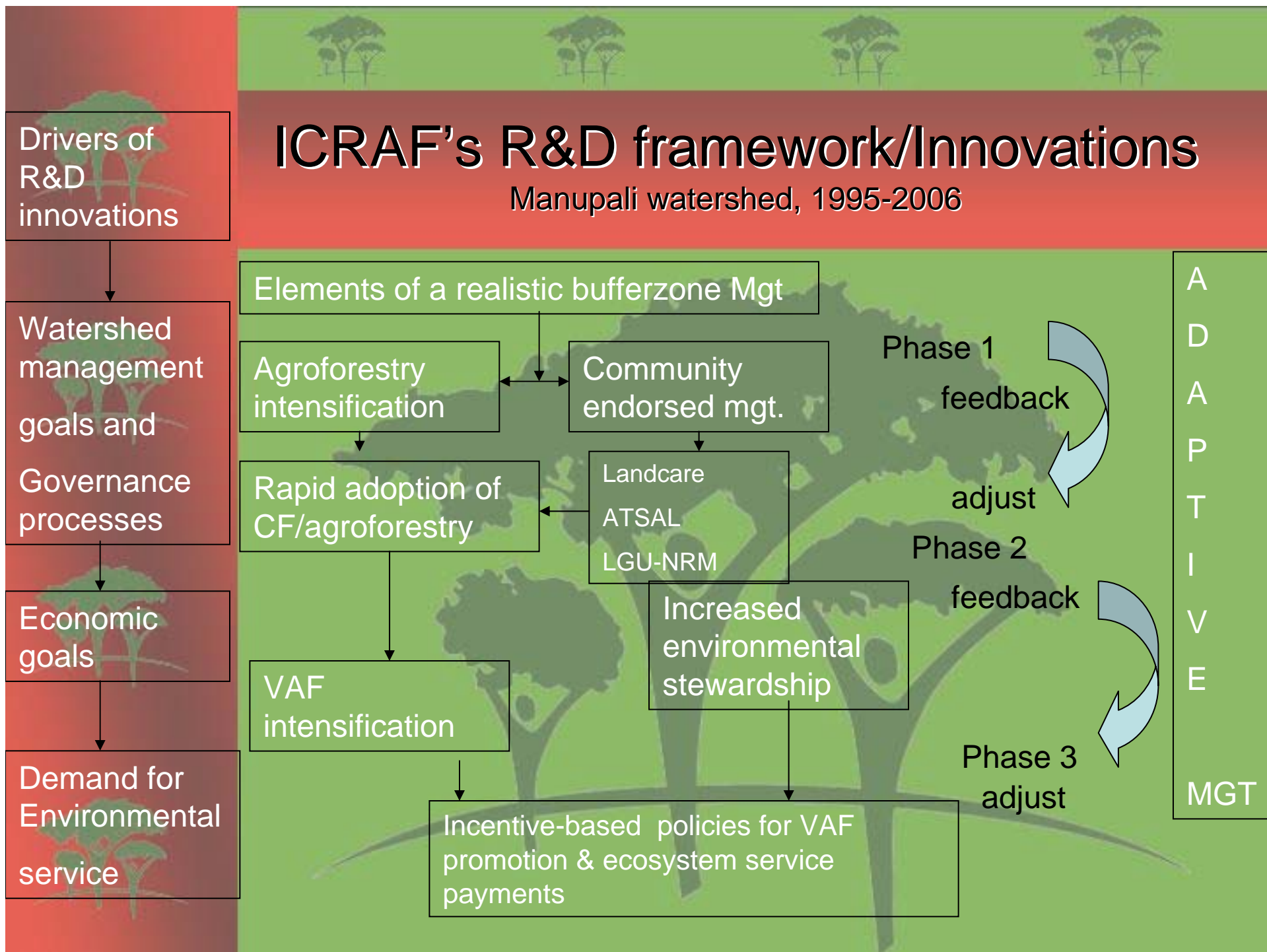


Key drivers of land use change

- Population increase
 - Emergence of corporate farming and other agribusiness
 - National policy direction (e.g., designating the province as a grain and high value vegetable production area)
 - Provincial development initiatives (e.g., sugar milling, feed milling etc.)
 - Introduction of new technologies
- 

