Knowledge Systems in Climate Change Adaptation Among Farming Communities in the Philippines

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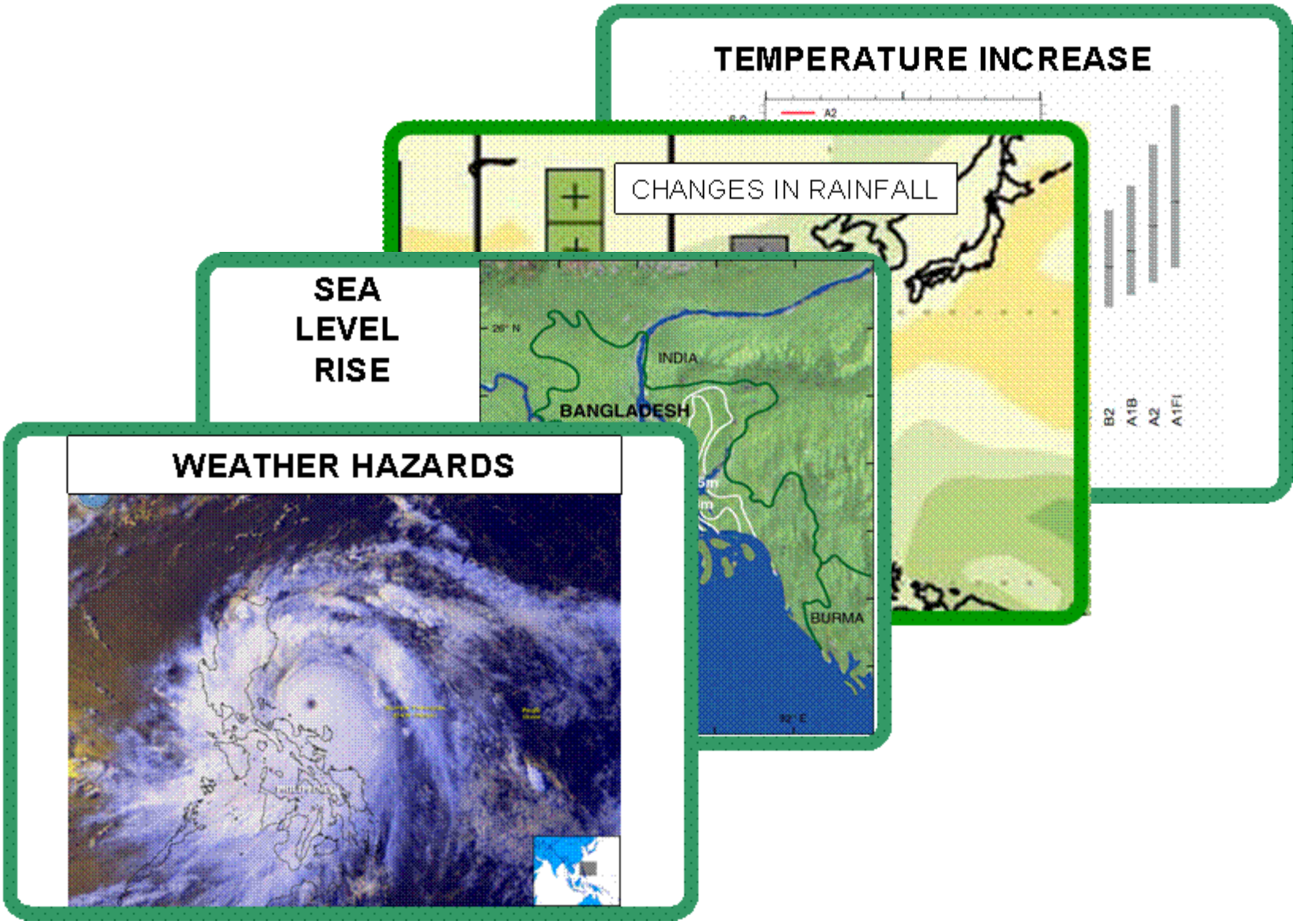
Topics

- Climate change
- Kinds of knowledge systems
- Science vs. traditional ecological knowledge
- Use of multiple knowledge systems in climate change adaptation: examples

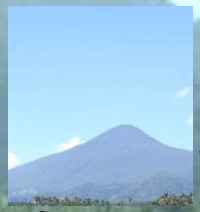
Key Messages

- **Farming communities are faced by the challenges brought about by the growing evidences of climate changes**
- **Different types of knowledge systems in enhancing the adaptive capacity of farming households and communities** must be optimized.

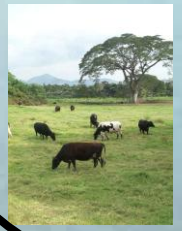
Climate Change Relevant to Farming Communities



Climate Change and Environment- A Landscape Approach



Climate Change



IMPACTS ON VARIOUS ECOSYSTEMS

Coping and Adaptation mechanisms

Knowledge Systems
Partnerships and collaboration

Climate change impacts in the Philippines

- Sea level rise and flooding
- Frequency of occurrence of rainfall-induced landslides
- Potential decline of agriculture and fisheries production
- Water shortage
- Reduced income and increasing hunger and poverty incidence
- Human health threats

Strategies on Adaptation (IPCC 2007)

- Macro- rapid economic growth and development along sustainable development path
- Micro- modify the management of and by sectors that are highly susceptible to climate change

Classifications of adaptation (Crosby 2005):

- anticipatory and reactive
- autonomous and planned

What is Knowledge System?

