Proceeding

Smart Tree-Invest Southeast Asia
Regional Closing Workshop

Jakarta, 17 May 2017

Climate-smart, Tree-based, Co-investment
in Adaptation and Mitigation in Asia
(Smart Tree-Invest)

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Editors

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World Agroforestry Centre (ICRAF)
Southeast Asia Regional Program

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Introduction

Transforming our World: the 2030 Agenda for Sustainable Development is a globally adopted program that broadly relates to human dignity, prosperity, protecting the biosphere, and promoting peace and security. Countries are now formulating indicators to track their progress towards the targets, while struggling against the impact of unpredictable socioeconomic and political shocks and present and future climate change. Overall, these changes are increasing the vulnerability of local populations to declining agricultural yields and food security, soil erosion, flash floods, and long-term freshwater shortages.

In addition, the planet's agricultural land needs to achieve a 70% increase in production to meet the demand for food from a growing population. Meanwhile, smallholding farmers in Asia and the Pacific are exposed to financial and environmental risks from changes to the climate. Their vulnerability is further increased by weak capacity to adapt to changes. Yet these farmers are crucial for providing food for some of the world's fastest-growing and largest populations.

Approximately 560 million people live in agricultural ecosystems with more than 10% tree cover, mitigating climate change by maintaining these production landscapes and adapting to changing conditions. Climate-smart, tree-based agriculture has the ability to maintain the environment's capacity to provide ecosystem services and intensify production. These agricultural landscapes provide a diverse range of tree species; are important habitats for plant and animal biodiversity; help maintain connections between forest fragments; and support healthy watersheds by buffering variations in rainfall.

The Climate-smart, Tree-based, Co-investment in Adaptation and Mitigation in Asia (Smart Trees-Invest) program has been working towards improving the livelihoods and resilience of smallholding farmers by reducing their vulnerability to shocks, including climate change. Smart Trees-Invest has worked with smallholders, both female and male, in vulnerable areas in Indonesia, Viet Nam and the Philippines to help create local solutions in collaboration with governments, development agencies and the private sectors. Smart Trees-Invest has paid special attention to developing benefits from external public and private funding through links with payment and co-investment for ecosystem services.

Workshop objectives

The Smart Trees-Invest Southeast Asia Regional Workshop is coordinated by the World Agroforestry Centre in collaboration with Government of Indonesia and the International Fund for Agricultural Development (IFAD). The regional workshop provides an opportunity to reflect on performance, on-the ground good practices and policy implications in the domain of smallholders' vulnerability and landscape-based ecosystem services. The workshop's objectives are three-fold.

1. Review on-the-ground practices, action-research tools and scientific assessments of increasing smallholding farmers' resilience through payment for, and co-investment in ecosystem services.
2. Reflect on lessons from mainstreaming into national policies and programs in Indonesia, Philippines and Viet Nam.
3. Agree on endorsements to Southeast Asian national governments and development agencies on the strategic focus for building social and financial co-investments in smallholders' resilience and provision of ecosystem services.

Workshop agenda

8:30 – 9:00	Registration and welcome coffee
9:00 – 9:05	**Welcome to participants** Regional Coordinator, World Agroforestry Centre Southeast Asia, Prof Dr Ingrid Öborn
9:05 – 9:15	**Keynote speech:** Government of Indonesia
9:15 – 9:30	**Capacity strengthening for vulnerability assessment: the concept:** Dr Sonya Dewi (World Agroforestry Centre)
9:30 – 10:15	**Co-investment for resilience and ecosystem service provisions: a three-country synthesis:** Dr Beria Leimona (World Agroforestry Centre) followed by presentations: • Indonesia: Dr Betha Lusiana • Philippines: Dr Rodel Lasco/Kharmina Anit • Viet Nam: Dr Delia Catacutan
10:15 – 11:00	Highlights from each country on empirical findings and detailed methods
11:00 – 11:45	**National and sub-national development agenda on smallholders' resilience and ecosystem services: potential for mainstreaming and sustaining local initiatives.** Panel discussion with: • National and sub-national government officers from Indonesia, Philippines and Viet Nam • Representatives from development agencies in Southeast Asia
11:45 – 12:00	**Synthesis and food for thought:** Prof Dr Meine van Noordwijk (World Agroforestry Centre)
12:00 – 12:45	**Guided walk** to country displays to showcase communities' stories, scientific findings, tools and methods.
12:45 – 14:00	Lunch
14:00 – 14:15	**Introduction to group discussion**
14:15 – 16:00	**Synthesis on empirical work and how research integrates into development.** Working-group discussions about the innovations; how to mainstream, upscale and replicate; key messages; and policy implications.
16:00 – 17:00	**Panel presentation from the group discussions and wrap up:** facilitated by Dr Beria Leimona
17:00 – 17:15	**Closing remarks:** Prof Dr Ingrid Öborn

Smart Tree-Invest Highlights

- Smart Tree-Invest is an action-research project in Southeast Asia, implemented by the World Agroforestry Centre (ICRAF) Southeast Asia in **Vietnam (Ha Thinh and Quang Binh Provinces), Philippines (Lantapan Municipality in Bukidnon Province), and Indonesia (Buol District, Central Sulawesi Province),** from 2014 to March 2017.
- It was the first project to pilot the development of **Co-investment in Ecosystem Services (CIS)** schemes, a modification of the widely-known concept of **Payment for Ecosystem Services (PES),** designed to maintain the ecosystem services at the project's sites through agroforestry in collaboration with farmers and the public and private sectors.
- More than 600 farmers from three countries were directly involved in the co-investment activities. The project activities have been replicated, adopted and up-scaled by the local governments, private sector and farmers through their own funding and resources.
- The project initiated collaboration with the private sector to maintain and improve the ecosystem services at the project sites, such as with an oil-palm plantation company (Indonesia), banana and pineapple plantation company (Philippines), hydropower company (Vietnam and the Philippines), and seedling company (Vietnam).
- To ensure the sustainability of the activities, the project facilitated the establishment of multi-sectoral coordination institutions at the sites, such as watershed working groups in Buol and Quang Binh and a PES working group in Lantapan. These coordination bodies continue to support and endorse post-project activities at the sites.
- The project provided best practices in support of the implementation of policy.
    - **Indonesia:** Law 6/2014 on Village Fund; Law 32/2009 on PES policy; and Government Regulation 37/2012 on Watershed Management.
    - **Philippines:** Climate Change Act 2009; NIPAS Act 1992; and National Administrative Order on Payment for Ecosystem Services (under review).
    - **Vietnam:** MARD Decision 819/ 2016 on action plan for response to climate change in agriculture and rural development 2016–2020; MARD Decision 923/ 2017 on action plan for green agriculture growth 2020; and Program 135 on New Rural Development Program and Local Agricultural Restructuring Program.

Project background

The Smart Tree-Invest was an action-research project implemented by the World Agroforestry Centre (ICRAF) Southeast Asia Regional Program with support from the International Fund for Agricultural Development (IFAD) and the CGIAR Research Program on Forests, Trees and Agroforestry (FTA). The project was carried out for three years in Indonesia, Vietnam and the Philippines.

The project aimed to improve the livelihoods and resilience of smallholding farmers by reducing their vulnerability to climate change. To do so, the project facilitated and promoted the development of ecosystem services' co-investment schemes that involved smallholders and other development actors, such as local governments and the private sector, in maintaining and improving the ecosystem services in their areas.

Since 2002, ICRAF has coordinated efforts in Asia and Africa to test and develop payment for ecosystem services' schemes that provided incentives to smallholders to provide ecosystem services (ES) through their farming practices. The lessons from the field show that smallholders' involvement in providing ES—which simultaneously reduces their vulnerability by increasing their access to sources of livelihoods' capital and increases co-benefits from the ES provision— are potentially promising for achieving the dual goals of poverty alleviation and conservation.

Based on those lessons, many form of payment for ES can be seen as **co-investment mechanisms** between smallholders, as the ecosystem services' providers, and external stakeholders from the public and private sectors as the ecosystem services' beneficiaries. The schemes are shown to reduce vulnerability to climate change and provide an efficient and fair way of investing private and public rural development funds. Co-investment by communities, governments and businesses builds trust and shared responsibility for accomplishing the dual goals of improving livelihoods and maintaining ecosystem services.

Abstract and session explanation
Introduction

- **Welcoming remarks from**

  Dr Ingrid Öborn, ICRAF Southeast Asia Regional Coordinator

  Dr Öborn provided short welcoming remarks to all participants from Indonesia, the Philippines, and Vietnam. She extended the warm welcome to ICRAF's partners from the other national and international development agencies for their participation in the workshop.

- **Keynote Speech,** *Dr Medrilzam, Director of Directorate of Environment, Ministry of National Development Planning (Kementerian Perencanaan Pembangunan Nasional/ Badan Perencanaan Pembangunan Nasional (BAPPENAS))*

  In his keynote speech, Dr Medrilzam mentioned that climate change is one of the biggest challenges to achieving the sustainable development goals in Indonesia. Further, he elaborated how climate change has forced smallholders in Indonesia to further degrade the environment, such as by occupying and cultivating forests in order to improve their livelihoods. However, many options, such as agroforestry, can be mainstreamed and replicated to improve smallholders' resilience while also maintaining environmental quality and reducing the impact of climate change on smallholders. He stated that the economic needs of smallholders should be addressed while also involving them in conservation efforts. The Government of Indonesia is encouraging green-growth plans at local levels to pursue sustainable development.

- **Capacity strengthening approach for vulnerability assessment**

  Dr Sonya Dewi, ICRAF Indonesia Country Coordinator *(see page 7-15)*

  Dr Dewi presented the conceptual basis of the Capacity Strengthening Approach for Vulnerability Assessments (CaSAVA), a research framework that was applied in the Smart Tree-Invest project. It comprises comprehensive socio-economic and biophysical assessments. Further, she explained how CaSAVA also aimed to help local people to reflect on their vulnerability and help them identify local solutions to improve their resilience. One of the features of CaSAVA is to identify alternative options based on the context of the problem ('options by context').

- **Climate-smart, Tree-based, Co-investment in Adaptation and Mitigation in Asia (Smart Tree-Invest): project introduction**

  Dr Beria Leimona, Smart Tree-Invest regional coordinator *(see page 16-21)*

  Dr Leimona provided the conceptual background and achievements of the project: how payment for ecosystem services (PES) transformed into co-investment schemes based on the lessons learned from RUPES, an earlier project also funded by IFAD; how smallholders' vulnerability is related to climate change; how smallholders can be involved in the provision of ecosystem services; and that smallholders' resilience can potentially be improved by involvement in tree-based co-investment in ecosystem services. Dr Leimona elaborated how Smart Tree-Invest translated different typologies of agroforestry into the co-investment schemes in three countries. She also presented the numbers of the project's activities and achievements.

Co-investment in the three countries

- **Preparing the ground for co-investment schemes in Buol District, Indonesia**

  Dr Betha Lusiana, Smart Tree-Invest Indonesia Coordinator (see page 22-27)

  In this presentation, Dr Lusiana presented the process of developing the enabling environment for co-investment schemes in Buol District, Indonesia. She first reflected on the identified conditions that indicated that at the time that Smart Tree-Invest began work in Buol stakeholders were not ready to support operationalized co-investment schemes. Therefore, the project team in Buol conducted several pilot models and capacity-building sessions with local stakeholders to prepare them to conduct co-investment in ecosystem services schemes in the district. By the end of the project, a local watershed working group—a multi-stakeholder forum consisting of local government officers from various sectors—decided to replicate the three pilot schemes, namely, tree-farming learning groups, participatory watershed monitoring, and tree-growth monitoring, using the district development fund.

- **Co-investment for watershed management: case study of Manupali Watershed, Philippines**

  Kharmina Anit, Smart Tree-Invest Philippines Research & Project Officer (see page 28-35)

  Ms Anit described the steps taken by the team in endorsing the co-investment scheme in Manupali Watershed, Lantapan, Philippines. The main goals of the scheme in Manupali were to increase the buffering capacity of the watershed while also improving smallholders' resilience through agroforestry. The project revitalized the inactive PES working group in Lantapan, involving the local government, such as MINDA and DENRO, and a hydropower company that represented the private sector. A local NGO, KIN, was engaged as a co-investment intermediary in collaboration with ALSA, a farmers' group that acted as the environmental-service providers. Her presentation also elaborated the achievement of project in supporting a resolution by the Mayor of Lantapan in adopting a co-investment scheme through climate-smart, tree-based agriculture.

- **Summary and achievements of Smart Tree-Invest in Vietnam**

  Dr Delia Catacutan, Smart Tree-Invest Vietnam project and Country coordinator (see page 36-43)

  Dr Catacutan presented the process of developing co-investment schemes in Ha Thinh and Quang Binh provinces, Vietnam. She explained the vulnerability of smallholders in both provinces owing to exposure to extreme climate events, then the identification of potential tree-based agriculture to buffer and filter impacts, and the gaps in smallholders' knowledge to be filled to reduce the impact of extremes. She explained two main co-investment schemes that were developed to improve smallholders' resilience and environmental conditions at the sites, namely, homegardens and forest plantations on sloping land. These schemes have been adopted and expanded by local stakeholders, such as the provincial government, a tree-nursery company, and IFAD's Sustainable Rural Development program in Ha Thinh. The provincial stakeholders at the two sites saw tree-based agricultural schemes introduced by the project as appropriate practical applications of their climate-smart agricultural policy.