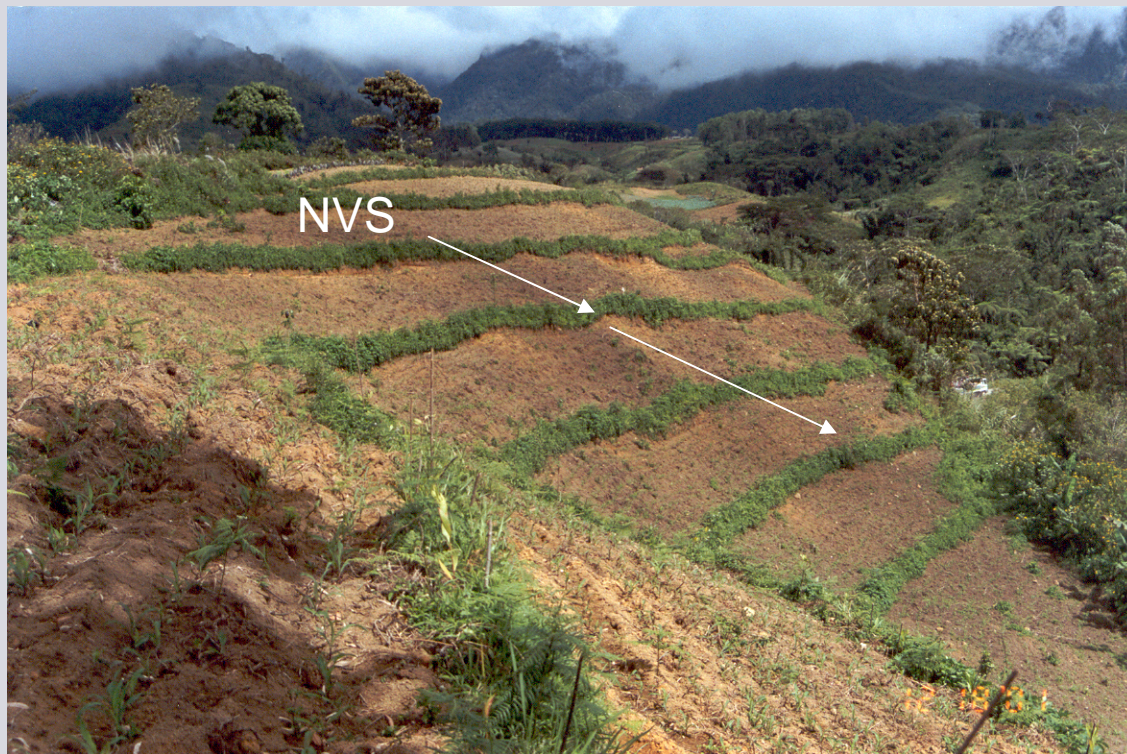
Analysis of threats to Lantapan's resource-base