- A body of propositions actually adhered to (whether formal or otherwise) that are routinely used to claim truth. (Feyerabend 1987 cf Reid et al 2006)
- A construction of a group's perceived reality, which the group members use to guide behavior toward each other and the world around them. (Zermoglio 2005 cf Reid et al 2006)

Use of traditional ecological knowledge

- Helps address the shortcomings of purely, formal, scientific knowledge. (MA 2003 cf Reid et al 2006)
- An invaluable source of fine-grained, detailed information about local ecosystem services, especially in areas where little formal knowledge exists. (Bohensky 2004 cf Reid et al 2006)

Use of traditional ecological knowledge

- It is increasingly being recognized as holding lessons for adaptive managers. (MA 2003 cf Reid et al 2006)
- It is often the only source of information about past patterns of ecosystem use, past land use, traditional customs, and the history of local politics. (Shackleton 2003 cf Reid et al 2006)

Drawbacks of Traditional Ecological Knowledge

- Falls short where the rate of change in socio-ecological systems is faster than the rate of knowledge evolution (Ainslie 2002 cf Reid et al 2006)
- Evolves inappropriately as a result of powerful external influences that override sensible local adaptations. (Hendricks 2003 cf Reid et al 2006)
- Oftentimes too fine-grained and context specific to detect larger scale and slow change (MA 2003 cf Reid et al 2006)
- Largely undocumented, unrefereed, and qualitative in nature

Example of traditional ecological knowledge

Pampanga-

- Smoking or *pausok*
- Use of herbal pesticide
- Lighting of lamps at night to scare insects, and putting of poison frogs in the field as plant pest controls

Catanduanes and Camarines Sur

- smudging technology, soapy water spray or water mixed with small pepper juice extract

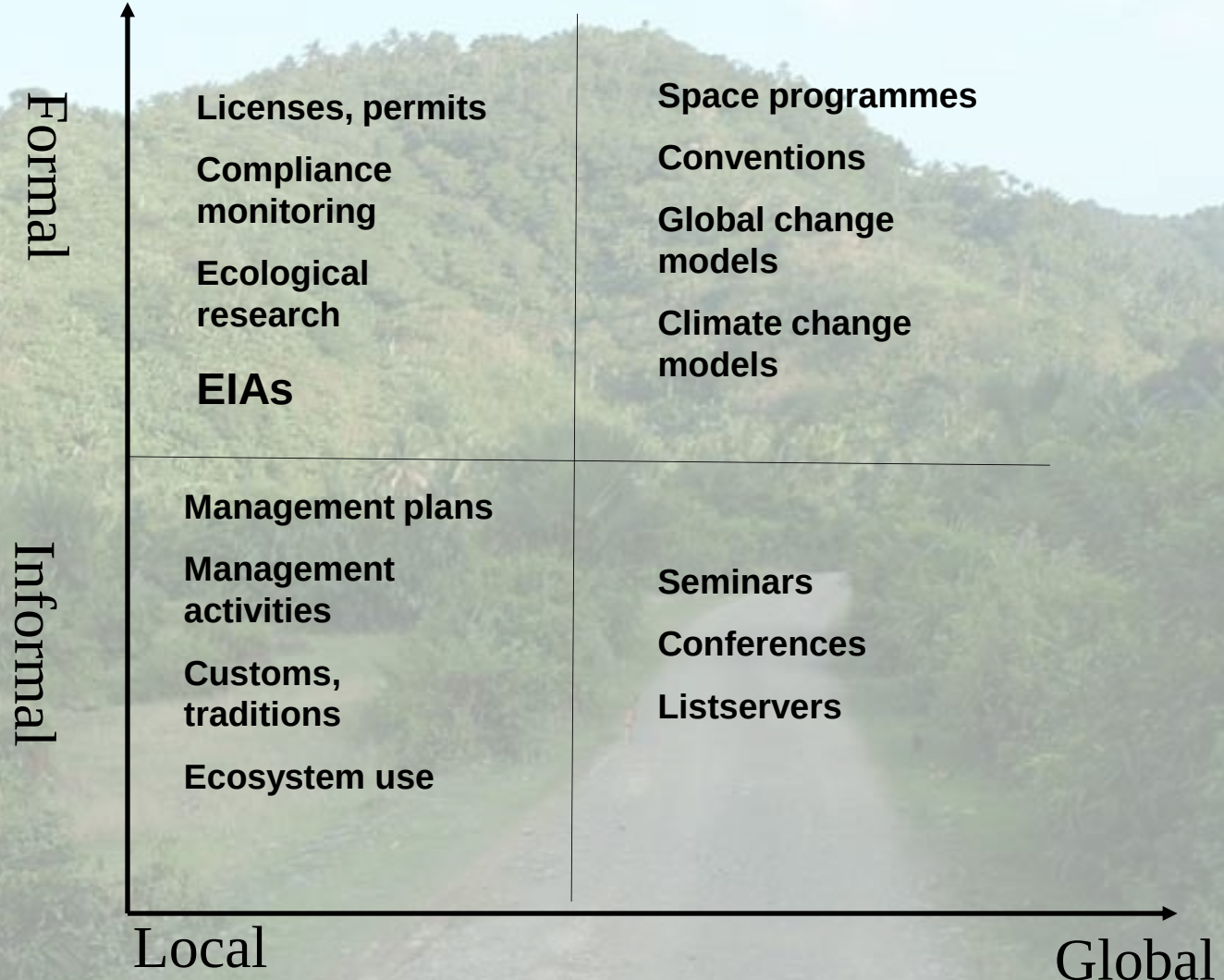
Multiple Knowledge Systems in Climate Change Adaptation

Adaptation strategies are a mix of both the science (or technical knowledge/formal) and the local knowledge, experience and instincts of farmers