Action-research highlights from the three countries

- **Research highlights in Indonesia: collaborative watersheds for better watershed functions**

Lisa Tanika, Smart Tree-Invest Indonesia Research and Project Officer (see page 44-49)

Ms Tanika presented one of the pilot models for collaborative watershed management, which involved the community and local government in Buol District, Indonesia. Collaborative management was identified as a potential co-investment scheme, in which the district government could collaborate with local communities in planning development and monitoring watersheds. Her presentation elaborated the experience of raise both local government and community awareness and capacities to sustainably manage a watershed, such as through training and a role-play watershed game. Further, she explained that the project had demonstrated that participatory watershed monitoring as a method could achieve the dual goals of data collection and awareness raising.

- **Research highlights in the Philippines**

Regine Evangelista, Smart Tree-Invest Philippines Research Officer (see page 50-59)

Ms Evangelista explained the results of the vulnerability and rapid hydrological assessments (RHA) that were used as a basis to develop the co-investment schemes in Manupali. The scenarios from RHA showed the potential of agroforestry to maintain subsurface water flows. The current monocultural agricultural practices showed more vulnerability to climate impact but also good potential for mainstreaming tree-based agriculture to reduce smallholders' vulnerability. In to these results, the project conducted several initiatives, such as agroforestry training and facilitating smallholders' business planning to improve ecosystem services and their livelihoods.

- **Research highlights in Vietnam**

Dr Rachmat Mulia, Smart Tree-Invest Vietnam Ecological Modeller (see page 60-69)

Dr Mulia shared how the project identified the potential and constraints to planting trees in Vietnam, which included limited knowledge of tree-planting and strict zoning regulations that left only forests and homegardens as potential areas in which to plant trees. Together with local communities, the project team designed optimal tree-based homegardens and sloping-land plantations. The designs included the preferred trees of the smallholders. The team also conducted ecological modelling simulations to estimate the impact of homegarden and sloping-land replanting on the watersheds and carbon conditions. The team also carried out profitability analyses of both schemes, to encourage more adoption of tree-based agriculture in homegardens and on sloping land.

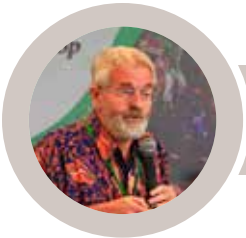
TALK SHOW: National and sub-national development agenda on smallholders' resilience and ecosystem services

moderated by Dr Beria Leimona

This session invited Anissa Pratiwi and Jerry Pacturan, representing IFAD Indonesia and the Philippines respectively, Amiruddin Rauf, the *Bupati* (head) of Buol District in Indonesia, Nguyen Bha Tinh, the deputy director of the Department of Agriculture and Rural Development (DARD) of Ha Thinh Province, and Nguyen Tri Phuong from the DARD of Tuyen Hoa district -Quang Binh Province, and Easterluna, the director of KIN, the NGO partner in the Philippines, as resource persons.

Dr Leimona asked the resource persons what were the lessons gained from the project for local stakeholders, and what was the policy relevance of the project's activities from the IFAD country perspectives. Mr Rauf from Indonesia stated that the project had helped the district government and other local stakeholders to collaborate more in watershed and climate-smart agriculture initiatives. Mr Nguyen Bha Tinh and Mr Nguyen Tri Phuong from Vietnam conveyed their appreciation of the project in introducing agroforestry for smallholders, which they saw as a practical application of a new policy on climate-smart agriculture in their provinces. Easterluna from KIN, a local project partner in Lantapan, mentioned that the project brought a new idea of collaboration between the local actors, as they became more empowered through active contribution and involvement in the scheme.

Ms Pratiwi from IFAD Indonesia mentioned how the Smart Tree-Invest delivered solid examples on how to link the new national Village Fund policy with smallholders' empowerment and environmental conservation. She also described the relevance of project activities with the COSOP of Indonesia, particularly on improving smallholders' resilience. Jerry Pacturan from IFAD Philippines stated that the project lessons learned and tools can be potentially adopted by INREMP, the IFAD existing investment project, and the forthcoming IFAD's RAPID project in the Philippines.



SYNTHESIS
Prof Meine van Noordwijk, ICRAF Chief Science Advisor

(see page 70-74)

This session provided some food for thoughts on how we may reflect to see one object from different perspective, and we will end up with different results. Prof van Noordwijk reflected on the different characteristics of three country sites, how the similar start in each site through the application of CaSAVA framework ended up with different co-investment schemes. Clarification of the issues, weighting the trade-off between options and considering the context are threefolds of action required in order to achieve development goals.

Table 1. Excerpts of group discussions by country

	Indonesia	Vietnam	The Philippines
Discussion Participants	1. Amiruddin Rauf (*Bupati*/Head of Buol) 2. Ibrahim Rasyid (Chief of District Development Planning Agency, Buol) 3. Supangat (Chief of Public Works, Buol) 4. Deni Ali Machmud (Watershed Working Group, Buol) 5. M Qasim (Watershed Working Group, Buol) 6. Lani Irawati (Watershed Working Group, Buol) 7. Tonang (Chief of Tourism Buol) 8. Betha Lusiana (Smart Tree-Invest Indonesia) 9. Lisa Tanika (Smart Tree-Invest Indonesia) 10. NP Rahadian (Smart Tree-Invest Indonesia) 11. Budi Wijayati (World Bank)	1. Nguyen Bha Thinh (Deputy director of DARD Ha Thinh) 2. Nguyen Tri Phuong (Chief of DARD Tuyen Hoa District, Quang Binh) 3. Cao Xuan Tin (Chairman of district people's committee of Tuyen Hoa, Quang Binh) 4. Delia Catacutan (Smart Tree-Invest Vietnam) 5. Rachmat Mulia (Smart Tree-Invest Vietnam) 6. Pham Thanh Van (Smart Tree-Invest Vietnam) 7. Ha My Tran (Smart Tree-Invest Vietnam)	1. Jerry Pacturan (IFAD Philippines) 2. Easterluna (KIN) 3. Regine Evangelista (Smart Tree-Invest Philippines) 4. Kharmina Anit (Smart Tree-Invest Philippines) 5. Amy Cruz (Smart Tree-Invest Philippines) 6. Hannah XXX (CGIAR Research Program on Forests, Trees and Agroforestry) 7. Eviyanti (the conservation.com) 8. Sacha Amaruzaman (Smart Tree-Invest regional)
Innovations (approach, methods) generated by the project activities	○ Simple, applicable and replicable technologies e.g. measuring sediment and rainfall ○ Community-driven nurseries, farmers' learning groups: from locally obtained seeds ○ Watershed game for raising awareness on the impact of human activities on watershed functions ○ Collaborative Working Group on Watershed Management (POKJA DAS Bumi Pogogul) at district level involving all district agencies	• Use of research findings in the development of co-investment schemes • Raised awareness of climate change through different approaches • Research in the development of agroforestry—i.e. combining trees and crops on the same land, particularly, sloping land—producing new concepts and techniques for the communes • Compilation and use of both local and scientific knowledge • Advisory groups that involved partners from different sectors at commune and provincial levels • Documentation through PhotoVoice	• Involving the private sector through public-private partnerships • PhotoVoice as a research tool and for engaging farmers and organizing communities • The term 'co-investment' was new and brought more flexibility for people who wanted to engage

	Indonesia	Vietnam	The Philippines
Best practices and lessons learned from Smart Tree-Invest's activities	Smart Tree-Invest's activities: • contributed to environmental and economic benefits • encouraged the enactment of better environmental regulations • simple technology to monitor watershed functions • induced planning based on needs at village level • proved that women could participate in environmental program • demonstrated that sustainable agricultural practices result in healthier and more productive landscapes • increased knowledge and skills in participatory watershed and tree management • increased knowledge of ecosystem services and payment for ecosystem services and co-investment	Smart Tree-Invest's activities: • considered economic, social, environmental and gender aspects in research and actions • demonstrated that agroforestry on sloping land can integrate multiple objectives, both for livelihoods and the environment • developed improved agricultural options based on local needs and preferences • provided initial investment for developing the improved models, which, after the stakeholders saw the benefits were adopted • allocated tasks to specific government agencies to support farmers with some technical issues	Smart Tree-Invest's activities: • embraced a landscape approach • brought together multiple stakeholders • built the capacity of farmers to communicate with investors and policy makers: taking their stories outside their homes • recognised the need for champions in the private sector to raise awareness, beyond CSR • identified the need to communicate PES and co-investment to a wide range of sectors • revealed unexpected champions e.g. church leaders' participation in the watershed management councils gave them a 'moral compass'
Post-project replication/ sustainability strategy	• Watershed Working Group is in charge of replication of the activities • Replication is being funded through the district's development fund in 2017 in Mulat Lantika-Digo Watershed • Technical guidelines for activity replication from the project team have been published and distributed • The upcoming Peraturan Bupati (District Head's Regulation) on Village Fund in 2017 will obligate 1% of the Village fund to be used for conservation • The upcoming District Regulation on CSR will obligate the private sector to co-invest in environmental/conservation activities • The District Head plans to enact a regulation on integrated watershed management • Engagement of the private sector (palm-oil and other companies) and villages (through Village Fund) in the co-investment schemes	District governments: Integrated the homegarden scheme into policy through DARD's • Decision No. 71/QD-HDND: Expansion of the Coverage of Homegardens policy in Huong Khe District of Ha Thinh • Decision No. 735/QD-UBND on Funding Support for Pilot Models of Homegardens in Quang Binh Provincial governments: The provinces of Ha Thinh and Quang Binh integrated the homegarden and sloping-land replanting activities into their strategies to implement national policy: • Decision No. 819/QD-BNN-KHCN: Program 135 and New Rural development Program, Local Agricultural Restructuring Program • Decision No. 923/MARD/2017 on Green Agricultural Development IFAD's SRDP in Ha Thinh adopted the homegarden method in its climate-smart agricultural activities. At the time of writing, Smart Tree-Invest is providing continuing technical assistance to SRDP in reviewing smallholders' proposals to the homegarden scheme. Further collaboration post-Smart Tree-invest is being negotiated.	KIN will be the fund manager for the upcoming co-investment scheme with farmers from ALSA farmers' group. KIN will be supported by the PES Working Group, who will verify the performance of co-investments twice a year. Several replication strategies are in place: • Business plans by smallholders on ES and livelihoods • Policy forums to follow –up on opportunities • Upscaling to other provinces: showing the good example of Bukidnon to other local governments • Expediting the message of co-investment through diverse channels, such as social media, artists, religious groups • Institutionalization of the PES and co-investment approach in government activities has occurred through a Local Resolution in Lantapan

Table 2. List of participants

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10	Lely Yuliawati	Chief of Buol District House of Representative	
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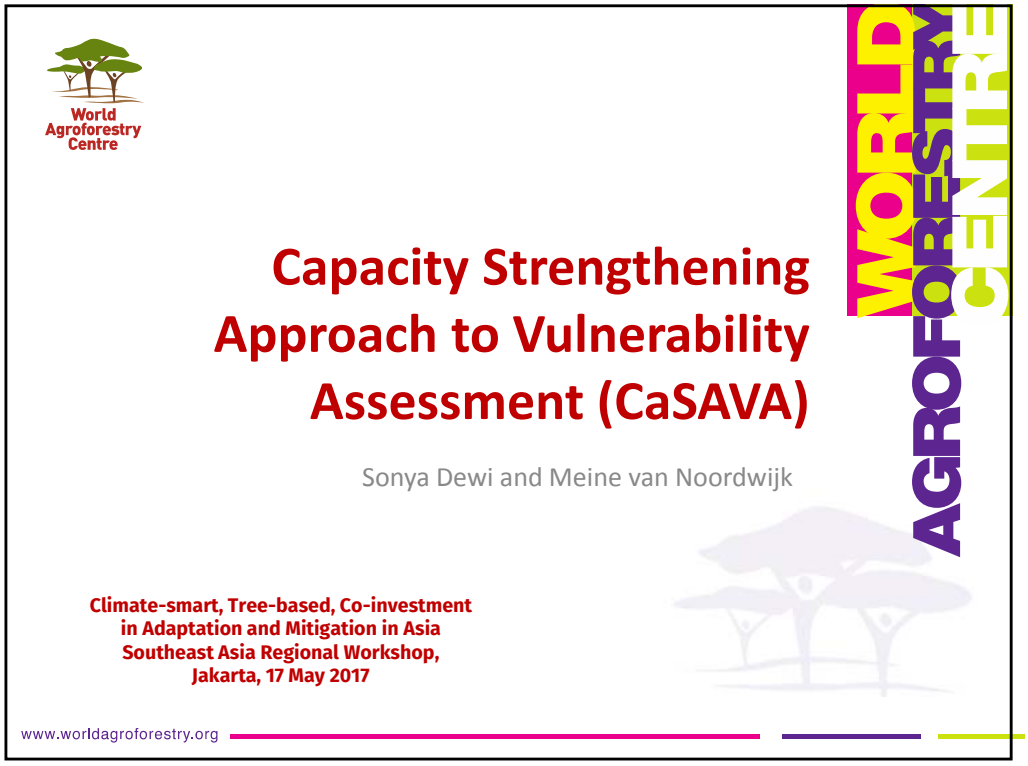
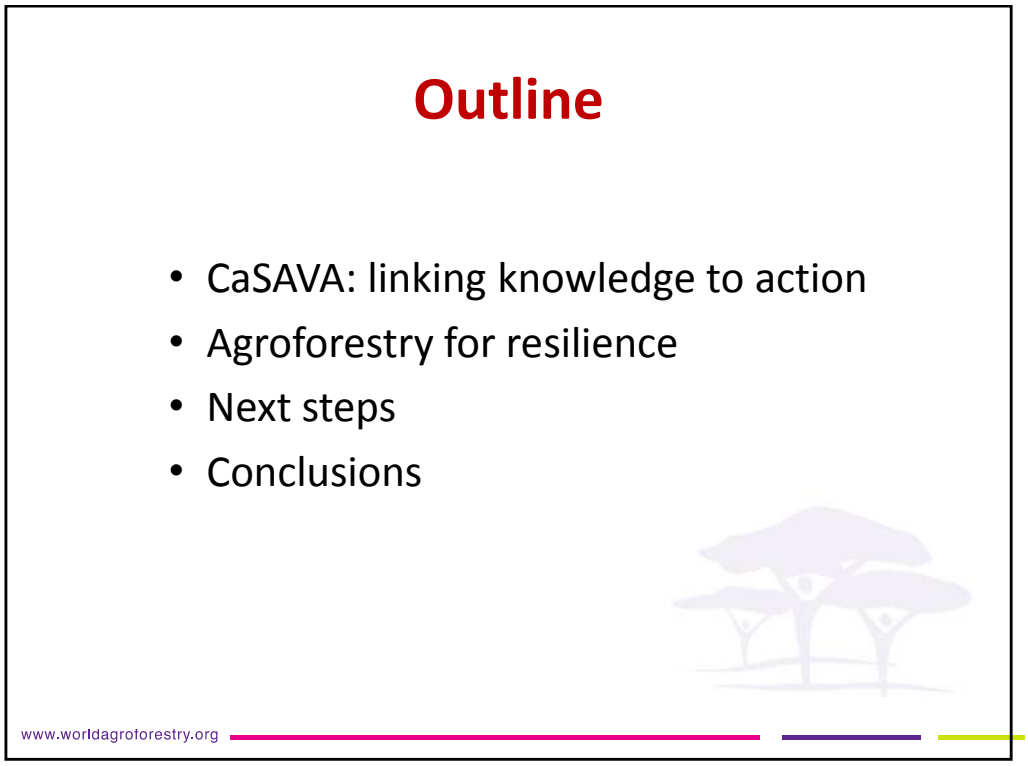
Capacity Strengthening Approach to Vulnerability Assessment (CaSAVA)