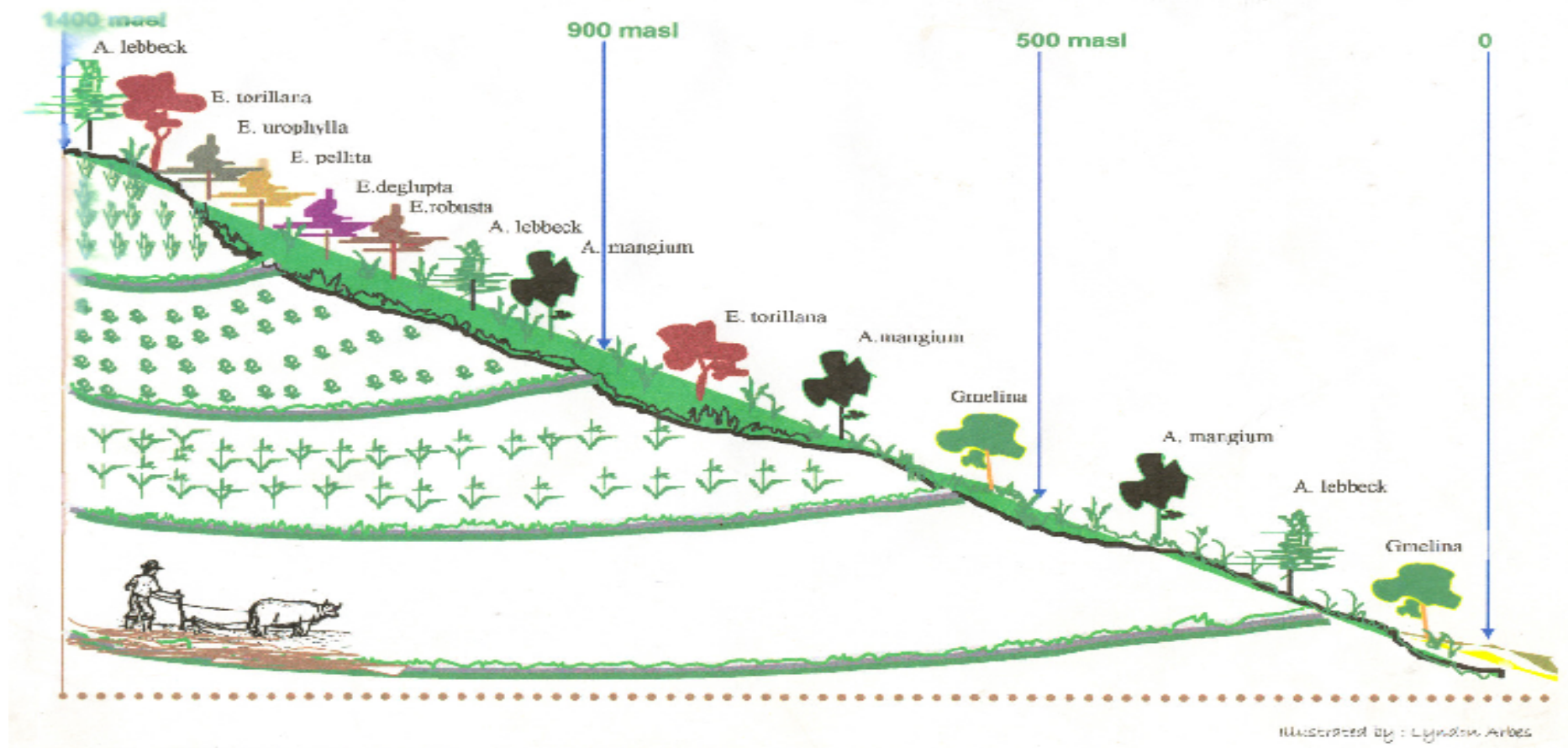
Phase 1: Technical innovations

Natural Vegetative Strips (NVS) as soil erosion barrier



Species evaluation trial

Best performing timber tree species at the age of 21 months across an elevation gradient in the Manupali Watershed in Lantapan, Bukidnon. 1996-1998.