Characteristics of knowledge along formal-informal and a tacit-explicit gradient

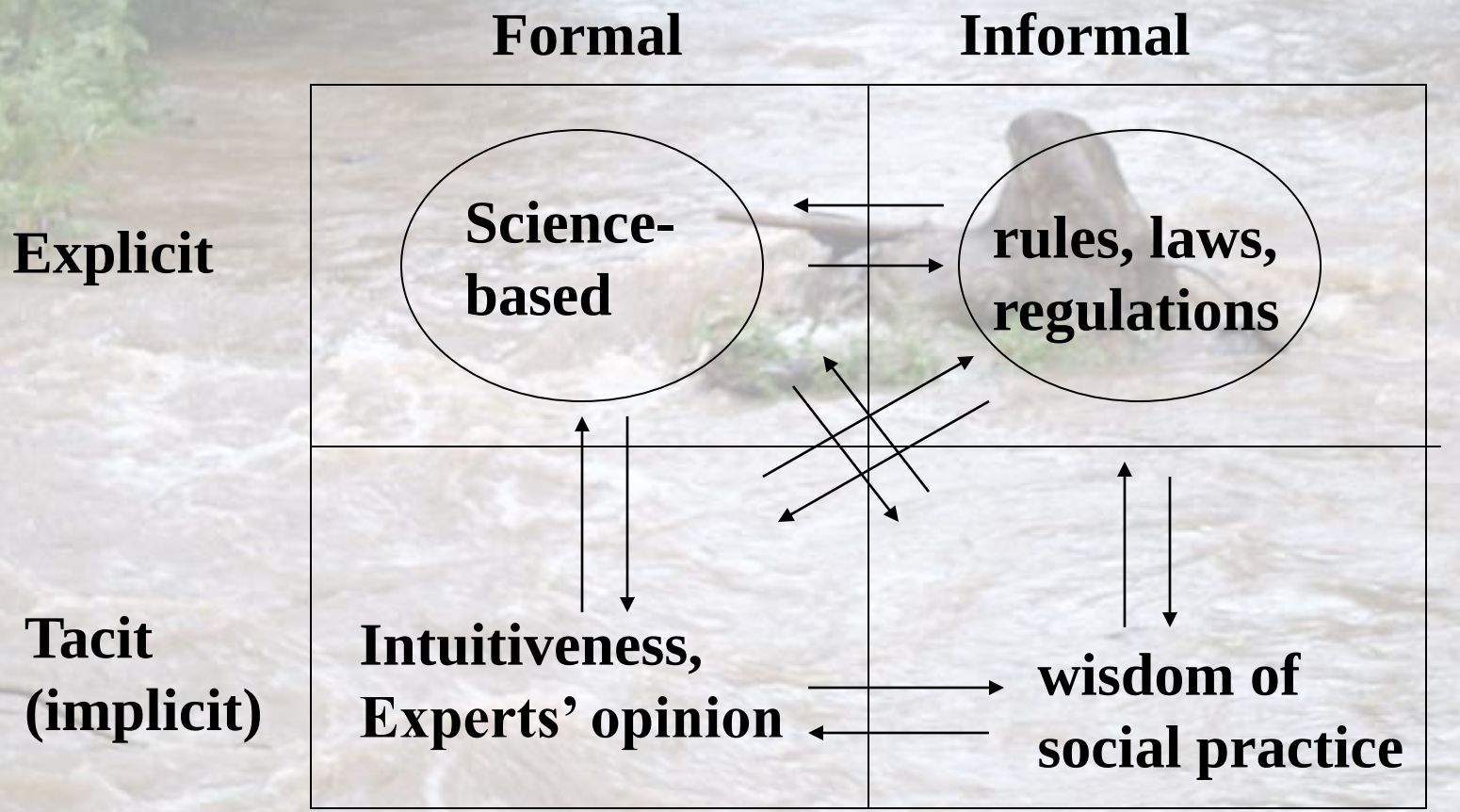
	FORMAL	INFORMAL
Explicit	Most but not all "scientific" knowledge is in this quadrant. The typical outputs of a conventional assessment are also here	This knowledge is codified but neither collected nor tested in accordance with conventional scientific rules.
Tacit	Scientifically trained people have formal knowledge that is uncodified.	This knowledge is embedded in local customs, traditions, and memory is transferred through oral history.