By Dr Sonya Dewi and Prof Meine van Noordwijk





CaSAVA

Capacity Strengthening Approach to Vulnerability Assessment

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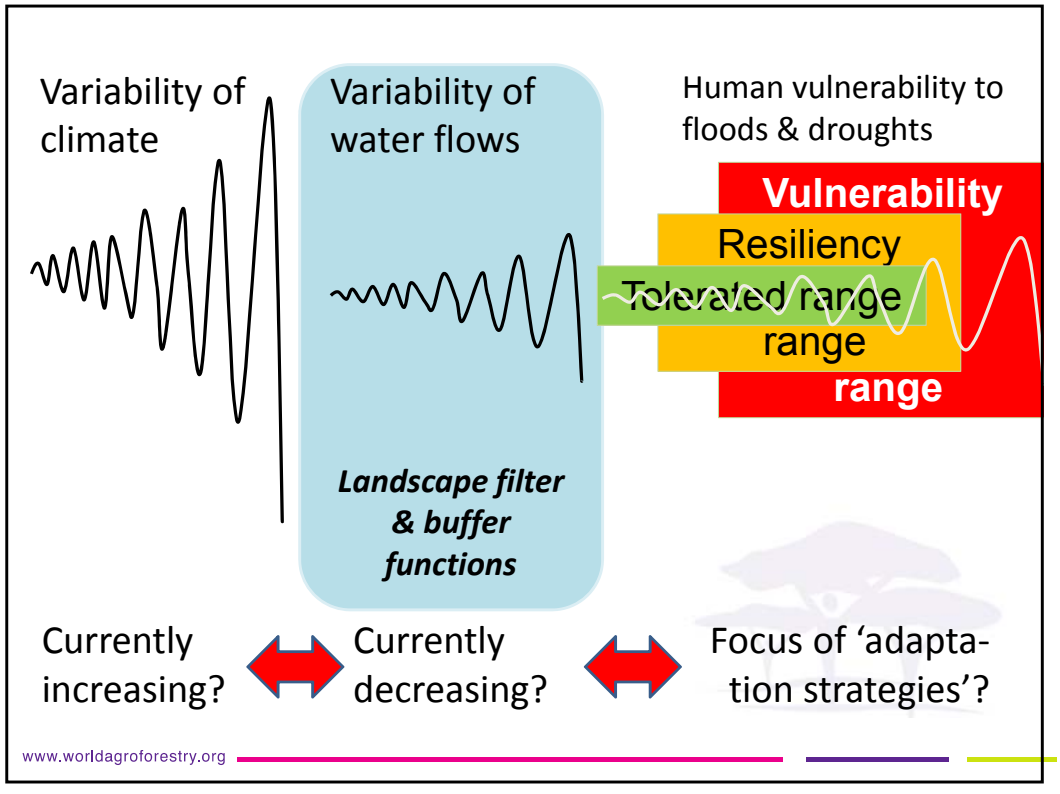

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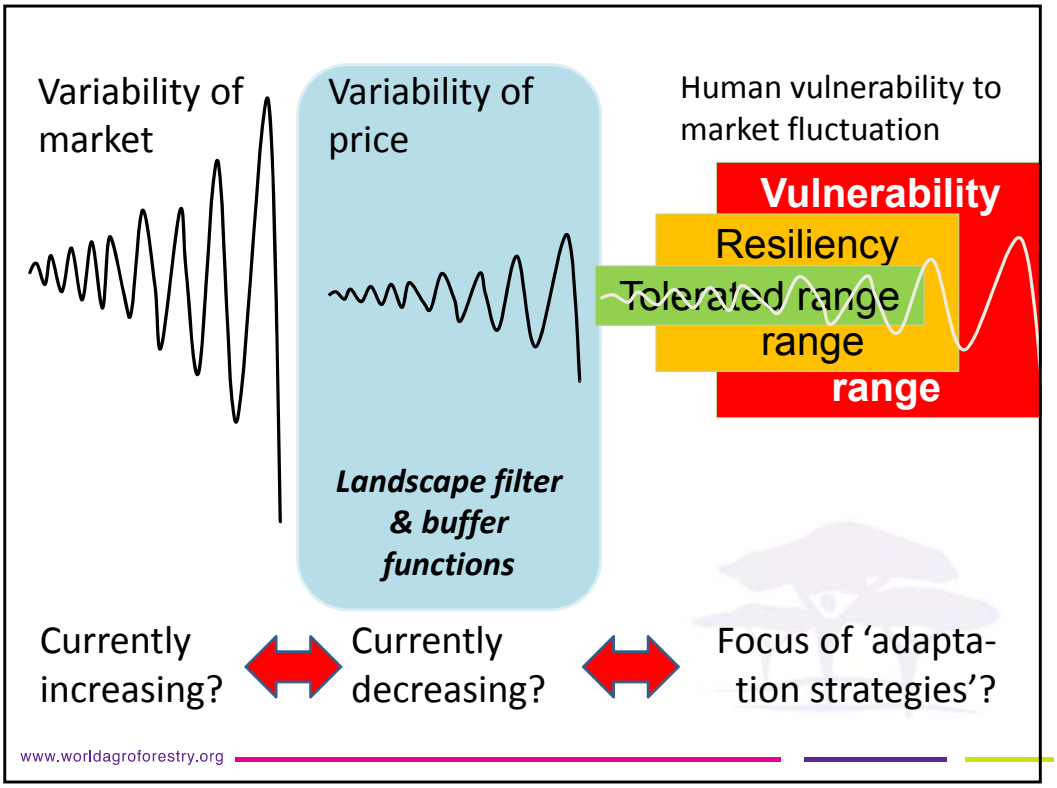


Vulnerability

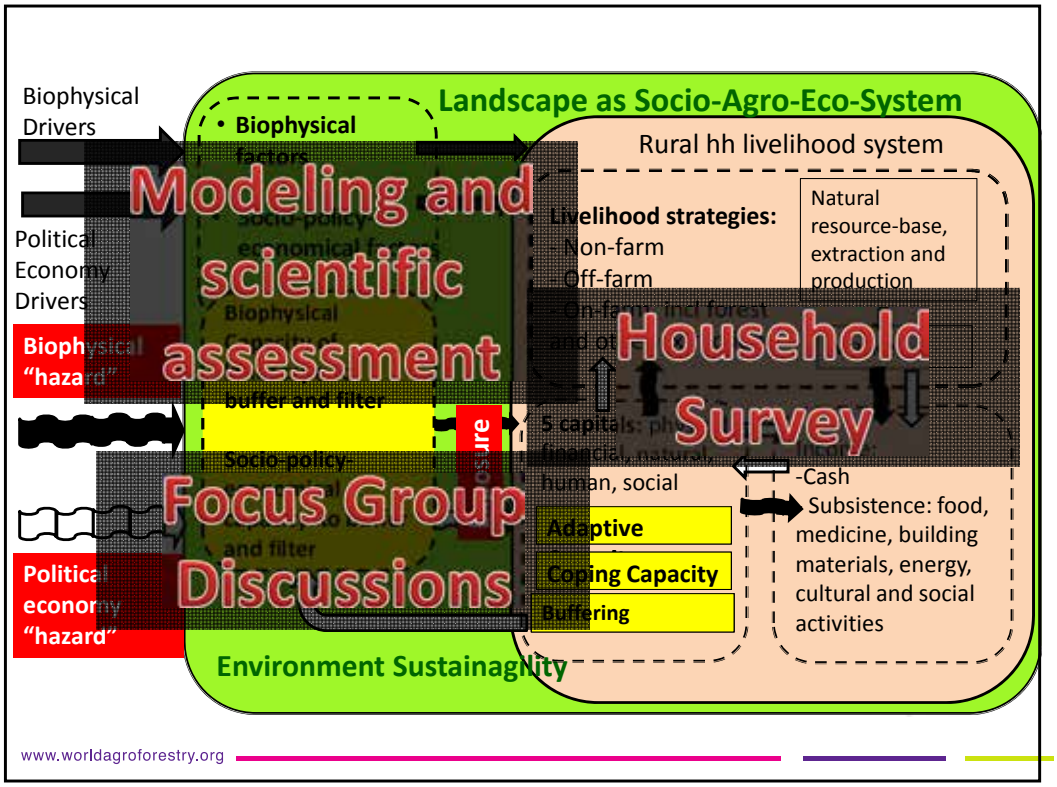
- The vulnerability caused by 'hazard' that affects the **productivity and profits** of agroecosystem practices of rural people, and therefore **livelihoods**;
- Vulnerability often stems from the lack of capacity in **buffering and filtering** at the landscape and broader societal level, and **coping and adaptive capacity** at the household level.

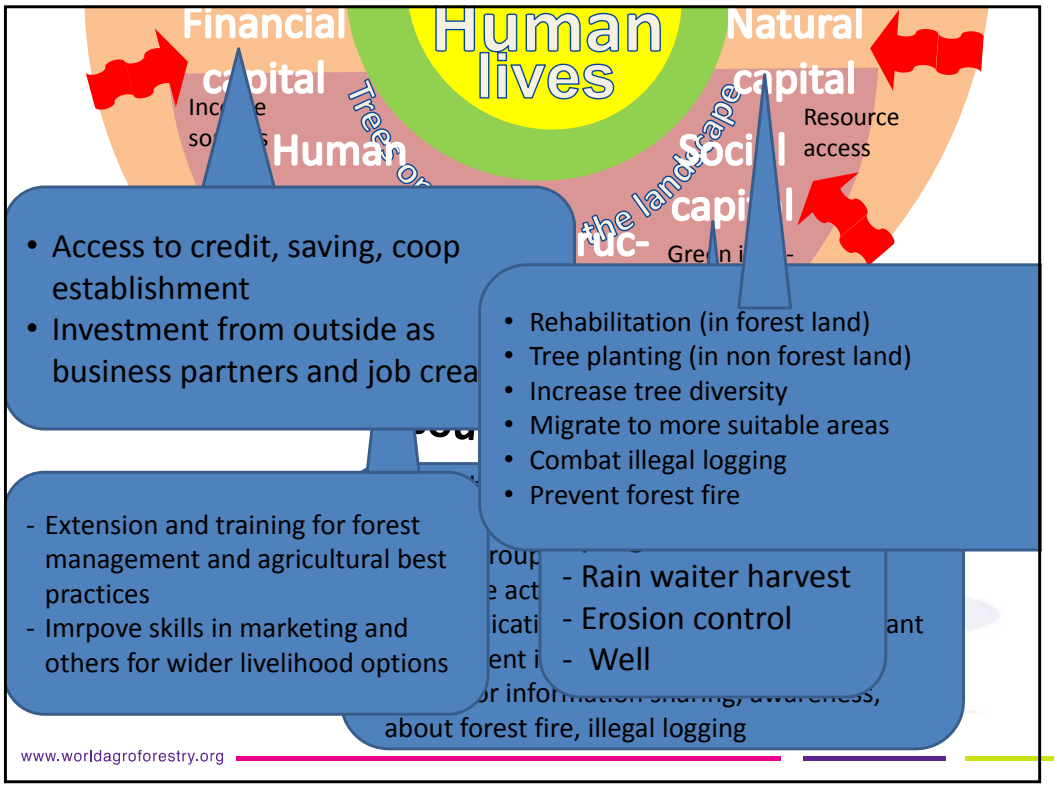
Scope of CaSAVA

- A landscape of agro-socio-eco-system that might experience hazards from biophysical and socio-political economy factors;
- Hazard factors: trends, shocks and seasonality.
  - Trends include: demographic changes, resources (including conflict), regional/national/international economic trend, trends in governance (including politics), technological trends;
  - Shocks encompass: human health, natural, economic, conflict, crop/livestock health;
  - Fluctuations/seasonalities accounted are those of process, of productivity, of health and of employment opportunities.