Evolution from NVS to agroforestry

1999

2002



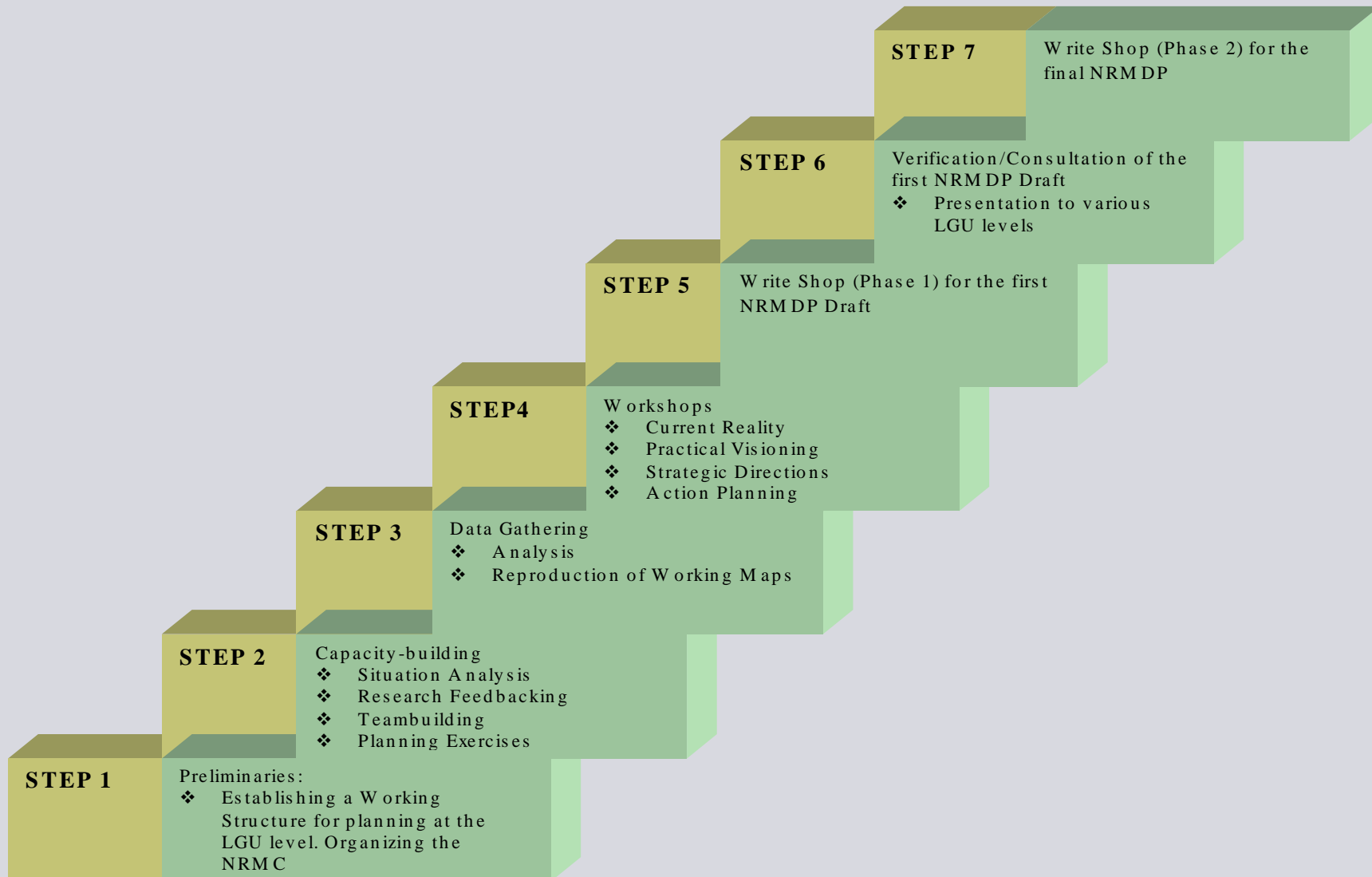


Phase 2: Institutional innovations

1. Local Government-led NRM plan
2. Farmer/community level
 - Landcare associations
 - Agroforestry Tree Seeds Association



Steps in developing the Lantapan NRMDP



Level of LGU support

Period	Level of LGU support	Factors
1996-1998	High	External facilitation