Most common uses of different types of knowledge



Source: Fabricus et al 2006

Use of multiple knowledge systems in climate change adaptation

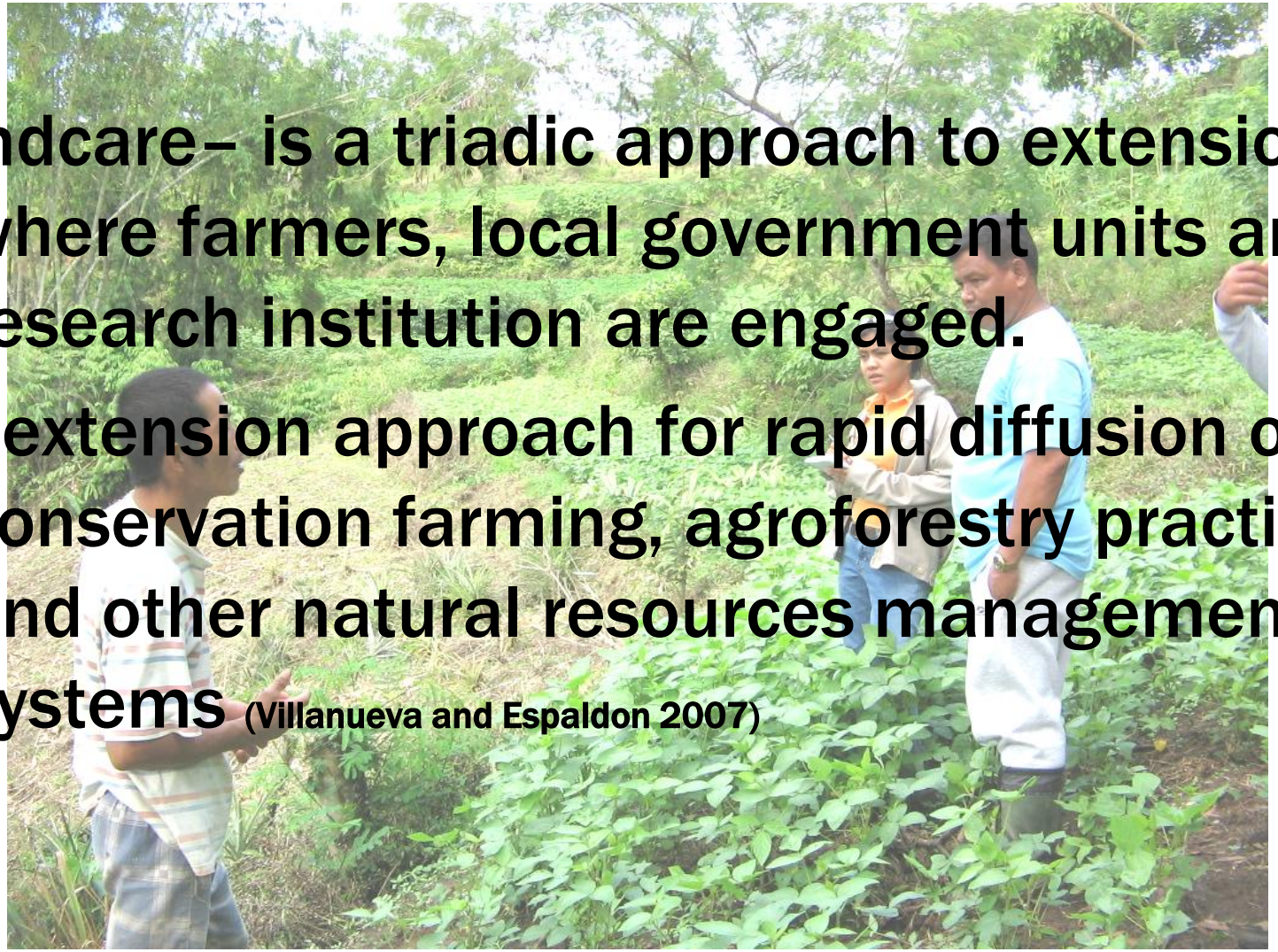


(Adapted from Flor 2003)

Science as a Source of Adaptation Mechanisms

- Coping strategies in rice production (Espaldon et al 2006)
  - Use of early maturing rice varieties, flood and drought resistant varieties
  - Use of windbreaks
  - Planting abiotic stress-resistant varieties
  - Simple harvesting and postharvesting handling
  - BIO farm system
  - Vermicomposting
  - Shallow tube wells

Multiple Knowledge Systems in Climate Change Adaptation



Landcare– is a triadic approach to extension where farmers, local government units and research institution are engaged.

An extension approach for rapid diffusion of conservation farming, agroforestry practices and other natural resources management systems (Villanueva and Espaldon 2007)

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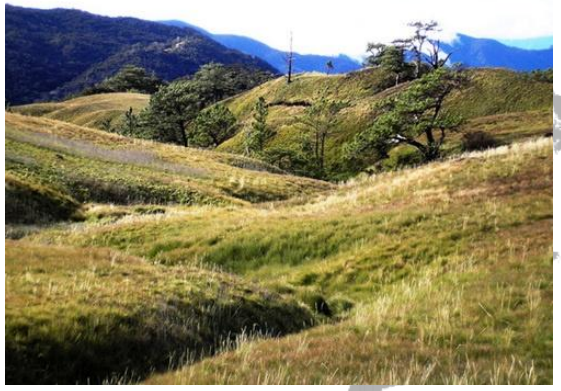
Source: Espaldon et al. 2007)

Source: Espaldon et al 2008)

Managing Grasslands in the Philippines to Augment Food Production Supply and Improve Environmental Security