CaSAVA Objectives

- assess landscape, societal and human capacities to adapt to environment, socio-political-economy changes in participatory manner;
- understand the multiple-scale causalities and decision making process in agro-socio-ecological landscapes;
- promote the local knowledge to adapt and reduce vulnerability;
- strengthen capacity of local people to develop strategies and take actions in managing their landscape sustainably


Biophysical Drivers
Political Economy Drivers
Biophysical "hazard"
Political economy "hazard"
Landscape as Socio-Agro-Eco-System
Biophysical factors
Modeling and scientific assessment
Focus Group Discussions
Rural hh livelihood system
Livelihood strategies:
Non-farm
Off-farm
Natural resource-base, extraction and production
Household Survey
-Cash
Subsistence: food, medicine, building materials, energy, cultural and social activities
Adaptive
Coping Capacity
Buffering
Environment Sustainagnity
www.worldagroforestry.org


Financial capital
Human lives
Natural capital
Resource access
Tree
the landscape
Access to credit, saving, coop establishment
Investment from outside as business partners and job crea
Rehabilitation (in forest land)
Tree planting (in non forest land)
Increase tree diversity
Migrate to more suitable areas
Combat illegal logging
Prevent forest fire
Extension and training for forest management and agricultural best practices
Imrpove skills in marketing and others for wider livelihood options
Rain waiter harvest
Erosion control
Well
about forest fire, illegal logging
www.worldagroforestry.org

AGROFORESTRY FOR RESILIENCE

www.worldagroforestry.org

WHY Agroforestry?

Practices across Indonesia: geographically distributed and very diverse

Resilience: stabilizing vs maximizing due to portfolio effect and multiple value chains

Contribution to income: 38% - 76% of 750 hh samples across Sumatra, Kalimantan and Sulawesi

Labor flexibility and distribution along the year

Diverse benefit at plot level: food, fibre, fuel, fodder, timber, medicinal (cash and non cash)

Gender equity: participation and differentiation along management and marketing chain

Ecosystem services: C-stock, water and soil management, (agro)biodiversity

Land tenure security: tree ownerships, long term use right

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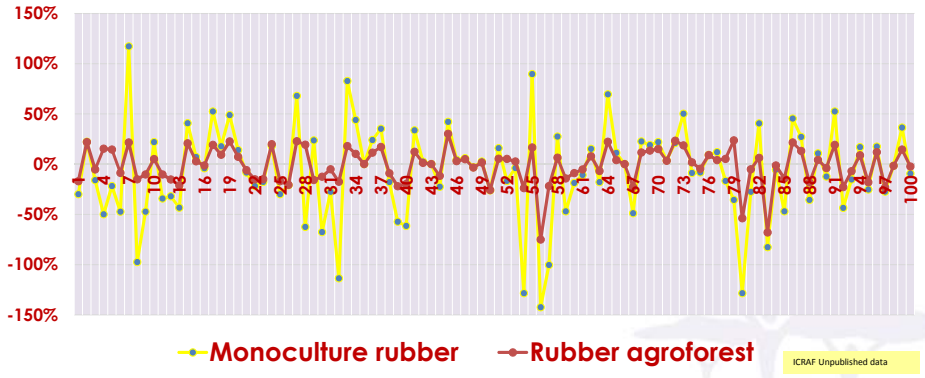
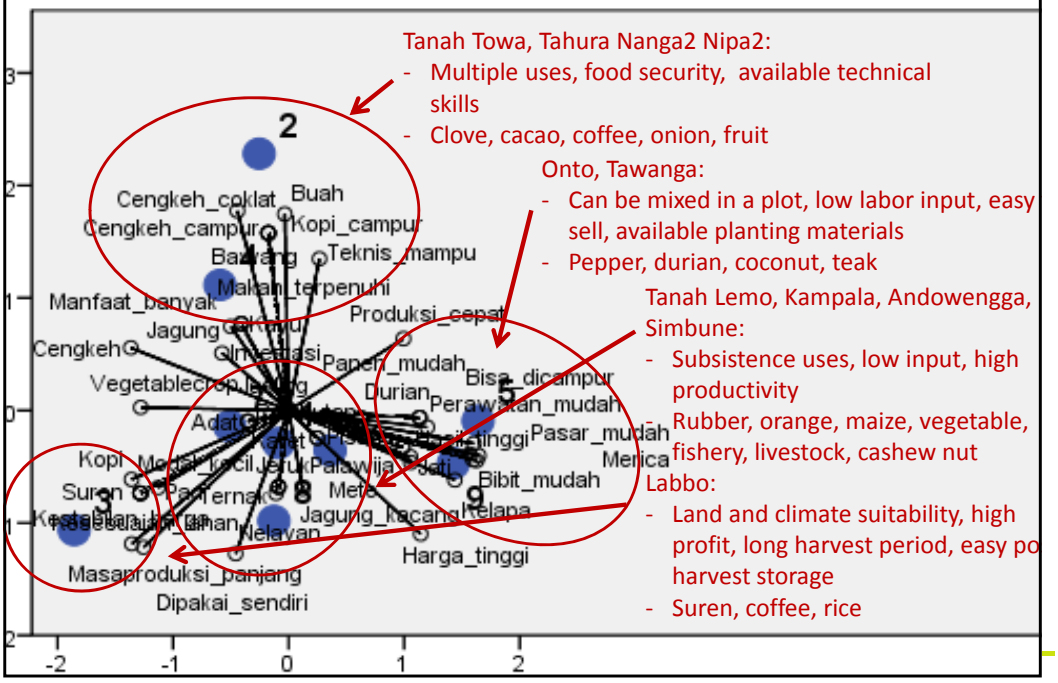
Stabilizing or maximizing?

With fluctuating price and yield:
- **Mean annual profit in Monoculture rubber is higher than that Rubber AF**
- **The lowest annual profit of Monoculture Rubber is much lower than that of Rubber agroforest**



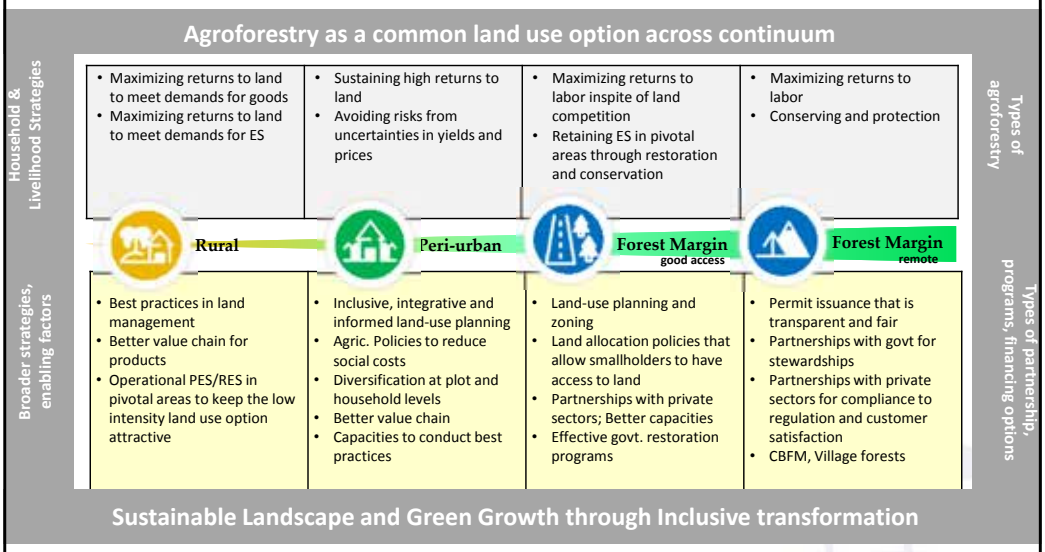
Criteria for selecting trees and land use systems



Next steps

- **Assess**
  - Scientific, LEK assessment
  - Models, field surveys, FGDs, household surveys
- **SWOT**
  - Dissemination of assessment results, discussions
  - SWOT analysis of conservation-livelihood issues
- **Map**
  - Partner identifications
  - Visioning, outcome mapping
- **Plan**
  - Conservation – livelihood specific objectives
  - Strategy development, action plan, agreement
- **Act**
  - Financing, mainstreaming, co-investment
  - Implementation
- **M&E**
  - M&E design: indicators, measurement, reporting
  - M&E process

Options by Contexts

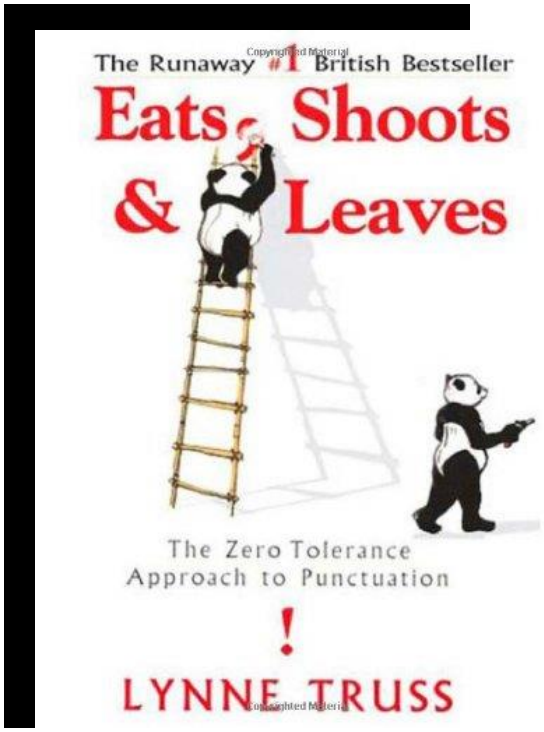


Conclusions

- CaSAVA promotes the links between of multiple-scale and multiple-domain of knowledge to action;
- Assessment is conducted in participatory manners, with awareness and capacity to identify options within the contexts are raised;
- Steps following CaSAVA have also been applied in several landscapes in Sulawesi and leading to conservation-livelihood agreements/contracts between public-private-people;
- Increased resilience is part of broader green growth and sustainable landscape;
- Tools, instruments and framework were tested in the three countries and are applicable elsewhere

Climate-Smart, Tree-Based, Co-investment in Adaptation and Mitigation in Asia)

By Dr Beria Leimona



SmarTinvest

Smart Tree-Invest

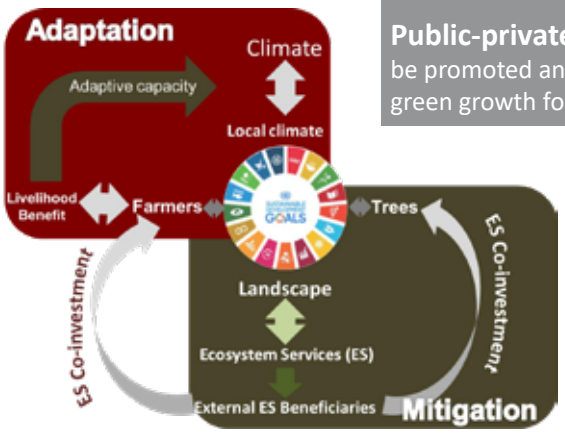
- Who is smart?
- Is tree smart?
- Can tree be smart?

Smart female and male **smallholders** who invest in a **multifunctional** agricultural, **tree-based landscape**

Smart **Tree-Invest(ment)**

Livelihoods and **resilience** of smallholder farmers through the promotion of **climate-smart, tree-based agriculture** in **Indonesia, Philippines and Vietnam**

SmarTinvest



Green approaches: applied universally? Barriers to its implementations?

Sustainable agriculture: concerted efforts to upscaling?