1999-2000	Low to Medium	Political factionalism
2001-2003	Low	Change in focus & priorities
2004-2006	Medium to High	Emerging opportunities



Key lesson

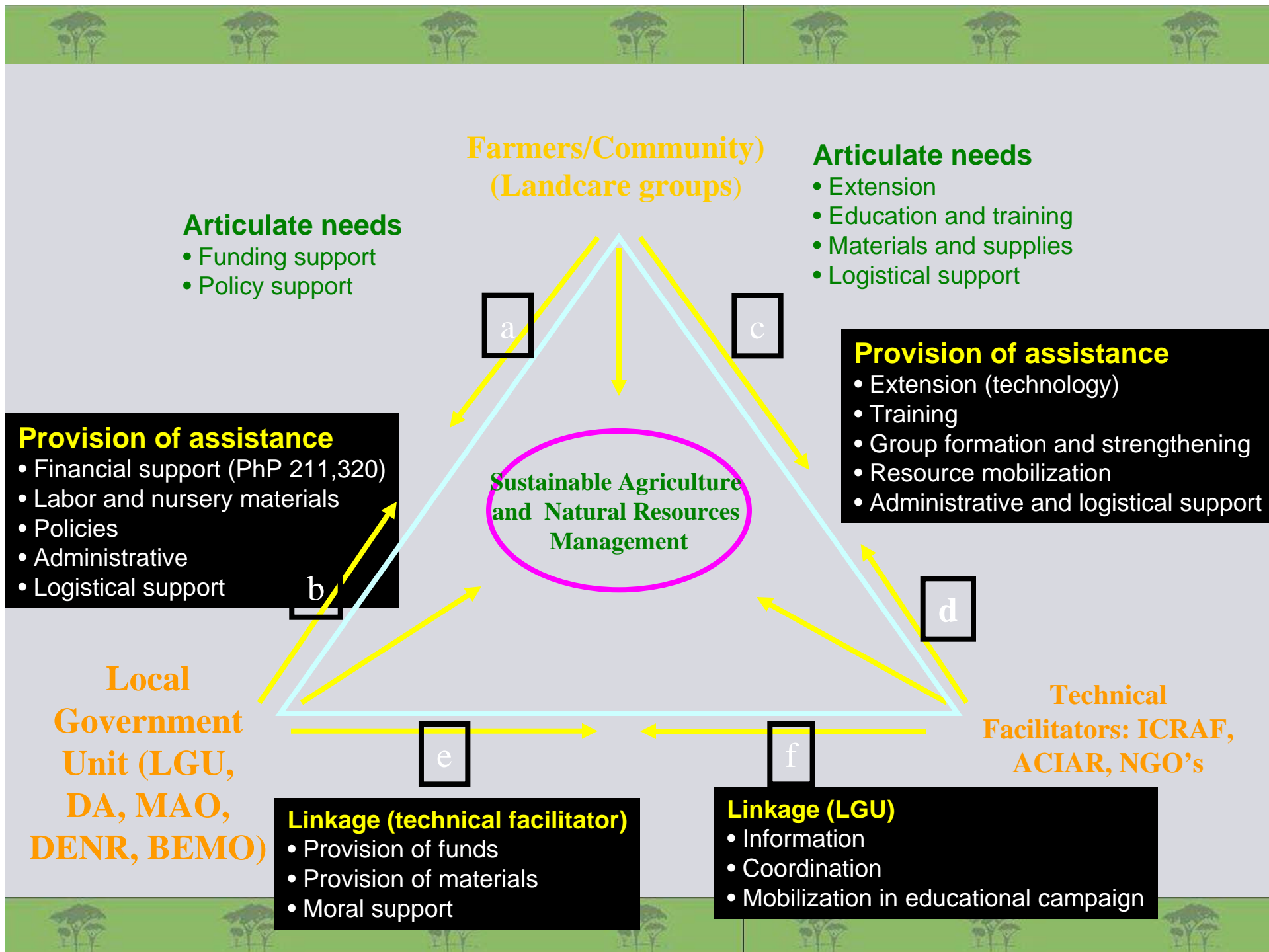
Where the watershed economy is highly dependent on the resource base, local government decisions and priorities, and political considerations are key determinants to successful watershed management.