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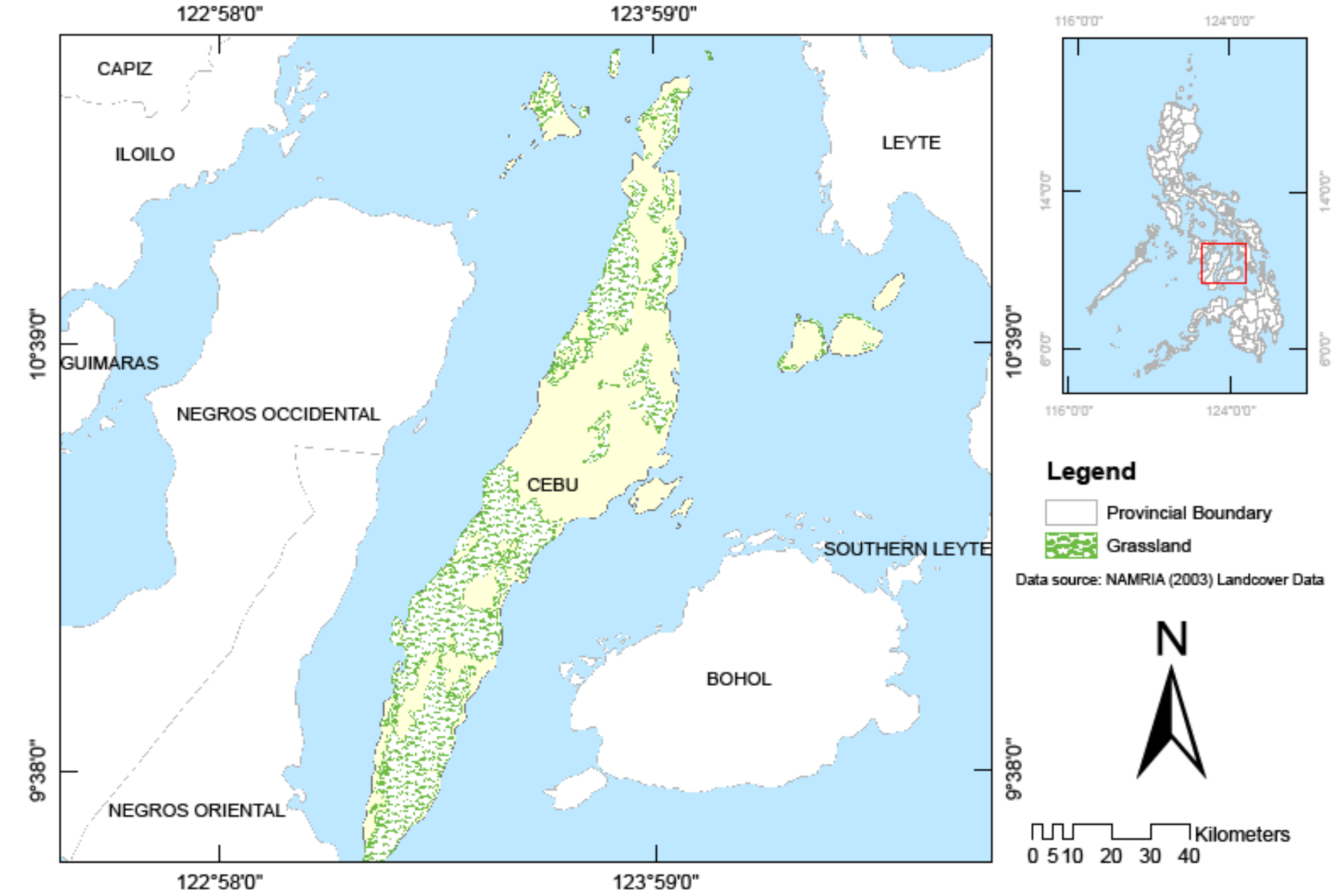
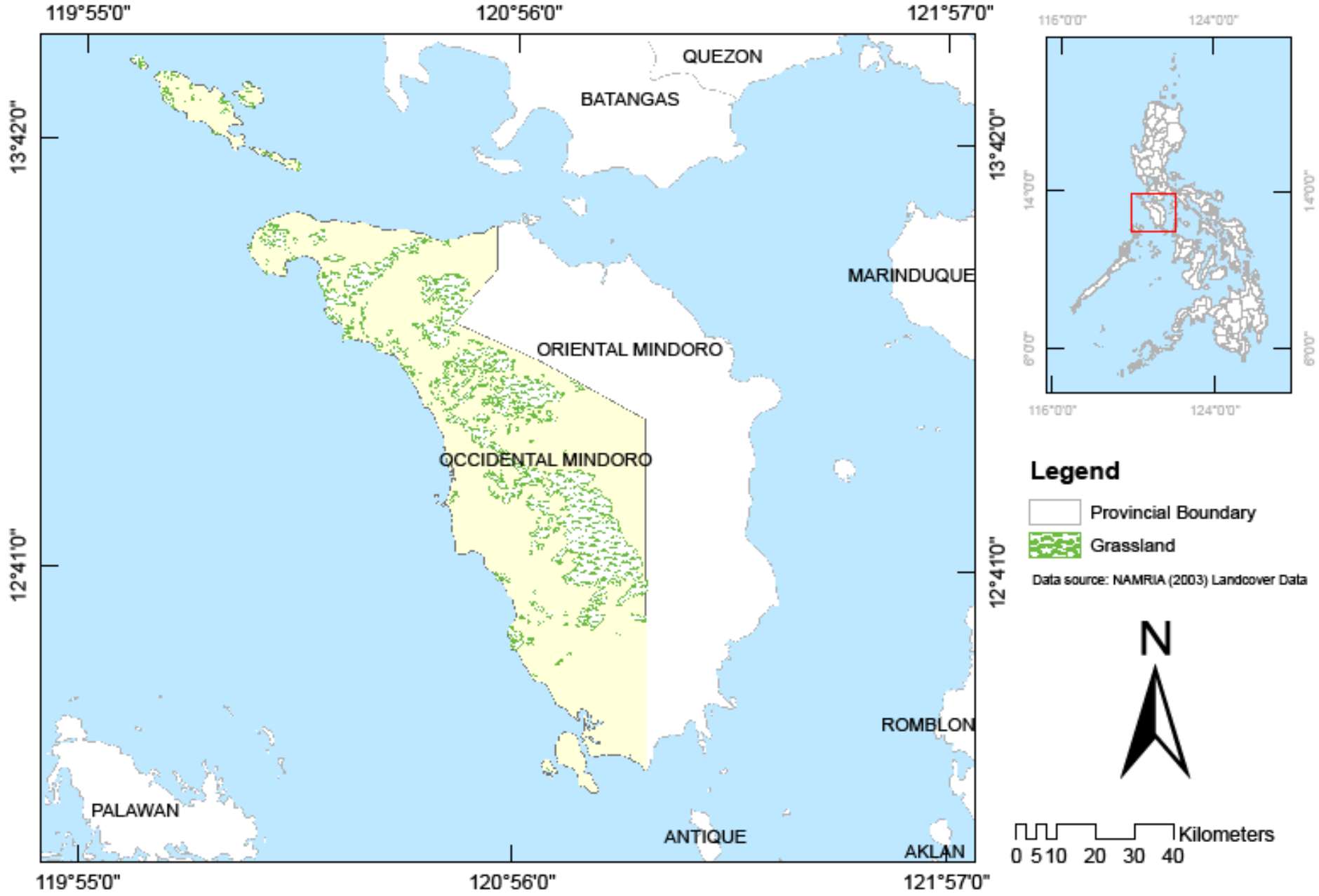
Grasslands Areas in the Philippines

- There are about **1.8 Million** ha of grasslands in the Philippines
- Around 60% of these grasslands could be found in 10 provinces of the country.
- These provinces include Cebu, Palawan, Oc. Mindoro, Negros Oriental, Zamboanga del Note, North Cotabato, Sarangani, Negros Oc., Zamboanga del Sur, and Nueva Ecija