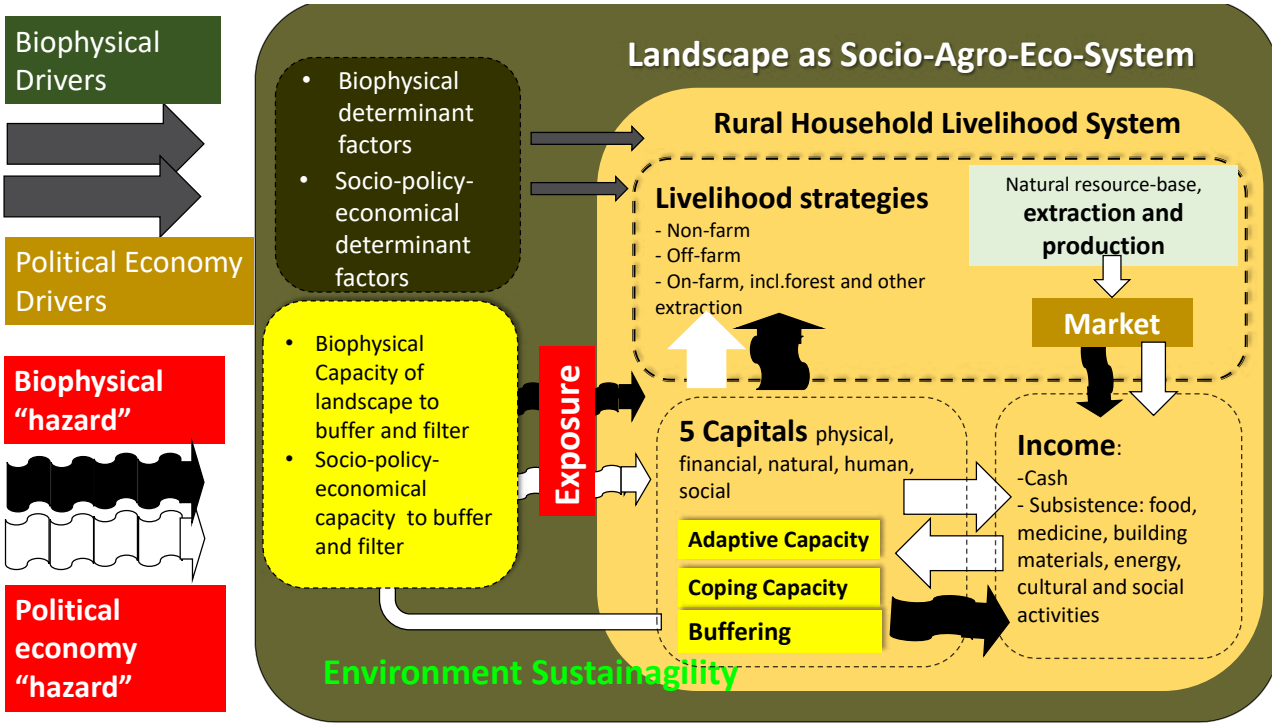
Public-private partnerships be promoted and used to drive green growth for smallholders?

RUPES

REWARDS FOR USE OF AND SHARED INVESTMENT IN PRO-POOR ENVIRONMENTAL SERVICES

- Payment for ecosystem services (PES) in the context of developing countries in Asia
- Co-investment for landscape stewardship
  - Financially and socially appropriate
  - Reflecting livelihood capital beyond financial one
  - Nature and its stewardship are invaluable

- Simple constructions and agroforestry practices to reduce sedimentation from agricultural lands
- Benefiting downstream hydropower and water users



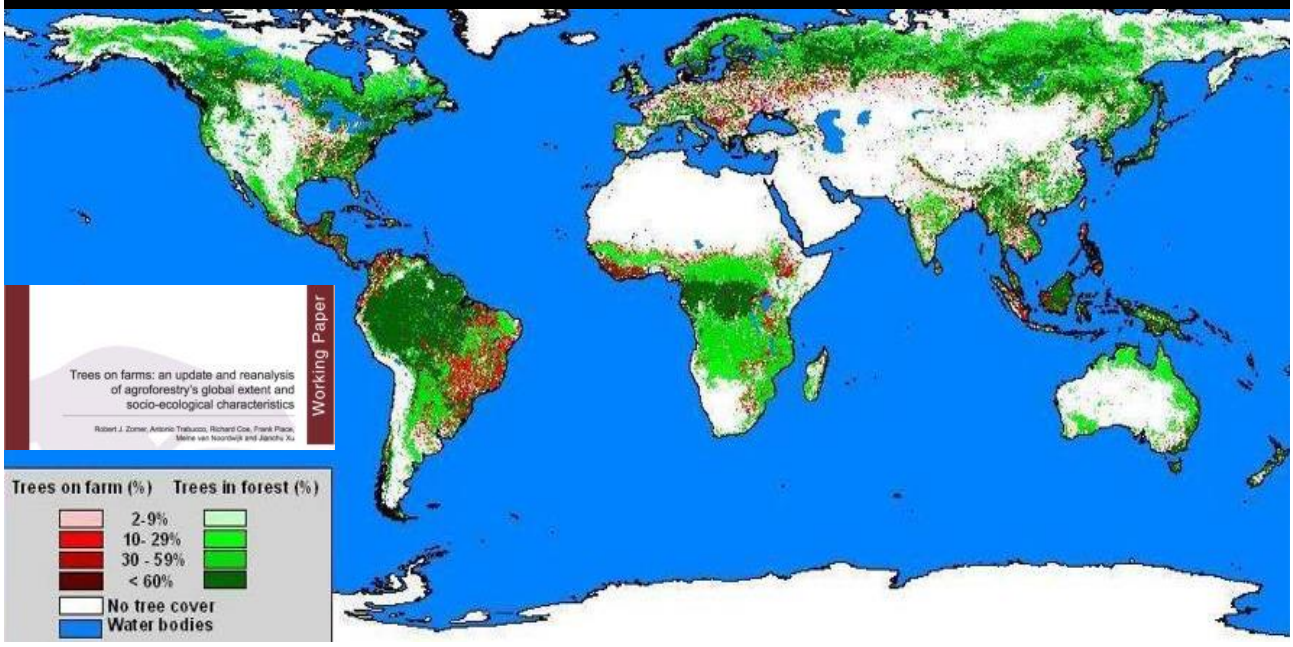
Landscape Approaches

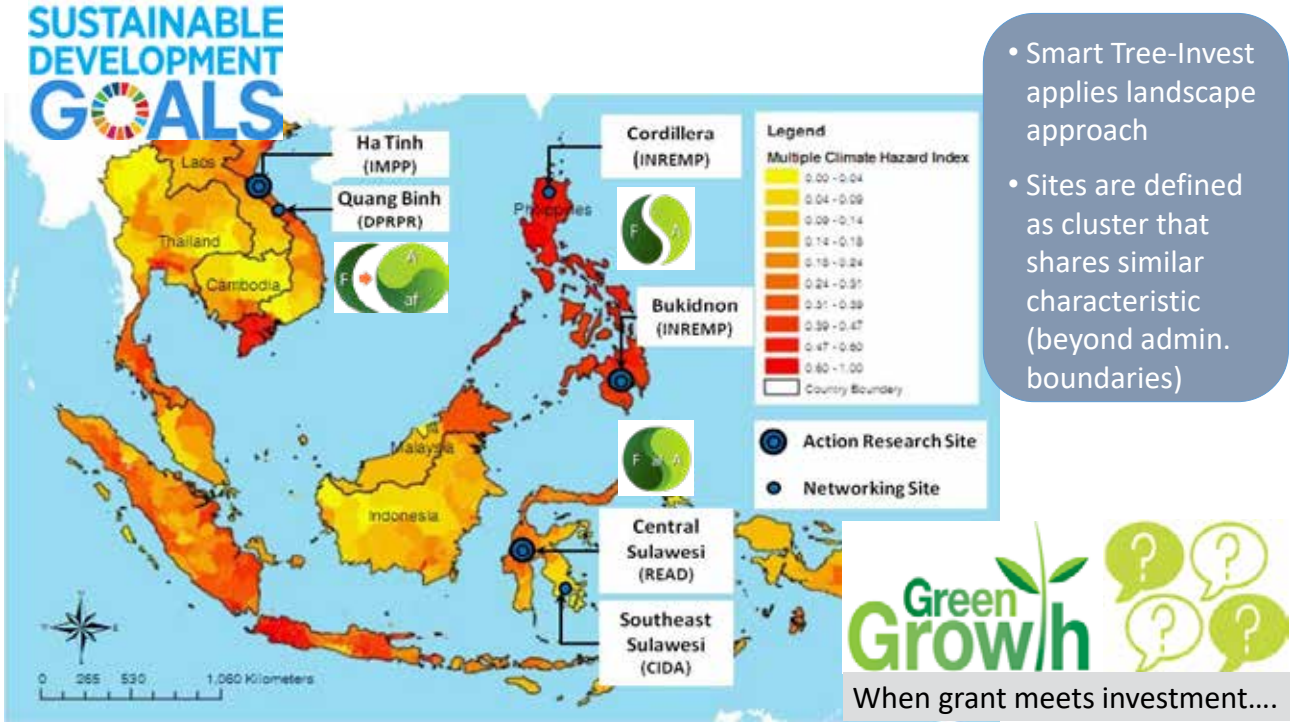
interacting theory of place and change

(van Noordwijk et al 2015)

- (Co)investment for wide-scale climate-smart landscapes firmly rooted in spatial and contextual aspects of current livelihoods
- Theory of place: livelihoods capital interacting in major similarity domains
- Generic theory of change:
  1) Process- and system- level understanding
  2) On-the-ground-action and supportive policy reform
  3) Reassessment of preferred solutions and early diagnosis of next generation

How much agroforestry is there? Where is it?





- Smart Tree-Invest applies landscape approach
- Sites are defined as cluster that shares similar characteristic (beyond admin. boundaries)

Green Growth

When grant meets investment....

> 1000 Household Survey, state of nutrition and food diversity

- Livelihood capital baseline
- Anthropometric measurement
- 24-call hour recall for mother and toddler's diet

> 130 Focus Group Discussions (>1100 participants)

- Vulnerability assessment
- Tree preferences
- Landscape visioning and farmers' perceptions
- SWOT resilience and local knowledge

(Participatory) Ground measurements:

- Spatial analysis (land cover)
- Hydrology (buffering index for watershed)
- Climatic, agro-biodiversity
- Carbon stocks

Multistakeholder trainings (communities, sub-national government officers) **and demo pilots**

Agroforestry 1

- Land management premised ecologically and economically suitable
- Specific practices combining trees, crops and/or livestock and aims for positive interactions

Tools: HH Survey, FGD, pilot activities

Activities:

- Tree nurseries
- Farmers' AF trainings
- AF home garden model

Agroforestry 1

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Agroforestry 2

- A part of integrated and multifunctional land use systems
- Landscape level interface of trees and farms, farmers and forest, tree domestication

Tools: FGD, watershed games, ES measurement and monitoring, FALLOW modeling

Activities:

- Business Case development
- Trainings on ES monitoring
- Co-investment schemes

CASAVA capacity strengthening and vulnerability assessment

Agroforestry 1

- Land management premised ecologically and economically suitable
- Specific practices combining trees, crops and/or livestock and aims for positive interactions

Tools: HH Survey, FGD, pilot activities

Activities:

- Tree nurseries
- Farmers' AF trainings
- AF home garden model

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- A part of integrated and multifunctional land use systems
- Landscape level interface of trees and farms, farmers and forest, tree domestication

Tools: FGD, watershed games, ES measurement and monitoring, FALLOW modeling

Activities:

- Business Case development
- Trainings on ES monitoring
- Co-investment schemes

CASAVA capacity strengthening and vulnerability assessment

Agroforestry 3

- Unifying concept
- Policy interface between agriculture and forestry

Tools: Outcome Mapping, Policy advocacy, Watershed forum

Policy implications:

- **Indonesia**: Village Fund, Compensation/Rewards and Payment for Ecosystem Services
- **Phil**: Sustainable financing mechanism for watershed management
- **Vietnam**: PFES, New Rural development Program, Local Agricultural Restructuring Program

Preparing the ground for co-investment scheme in Buol, Central Sulawesi, Indonesia

By Dr Betha Lusiana

Preparing the ground for co-investment scheme in Buol, Central Sulawesi, Indonesia

Smart – Tree Invest Indonesia Team

Transforming lives and landscapes with trees

Climate-smart, Tree-based, Co-investment in Adaptation and Mitigation Asia, Regional Workshop
Jakarta, 17 May 2017

The Indonesian context

- Rural poverty reduction is a national priority
- Sustainable agriculture – agriculture development that 'pay attention' to the environmental condition is the vision of development in many provinces and districts
- Increase in public expenditure for agricultural development and fund transfer to the region for strengthening community driven development

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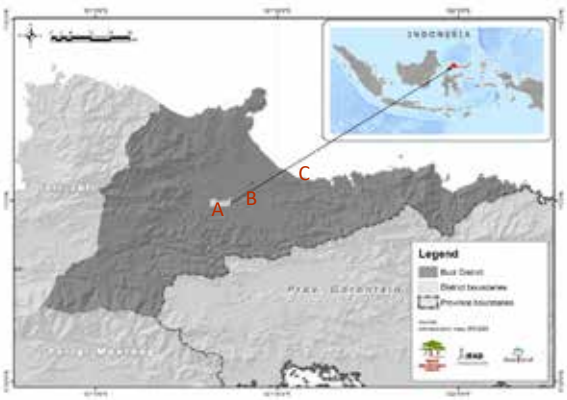
How can we align the concept of co-investment scheme for ecosystem services with rural poverty reduction and sustainable agriculture using public funding?