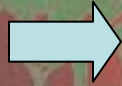
Farmer-level institutional innovations

Landcare, is a community-based program involving both technical and institutional innovations to address the problems of resource degradation, poor production, poverty, weak environmental governance, and ineffective watershed management



Landcare Processes

Starting point



1. Problem I.D

- Series of IEC, & consultation/participatory workshops



Facilitator works with group on process and content to identify issues and achieve consensus on action



5. Participatory Monitoring & Evaluation



4. Linkaging/ Networking with support groups

- series of negotiation & strategic planning to strengthen support for Landcare group initiatives



2. Further awareness & Capacity-building

series of training & farmer-farmer knowledge sharing visits to learn the various technical and institutional innovations w/ local champions in Landcare



3. Formation of Functional Groups/ Extension Team

Usually starts with small interest groups federated at village—municipal level



Continues knowledge generation and sharing

Share common problem, belief and aspirations to adopt, share and improve their well-being

Unprecedented rate and extent in technology adoption

Fig1. Increased adoption of contour farming and agroforestry

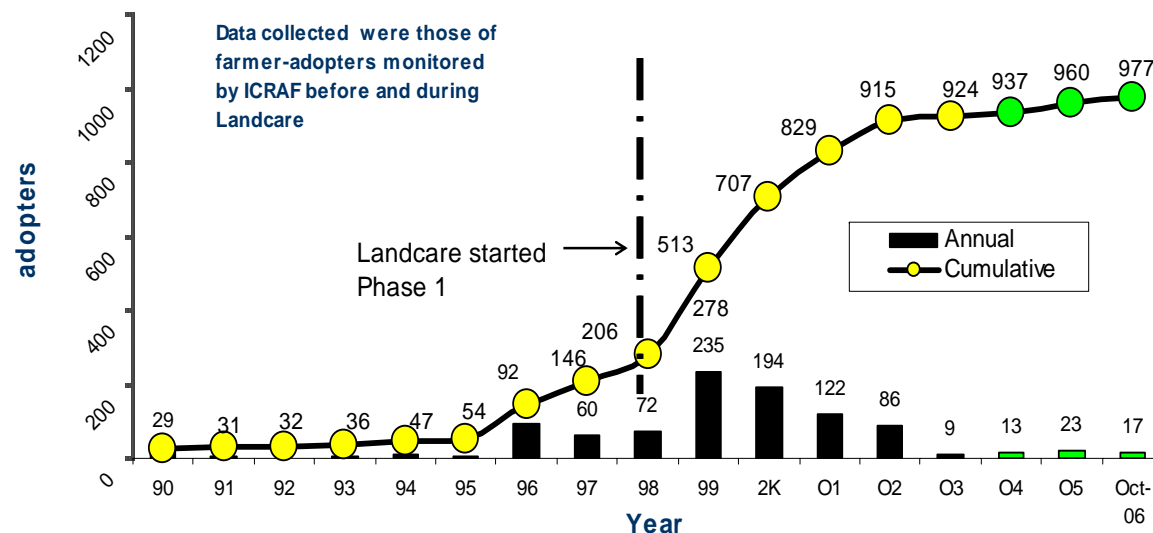
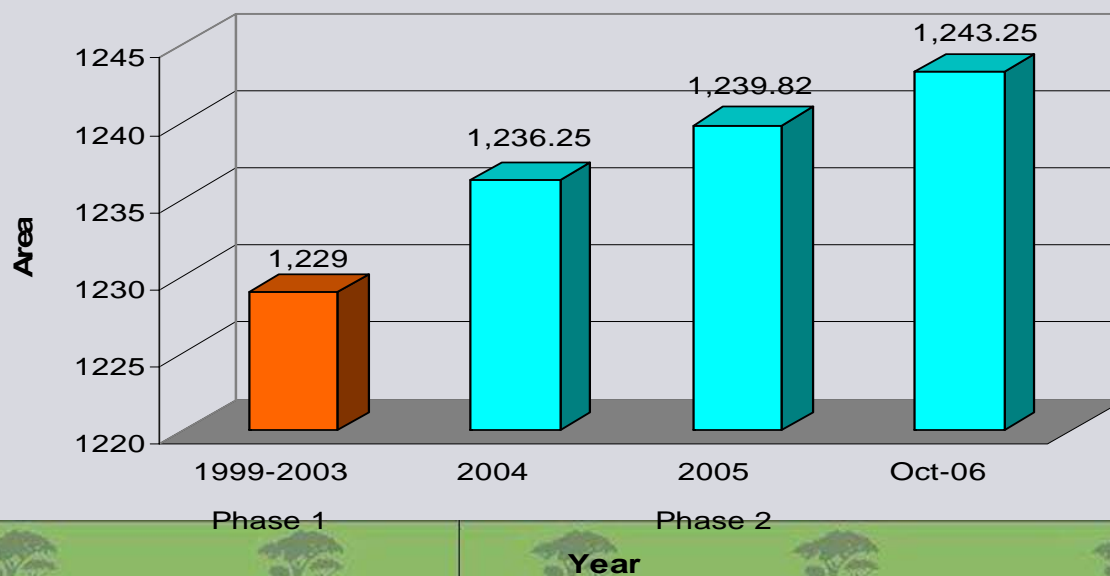


Fig 2. Increased in area with conservation measures



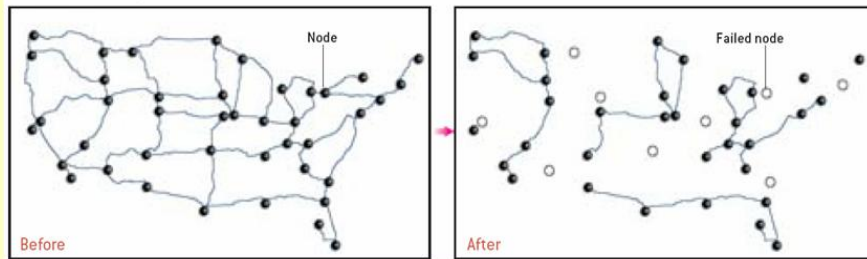
Rate and extent of technology adoption of NVS and agroforestry

Sites	Period covered (years)	Total Crop Area* (ha)	Total Crop Area applied with conservation technologies (ha)	Percent of cropped area (%)	Total number of farming households**	Total number of adopters	Percent to farming households (%)	Average number of adopters per year
Lantapan	7	10,797	1,261.32	12	5,550	977	18	140
Manolo Fortich	6	14,566	70.38***	.48	3,872	201	5.2	34
Maramag	7 mos					ND	ND	
<i>Others</i>								
Malaybalay	5	ND	48.12	ND	ND	198	ND	40
Impasugong	3	ND	34.35	ND	ND	42	ND	14
Arakan North Cotabato	2	ND	18	ND	ND	19	ND	10
Total		ND		ND	ND		ND	

RANDOM NETWORKS, which resemble the U.S. highway system or?