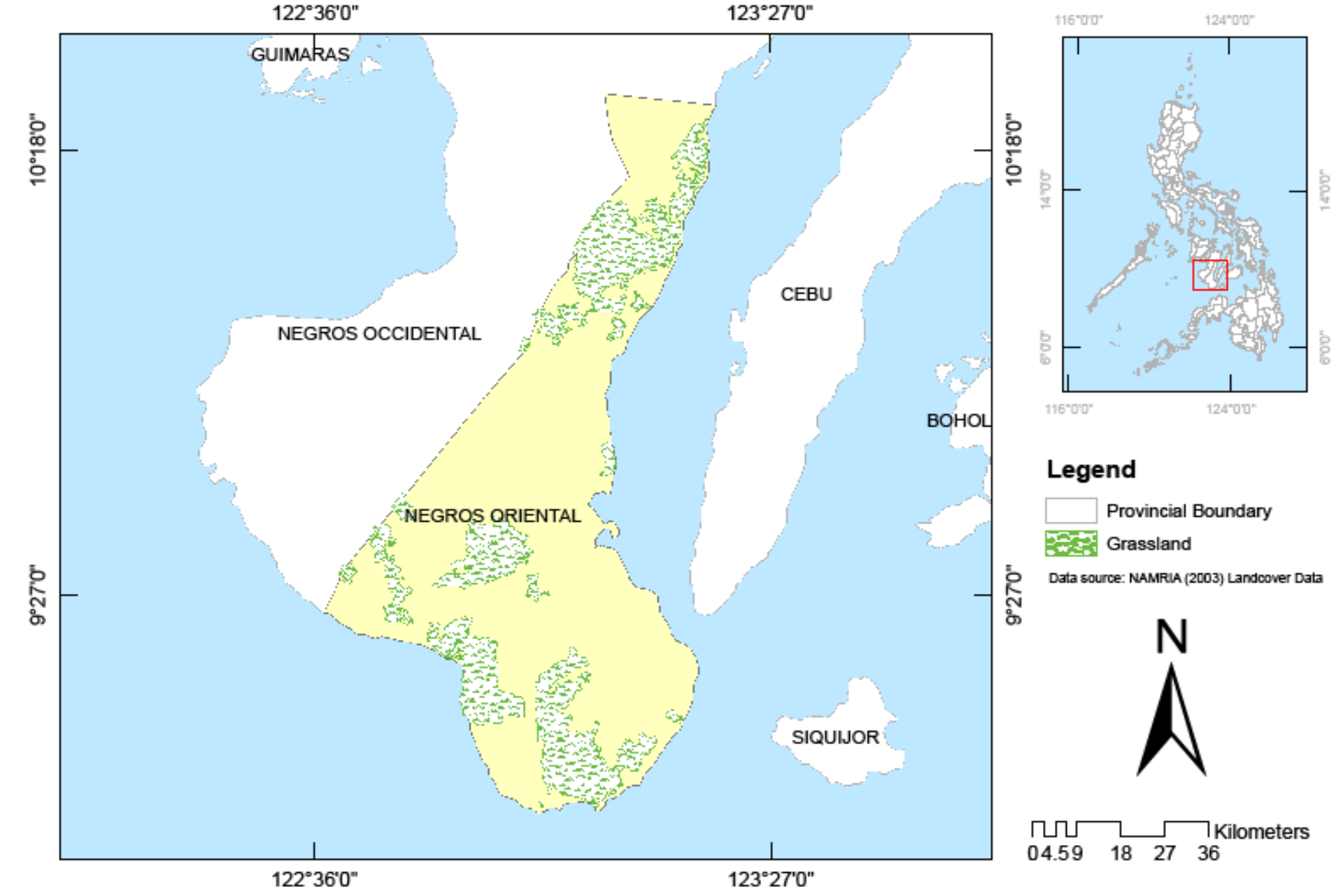
Cebu Grassland



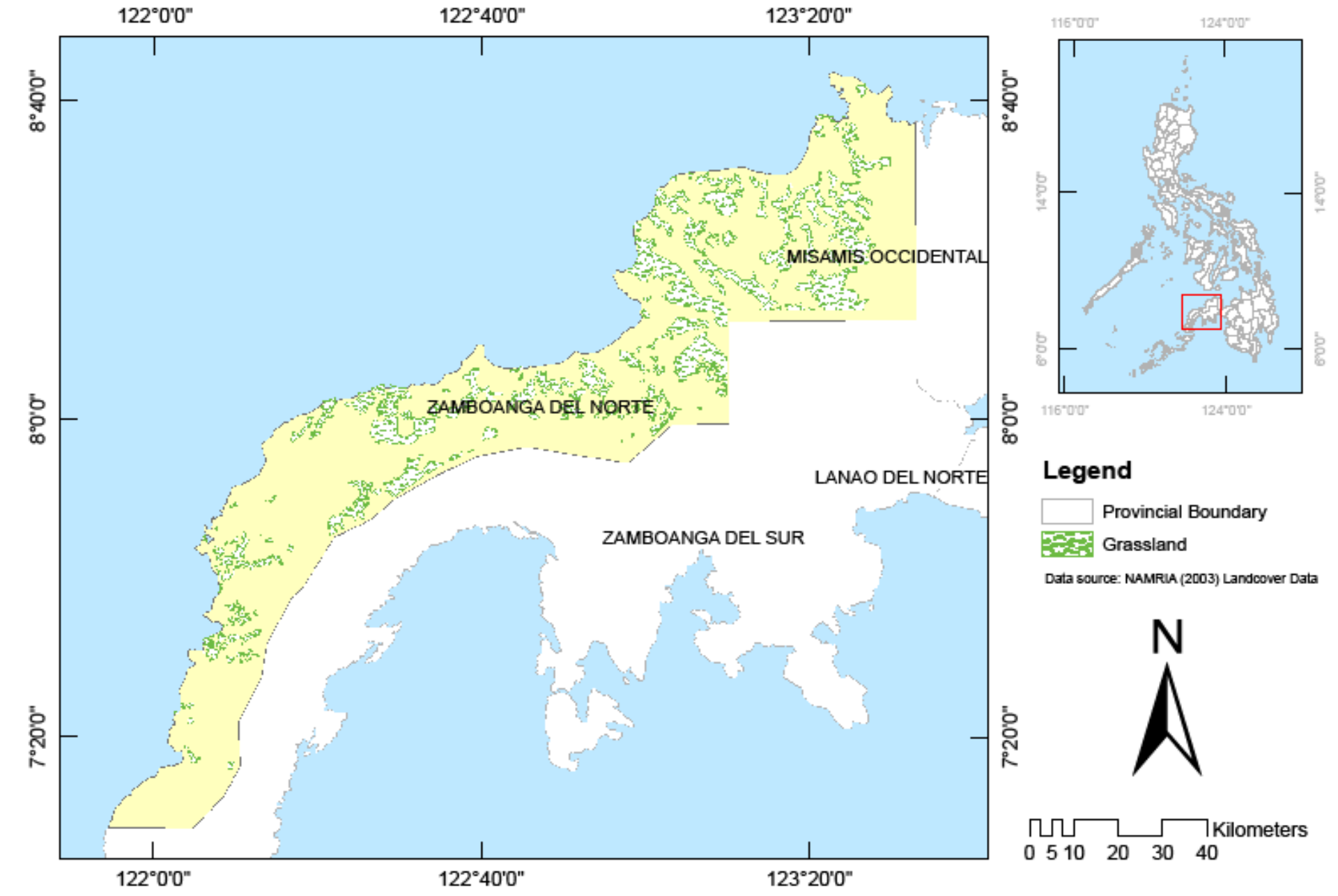
Occidental Mindoro Grassland



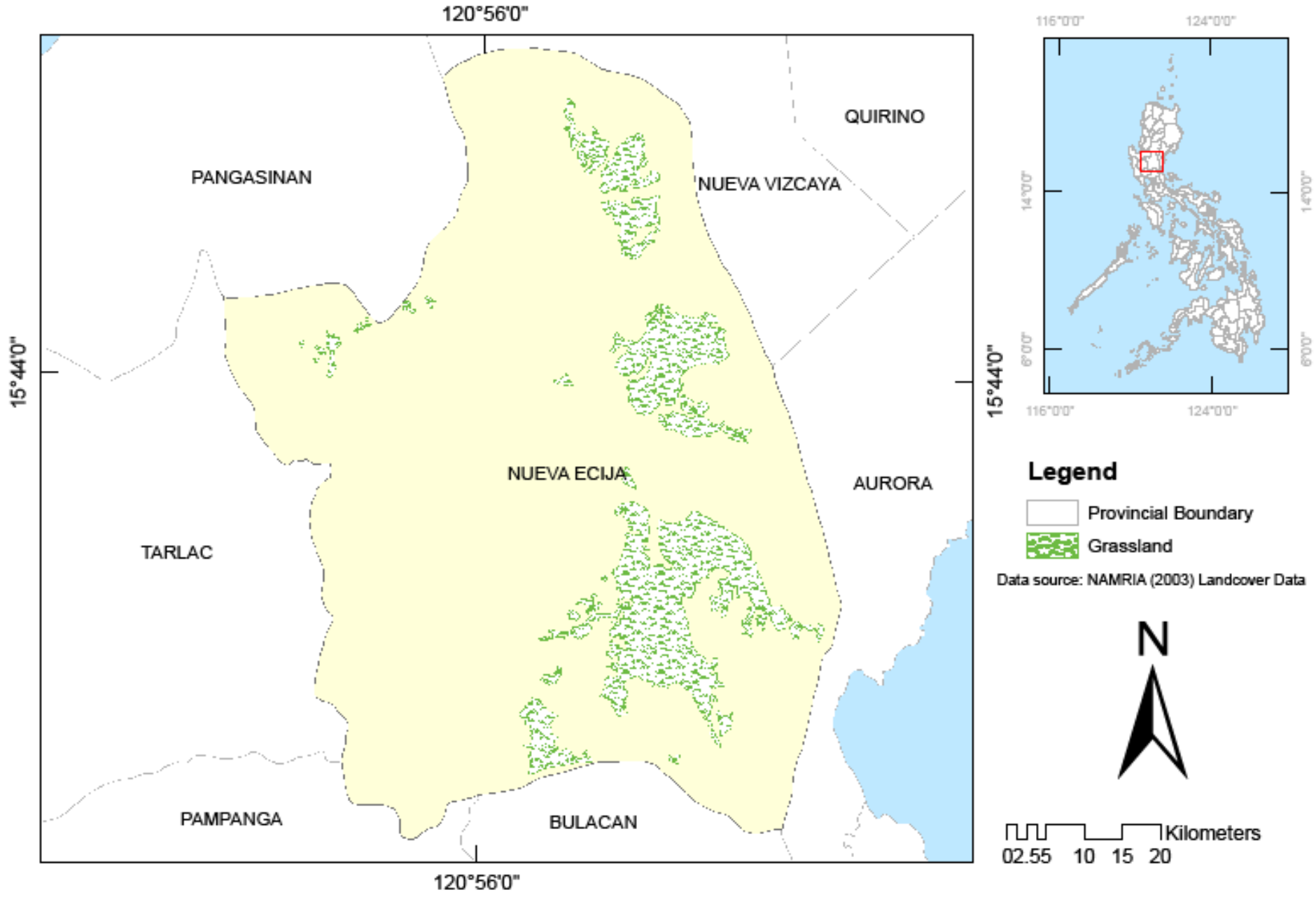
Negros Oriental Grassland



Zamboanga del Norte Grasslands



Nueva Ecija Grassland



Grasslands as Source of Food and Livelihood

- **Assuming that only 50% of the 1.8M ha of grassland areas can be utilized for agriculture, which is about 0.9M ha, it would generate approximately additional production of:**
  - **Rice – 2.3 tons/ha × 0.9M ha = 2.07M tons/season**
  - **Corn – 2 tons/ha × 0.9M ha = 1.8 M tons/season**
  - **Additional Crops**