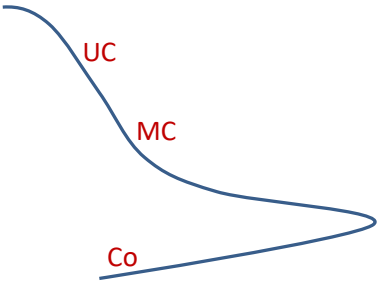
The project site



- Buol District, Central Sulawesi
- Forest frontier, forest conversion to large settlements area and oil palm plantation
- Three landscapes/clusters:
  A. Upstream catchment (UC)
  B. Mid-stream catchment (MC)
  C. Coastal (Cl)
- Absence of major private sector entities as down-stream beneficiaries

The local context: landscape profiles

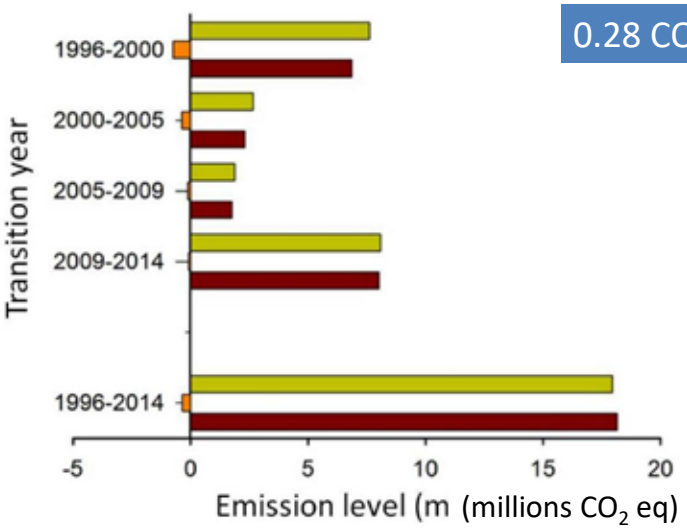
Landscape differs in the type of agricultural systems, community, livelihood options, infrastructure conditions



Land-scape	Agricultural systems	Community type	Livelihood	Infra-structure
UC	Annual crops	Migrants	Agriculture	Poor
MC	Annual crops, timber & cacao systems	Mixed	Agriculture	Moderate
Co	Tree-based	Local	Agriculture Fishing Mining	Good

The local context: ES condition

Net Carbon Emission



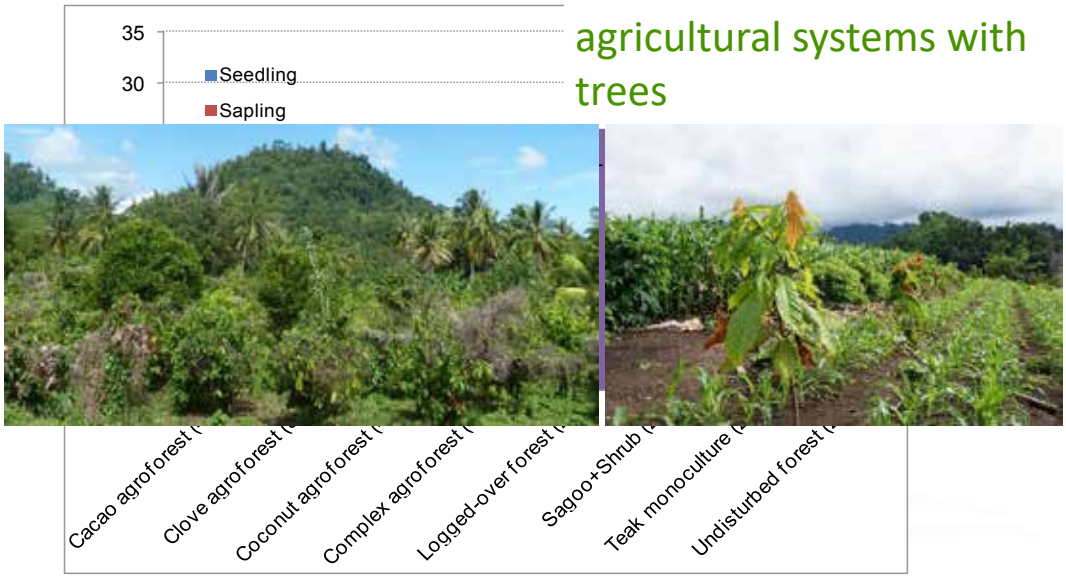
0.28 CO_2 eq. Mg $ha^{-1}year^{-1}$

Conversion of forest to oil palm plantation, large settlement, agriculture

The local context: ES condition

Agrobiodiversity

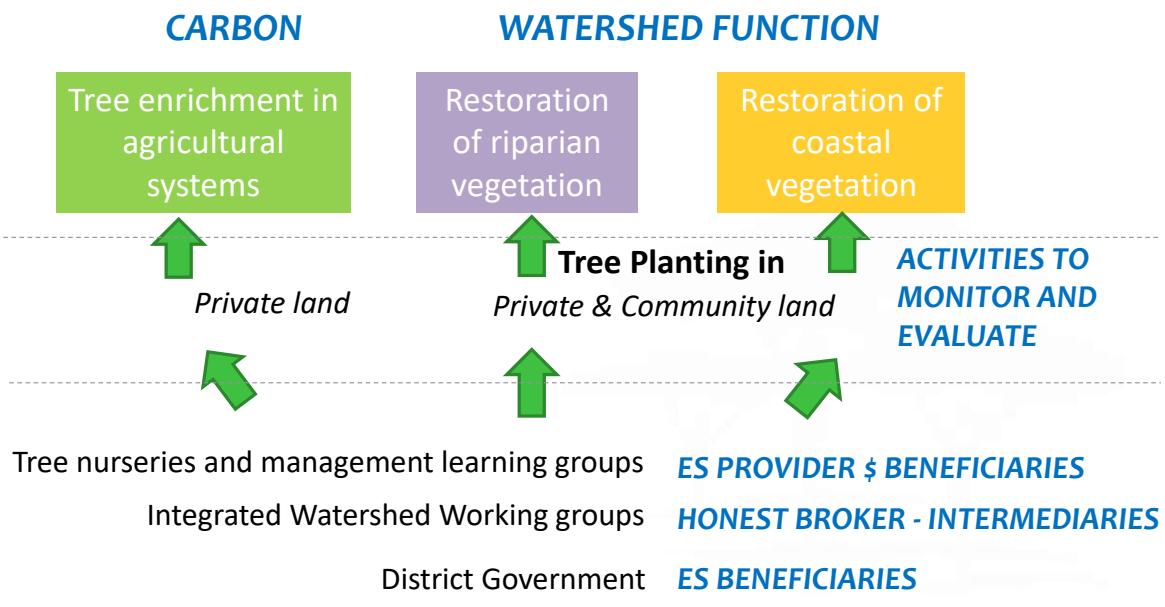
Potential to enrich the agricultural systems with trees



The local issues: Vulnerability, shocks and buffers

Shocks	*Buffer*
Floods	*Build river embankment*
Increasing food price	*Diet diversity, access to variety food choice*
Decreasing agr. products' price	*Self-distribution (reduce transportation cost)*
Scarcity of fertilizer	*Knowledge on producing non-chemical fertilizer*
Pest and disease	*Knowledge on farming management*
Coastal abrasion	-
River blank collapse	-

Potential performance-based co-investment scheme



Enhancing the enabling condition for implementing co-investment scheme

- Increase farmers capacity to manage their existing agricultural systems including tree-based systems
- Increase the capacity of both community and local government in monitoring their landscape (ES, landscape functions)
- Improve the capacity of the local government to act as intermediaries in developing a co-investment scheme, including capacity of monitoring and evaluation

- alignment of activities with district programmes
- active partnership with the government, creating opportunities for scaling up/out

National seminar on village fund

Farmers learning group

Working group on watershed management

Participatory watershed monitoring

Training of trainers – extensionist

Highlight of achievements

- Establishment of working group on Watershed Management – intermediaries of co-investment
- Establishment of farmers' learning group – potential providers of ES - 2 proposed activities to village fund
- Trained champions on watershed function monitoring – potential provider of support to district program
- Scaling out - by district offices involving private sector

Promotion of environmental stewardship

Thank you

For more info contact:
Betha Lusiana, b.lusiana@cgiar.org

The World Agroforestry Centre
ICRAF Southeast Asia programme
Jl CIFOR, Situ Gede, Bogor, Indonesia

World Agroforestry Centre

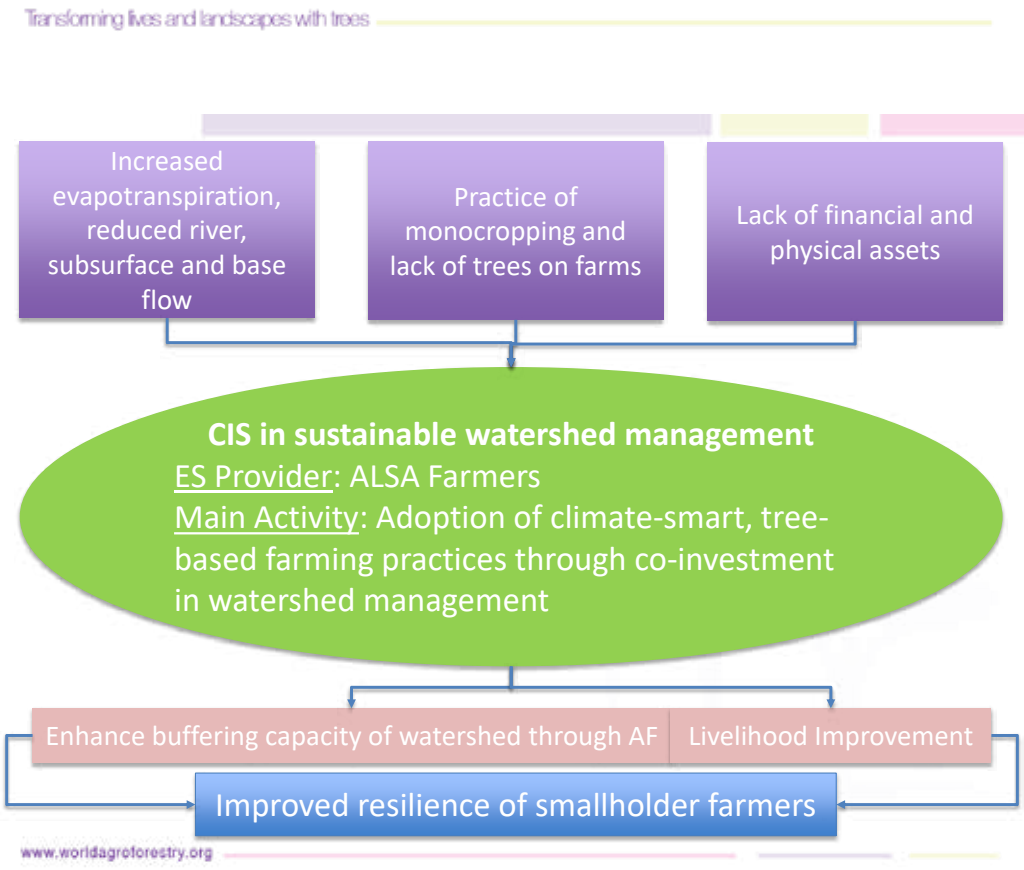
CGIAR
Science for a food-secure future

Co-investment for Watershed Management: Case of Manupali Watershed

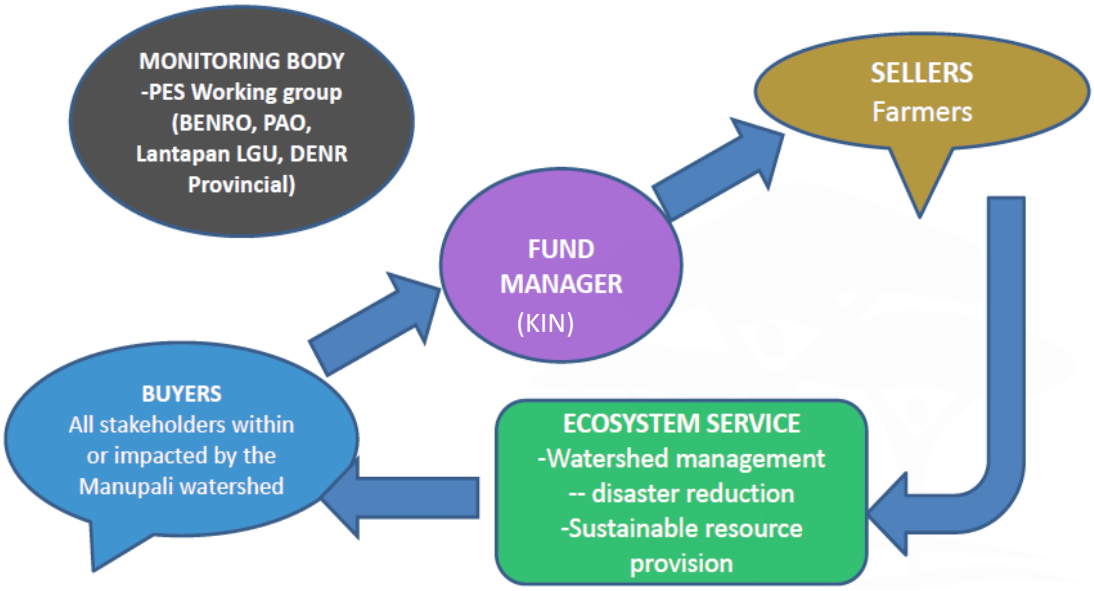
By Kharmina Anit

Co-investment for Watershed Management:

Case of Manupali Watershed



Identifying the CIS Actors



Manupali Watershed Co-Investment Framework

Establishing stakeholder support

- Revitalized PES Working Group (May 2015)
- Multi stakeholder, with individual institutional members "co-investing" their own share towards a successful PES/CIS scheme.
- Representatives from ES Players:
  - ✓ Sellers: Farmers, village leaders, IP group
  - ✓ Buyers: NPC, DOLE, MKAVI, INREMP
  - ✓ Intermediaries: Municipal and provincial LGUs, DENR, PAMB, MINDA, BSU, CMU, Civil Society

Developing the business case

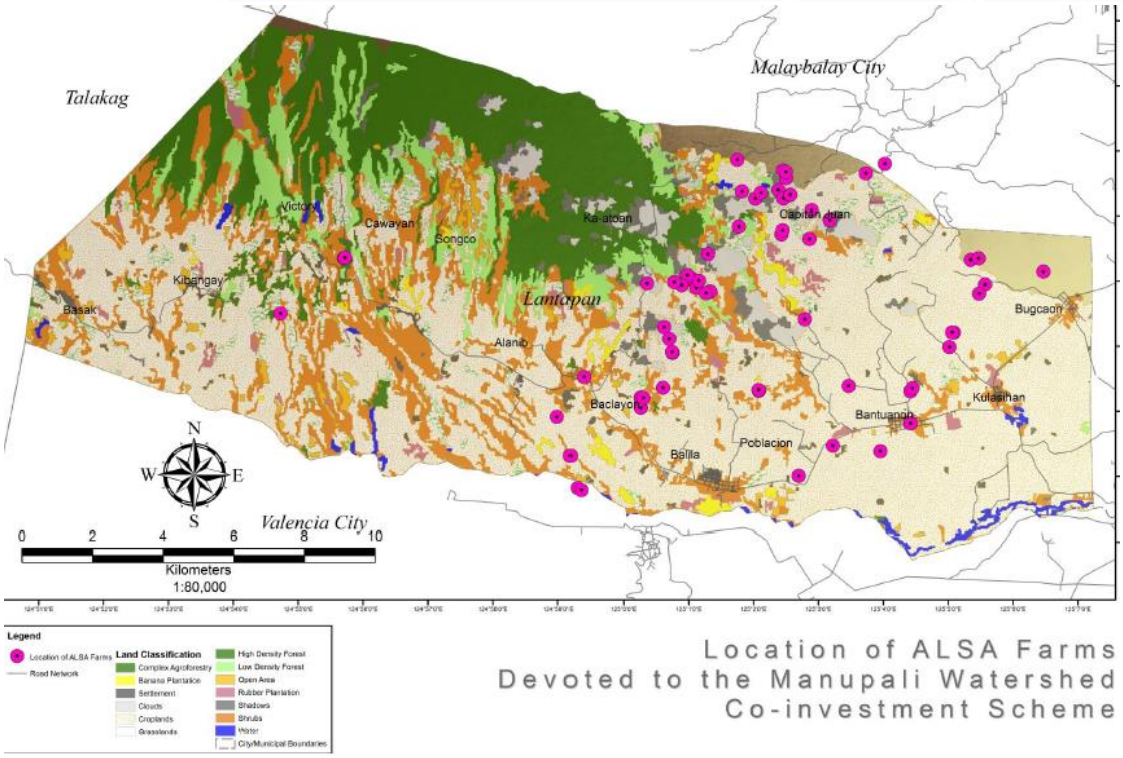
- AKA Management Plan. Contains goals, indicators, means of verification, management focuses, activities, costs and cost projections

Developing the business case

Scenario 2: original cost inflated by 30%
Including admin cost

Management Focus	2017	2018	2019	2020	2021	TOTAL	%
Environment	4,397,250	3,679,000	3,614,000	2,444,000	2,444,000	16,578,250	**27.4%**
Livelihood	9,727,380	3,385,720	4,757,220	4,757,220	4,757,220	27,384,760	**45.3%**
Governance	4,575,220	2,456,220	2,456,220	2,456,220	2,456,220	14,400,100	**23.8%**
Education	104,000	1,404,000	104,000	104,000	104,000	1,820,000	**3.0%**
Health and Sanitation	77,350	55,250	55,250	55,250	55,250	298,350	**0.5%**
TOTAL	**18,881,200**	**10,980,190**	**10,986,690**	**9,816,690**	**9,816,690**	**60,481,460**	**100.0%**

PHP 12,096,292/year or
PHP 736,984/hectare for 5 years or
PHP 147,396/hectare/year



Location of ALSA Farms
Devoted to the Manupali Watershed
Co-investment Scheme

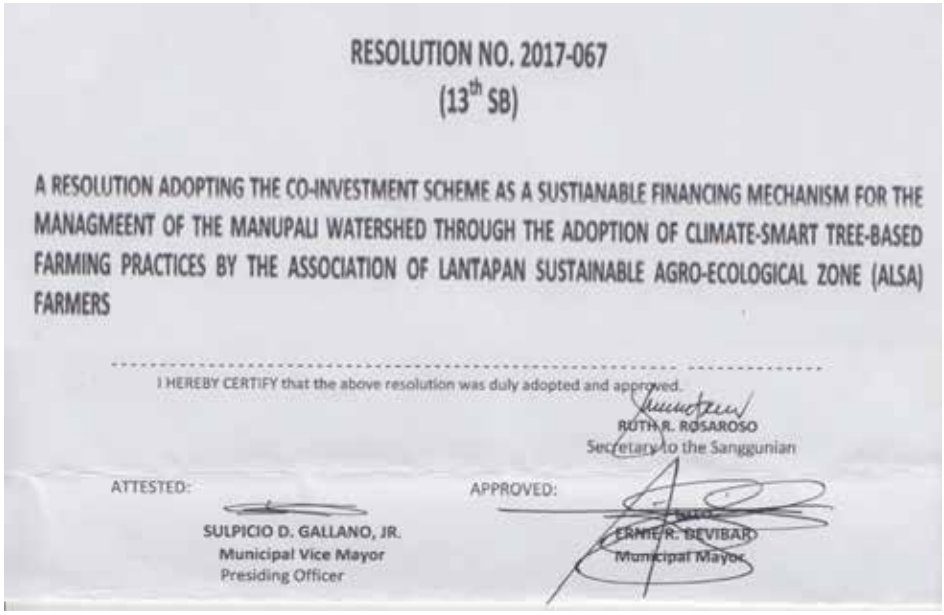
Key activities include:

- Nursery establishment for cacao, coffee, and fruit tree seedlings
- Adoption of climate-smart, tree-based farming practices
- IEC on CSA adoption in the community
- Adoption of organic livestock production
- Conduct regular meetings and functions of the organization in line with the other activities mentioned in the plan
- Conduct training on livelihood sanitation

Water Users' Forum

- Organized on the 19th of April 2017 to gather potential investors for the co-investment scheme of ALSA – attended by 71 participants
- Signing of LOA between ALSA, KIN and ICRAF – transfer of seed fund to ALSA thru KIN

Policy mainstreaming



RESOLUTION NO. 2017-067
(13th SB)

A RESOLUTION ADOPTING THE CO-INVESTMENT SCHEME AS A SUSTIANABLE FINANCING MECHANISM FOR THE MANAGMEENT OF THE MANUPALI WATERSHED THROUGH THE ADOPTION OF CLIMATE-SMART TREE-BASED FARMING PRACTICES BY THE ASSOCIATION OF LANTAPAN SUSTAINABLE AGRO-ECOLOGICAL ZONE (ALSA) FARMERS

I HEREBY CERTIFY that the above resolution was duly adopted and approved.

RUTH R. ROSAROSO
Secretary to the Sanggunian

ATTESTED:

SULPICIO D. GALLANO, JR.
Municipal Vice Mayor
Presiding Officer

APPROVED:

ERNIE R. DEVIBAR
Municipal Mayor

- Whereas, ...it is recognized that the available funding source, particularly under the programs of the government would not suffice, hence the adoption of Co-investment Scheme as a sustainable source of funding mechanism to bankroll a sustained rehabilitation and protection program

- Whereas, ALSA plans to develop and convert over 70ha of their farm lands from current practices to sustainable climate smart practices such as, but not limited to agroforestry to provide ES to downstream communities

- Whereas, it is a matter of social justice that those who provide ecological services vital to the survival and economic development of downstream communities must be rewarded for their services...

Policy Forum

Advancing PES for the Sustainable Management of Natural Resources (May 12)

- A total of 37 participants attended the forum consisting of representatives from the national government, IFAD-PH, DENR-INREMP, members of the national PES TWG, USAID, academe, non-government agencies, private company, and local partners

Policy Forum

Highlights of the Open Forum

- NCIP commended this effort and PES as a mechanism since in their experience, most incentives only reach the local government and not the IPs
- DILG commended the active role of the Provincial Governement of Bukidnon as our local partner and encourages other LGUs to do the same for upscaling – number game

Policy Forum

Highlights of the Open Forum

- NEDA already included this effort in the new PDP agenda and is looking forward to future steps in coming up with a national policy, an EO not an AO
- RIGPA expressed the need for such events to raise awareness among stakeholders of the environment to work together

Policy Forum

Highlights of the Open Forum

- REECS said that we should not rely on PES as the only solution, it may be one, but it needs to be supported by other mechanisms to make it sustainable
- Potential funding were raised coming from PTFCF, DENR-INREMP, and MINDA – for the sustainability of the ALSA CIS and upscaling of efforts outside of Manupali

Thank you!

World Agroforestry Centre

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Fax: +254 20 722 4001
Email: icraf@cgiar.org
Web: www.worldagroforestry.org

CGIAR
Science for a food-secure future

Summary and achievements in Vietnam (2014-2017)

By Dr Delia Catacutan

Smart-Tree Invest project regional workshop

Summary and achievements in Vietnam (2014-2017)

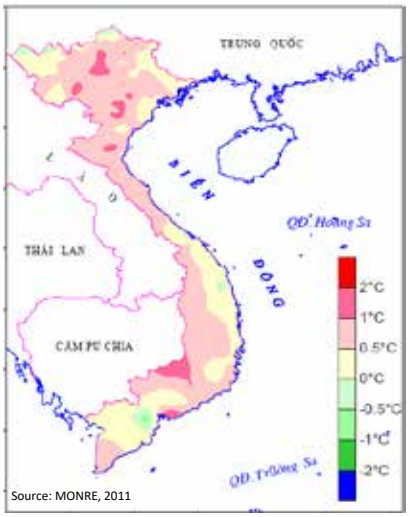
Jakarta, Indonesia
May 17, 2017

ICRAF Viet Nam Country Office
Southeast Asia Regional Program, Hanoi, Viet Nam

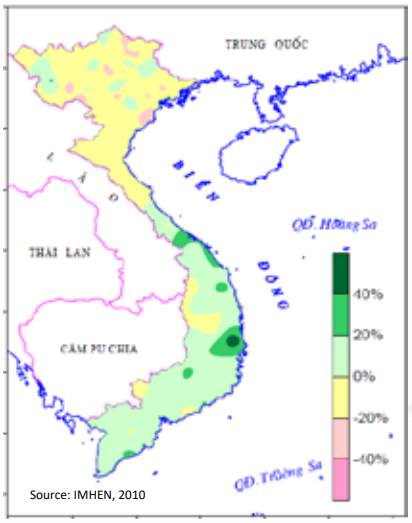
www.worldagroforestry.org

Vulnerability in Vietnam

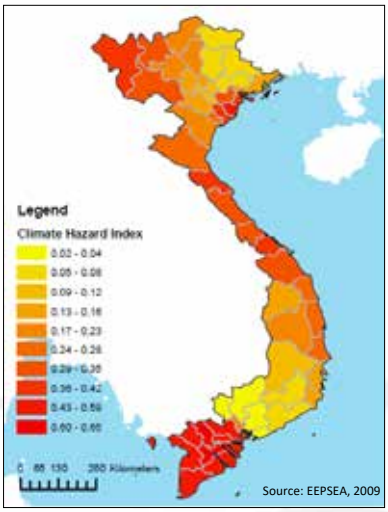
Due to its socio-economic, landscape and geographic conditions, Vietnam is vulnerable to climate change and variability



Changes in **average temperature** over the past 50 years

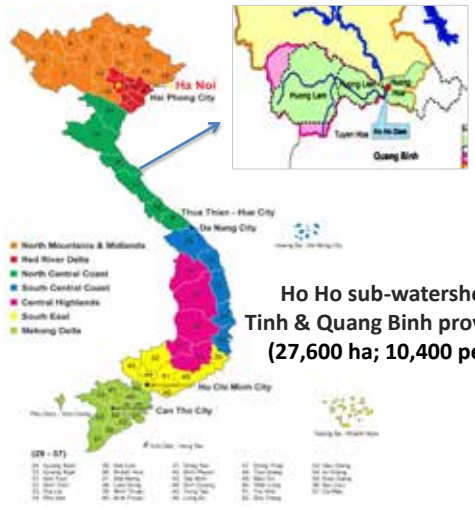


Changes in **annual rainfall** over the past 50 years



Climate hazard index

The project site and current issues



Ho Ho sub-watershed, Ha Tinh & Quang Binh provinces (27,600 ha; 10,400 people)

- **Vulnerable** to climate change and variability (drought, flooding)
- Perceived increased intensity and impact of climate change and variability due to **forest degradation**
- Ho Ho dam and **hydropower plant** started to operate in 2013
- **The quantity and quality of water** in Ngan Sau river has **declined** in the last decade (2005-2014)