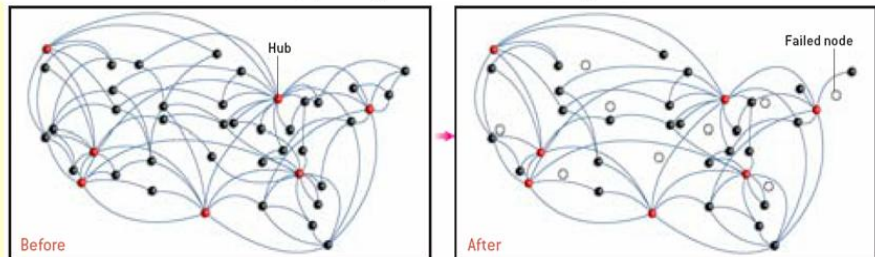
Few seed centres, providing seed to NGOs, providing seed to each their areas?

Random Network, Accidental Node Failure



SCALE-FREE NETWORKS, which resemble the U.S. airline system or?

Seed centres and NGOs supporting seed and seedling networks?

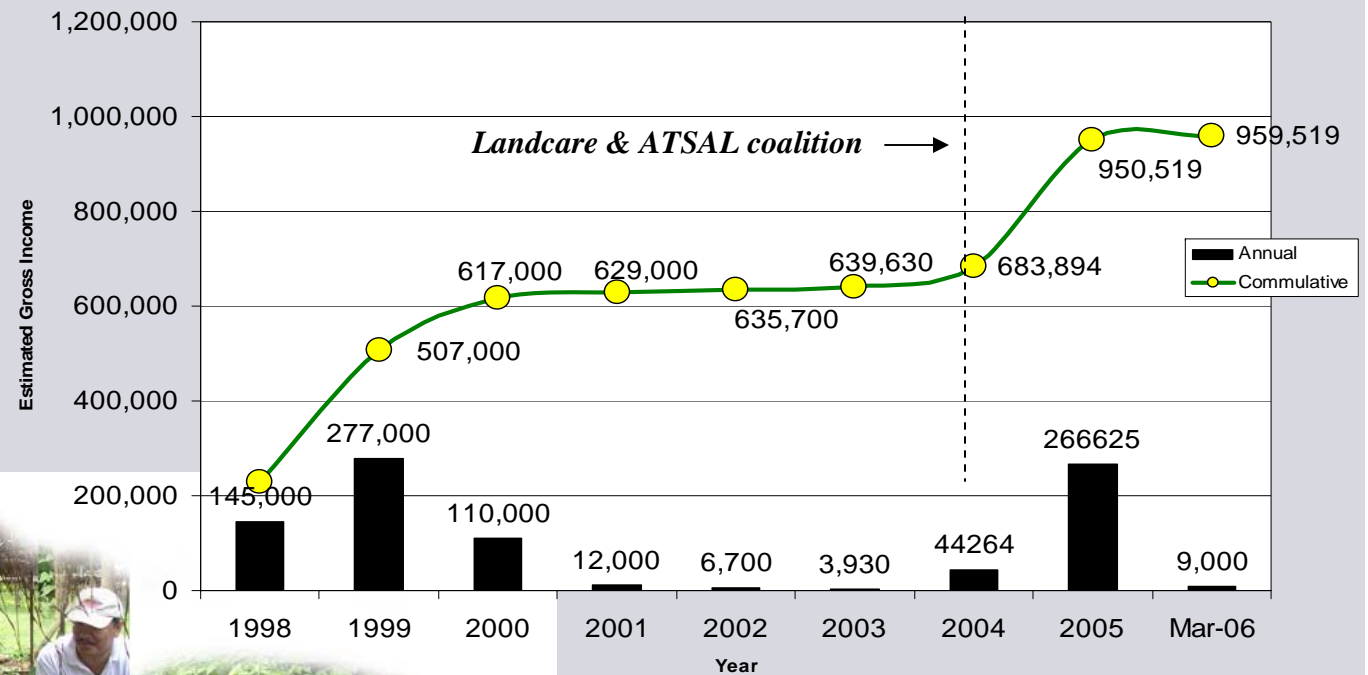


Support is needed to develop a robust germplasm production and distribution network




Agroforestry Tree Seeds Association of Lantapan (ATSAL)

Fig. 4 ATSAL's Estimated Gross Income on various Agroforestry
Seeds from 1998-2006




*Economic activity:
seeds and seedling
business*





But, farmer participation in Landcare activities also declined due mainly to economic factors

- **Employment in the 3 banana plantation companies**
 - **Leasing-out of lands to plantation companies**
 - **Severe lack of capital**
 - **Delay in economic benefits of conservation practices (conservation v.s economic goals)**
 - **Change in government focus and priorities**
 - **Initial group objectives were met**
 - **Adoption ceiling was reached**
- 




Key lesson

There is a need for continuous expenditures in the “repair and maintenance” of social capital, if it is not to be depleted—this will be in the form of continuous training, bridging social distance, and facilitation.