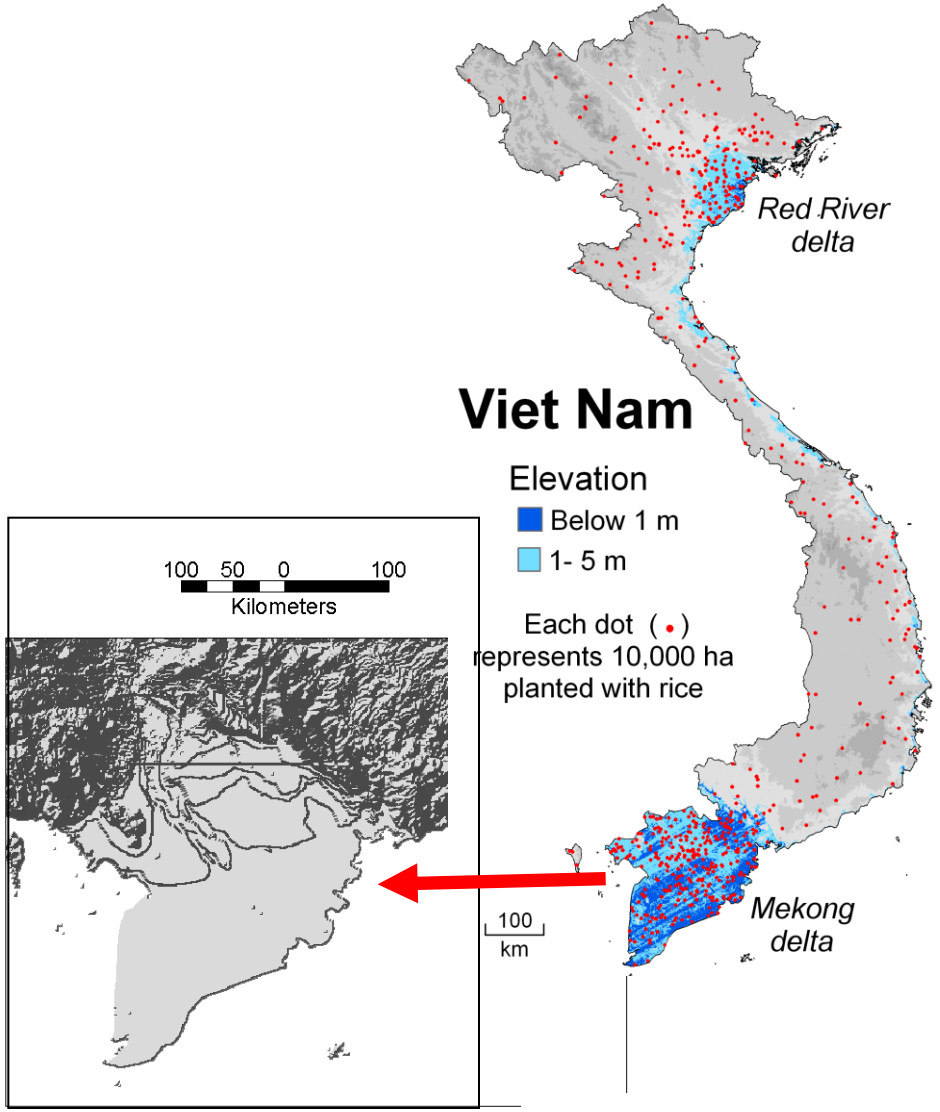
Sustainable Agriculture and Natural Resource Management Project

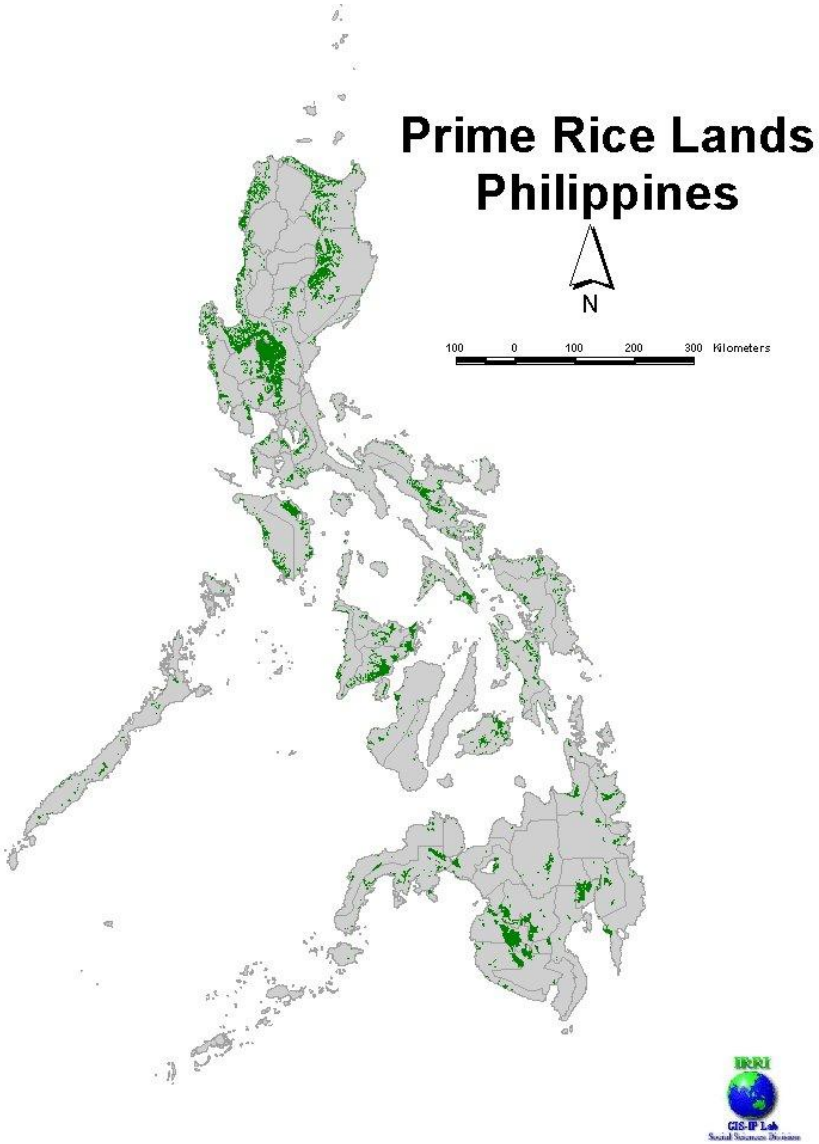
- **Low cost drip irrigation for the uplands (Ella et al 2008)**
- **Vegetable-trees complementarity (Mercado et al 2008)**
- ****Indigenous vegetables (++ income generation, stabilization of soil, nutritional enrichment)(Pallada et al 2008)**

UPLB SESAM Research

- **Assisted Natural Regeneration (Florece et al 2001)**
- **Challenges in areas in local ecological knowledge and climate change impacts and adaptation in fisheries (Sampang 2005)**

On sea level rice





(Wassman 2009 Hijmans, pers. comm.

Climate Change Adaptation:

Rice systems have to become more resilient to…

- **Drought**
- **Submergence**
- **Salinity**
- **Heat waves**

Challenges of Adaptation =
Challenges in unfavorable environments

(Wassman 2009)

Conclusions

- **Adaptation strategies are available in research institutions and as wells as in local and farming communities**
- **Reducing vulnerability the complex process of coping and adaptation**
- **Challenge is selecting and putting together appropriate mix of strategies** and the kind of viable partnership between different sectors, linking science and practice (transdiciplinary approach)

Thank you for listening