Solutions

- Consolidate the remaining “isolated” stock of social capital (individual groups)
 - Increase competitiveness through “specialization” of certain products viz a viz expertise.
 - Strengthen bridging efforts
- 

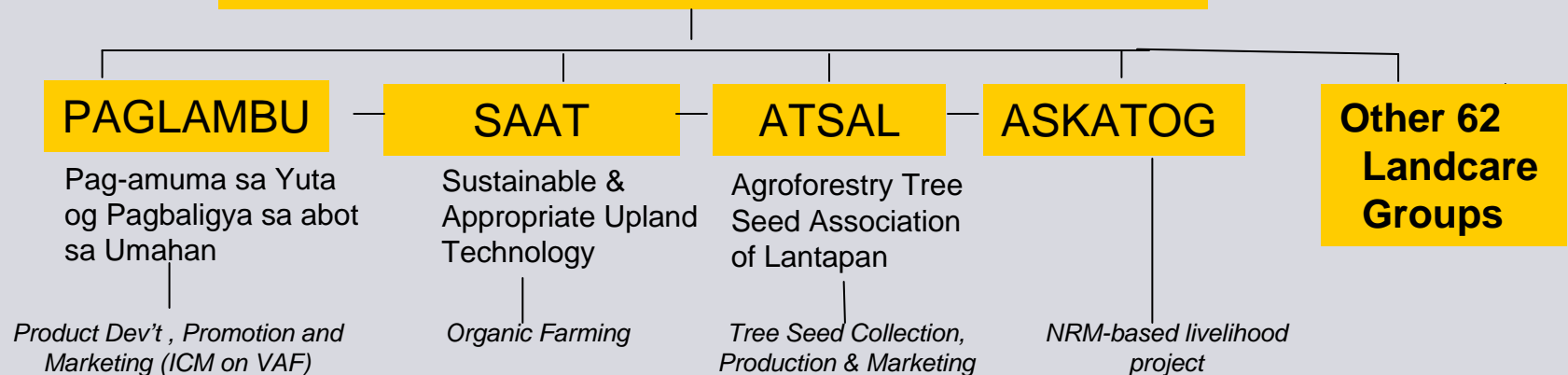
1. Impacts on institution building

- **strengthened bonding social capital (small landcare groups-- 62 multi-sectoral Landcare groups women,youth/school, church etc)**
- **developed/strengthened bridging social capital (landcare associations/federations)**



Coalition among Landcare & other farmer-based organizations & support groups within & across sites

LANTAPAN LANDCARE ASSOCIATION INC.





Transformed landscapes=improved crop production and environmental services





Remaining issues/questions

- How to make Agroforestry a more attractive option to other farmers.
- How to better support the current adopters of agroforestry.
- What support are most needed at the local and national levels? and from communities outside the watershed?





Phase 3: Deepening technical knowledge of vegetable-agroforestry (VAF) system, and incentive-based policies to: a) promote VAF system, and b) reward environmental services

- Deepening knowledge-base on the technical viability of tree integration in vegetable production systems (on-farm research)
 - Identifying market niches of farm-grown trees and high-quality vegetables
 - Policy-action research on institutional arrangements for promoting VAF and rewarding environmental services
- 



Concluding comments


- 1. Watershed mgt. objectives and economic goals can be addressed through adaptive R&D innovations**






What does it take for R&D organizations to effort support watershed management efforts?

2. Adaptive management is needed, to better design R&D innovations for effective and sustainable watershed management

- simple learning cycle
 - goals are set, but with flexibility for change
 - on-ground management have to change
 - necessitates that the R&D institution's organizational practices are highly facilitative, and have the willingness not only to lead, but also be part of a joint learning process
- 



3. In rapidly growing watershed economies, the key determinants to successful management are:

a) effective local government support with practices that are consistent to the intention of policies

b) community-initiated change, involving a broad range of stakeholders (e.g., agribusiness sector, and with broader support from outside communities