Recent flooding and drought in northern central Vietnam

Recent intense flooding (2016) in Ha Tinh province with at least 21 people dead, 8 missing and many injured
http://e.vnexpress.net/news/news/stranded-flood-victims-in-ha-tinh-on-verge-of-running-out-food-3484709.html

Drought dried reservoirs in Ha Tinh province (2017):
http://vietnamfriendship.vn/Drought-dries-reservoirs-and-dams-in-Ha-Tinh-province-02-7059.html

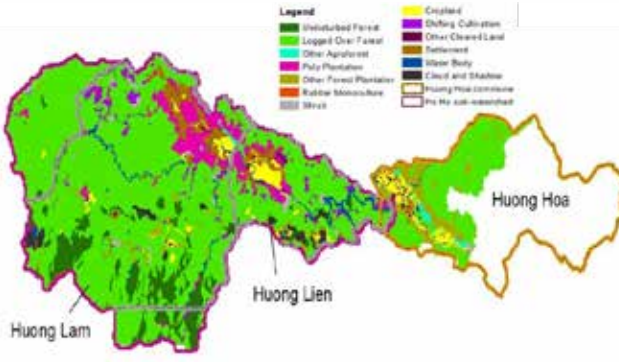
Hydrological conditions

Report from Ho Ho hydropower plant on the hydrological conditions of the sub-watershed (2014)

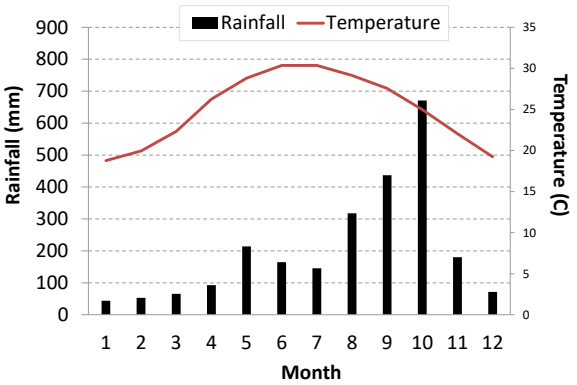
- Compared to 2004, current **water flow in Ngan Sau river has decreased by 60%**. Current flow is 8 m^3/s.
- **Increased flooding intensity** has damaged the dam its faiclities. In 2004, it took 48 hours for the reservoir to be flooded. Today, it takes only 24 hours.
- **Sedimentation in the reservoir has significantly increased** affecting storage capacity and water quality.

Biophysical and climatic conditions

Landcover type in 2014
(70% logged over forests)



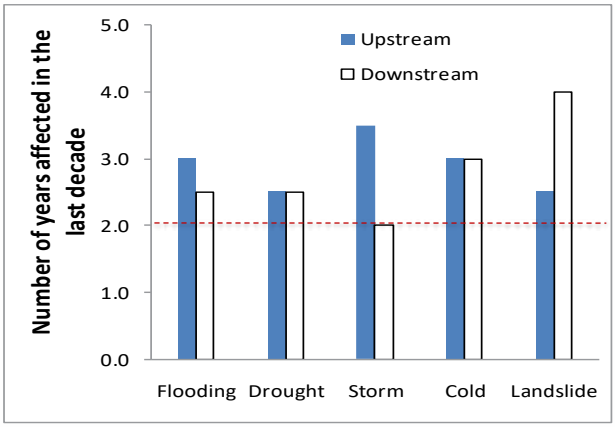
Average rainfall and temperature for 30 years (1982-2011)

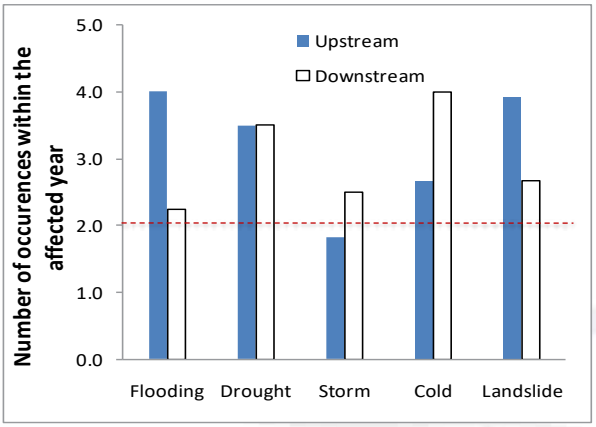


- Short rainy season (3 months August-October)
- Annual cropping season between February-July

Intensity of extreme weather events

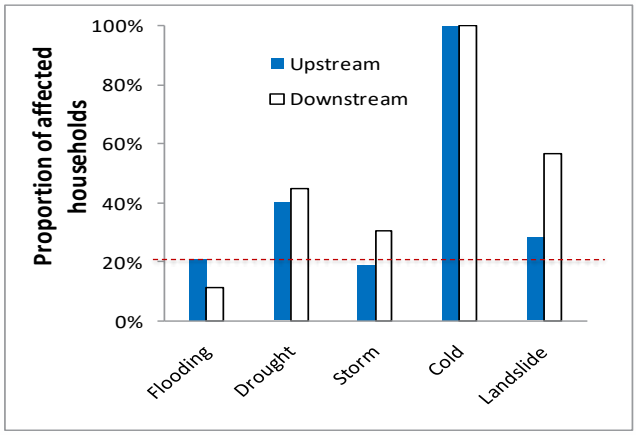
According to local people, in the last decade (2005-2014) extreme weather events occurred 2-4 times; 2-4 occurences within affected years

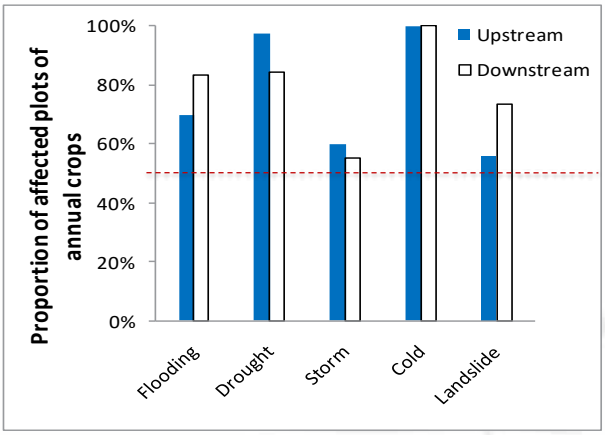




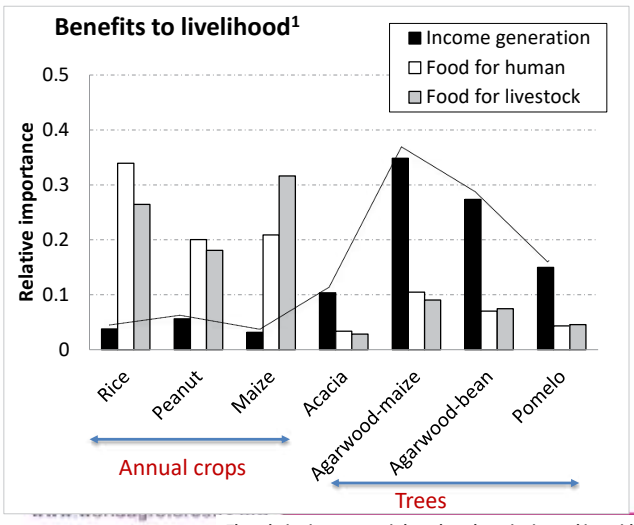
Impact of extreme weather events

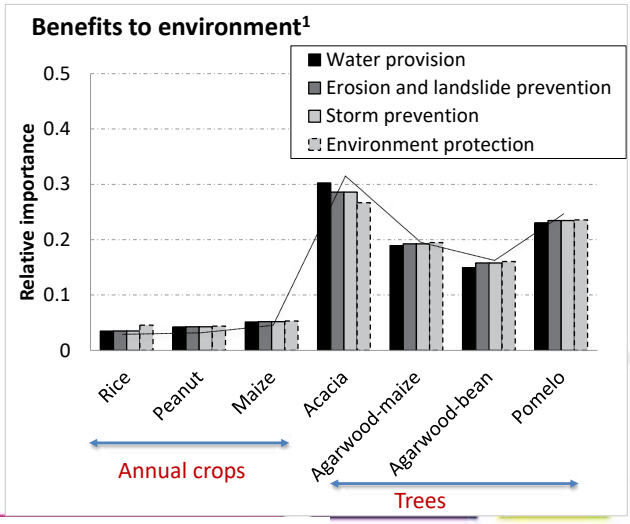
According to local people, substantial impact of extreme weather events were experienced by households, and observed in agricultural plots





Local knowledge on benefits of tree planting

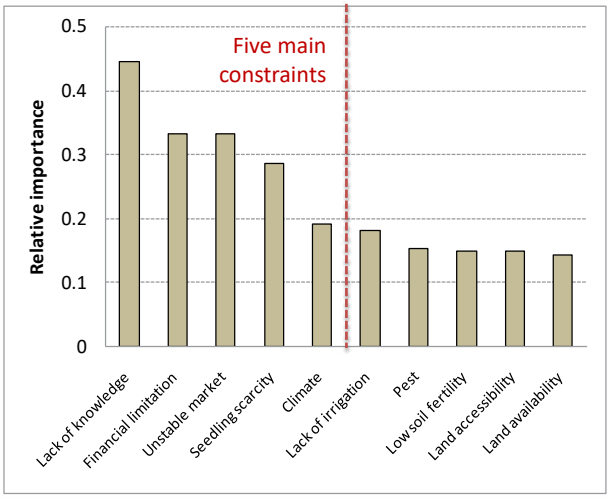


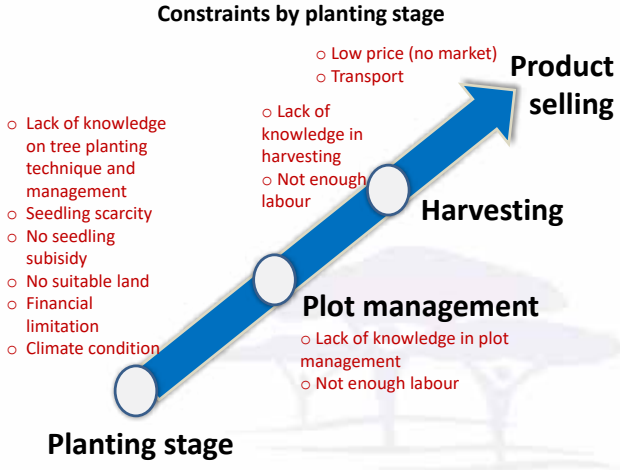


The relative importance is based on the pairwise ranking with Analytic Hierarchy Process (AHP) (Saaty 1990)

Constraints to tree planting

Thre is a need for training in tree management, financial support for initial investment, improvement in access to market, and provision of quality seedlings





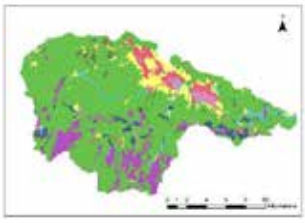
Co-investment schemes

To overcome constraints to tree planting, the project helped to select **suitable households** for demonstration trials, find **co-investors**, **policy support**, **certified nursery** to supply fruit tree seedlings, organize **trainings**, and explore **market linkages**

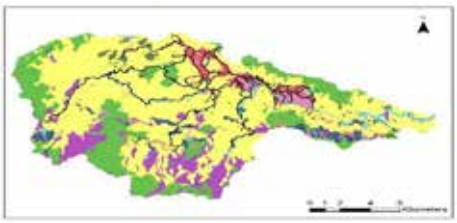
	Homegarden	Forest plantation (sloping land)
System	AF with trees, crops, forages	AF with trees, crops and forages
Intermediary	ICRAF	ICRAF
Land owners	Farmers with HG size > 1000 sqm	Farmers with forest land
Co-investors	ICRAF, farmers, nursery company, local government	ICRAF, farmers
No of households involved	27 and 161 volunteers	3
Total area (ha)	7.5 ha (in 7 villages)	3 ha (in 2 villages)
Total budget (USD)	2,000 USD per village	2,000 USD per village
Components	Pomelo, orange, guinea, mulato II grass	Pomelo, orange, guinea, mulato II
Year started	June 2015	June 2015

Impact of forest restoration on hydrological functions

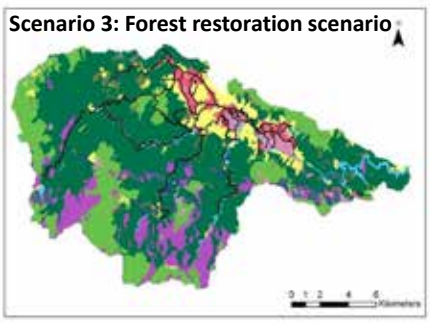
Scenario 1: Baseline 2014



Scenario 2: Acacia expansion 1km from road and 3 km from riverbanks



Scenario 3: Forest restoration scenario



The FMB and SFE have plans to protect and enrich the forest, but livelihood pressures drive forest land convertion into acacia. The impacts of acacia expansion and forest enrichment on hydrological service needs to be assessed.

- GenRiver model (van Noordwijk et al. 2011) shows that acacia expansion results in higher annual river flow than baseline or forest scenario. However, the **main part of its river flow comes from surface run-off.**
- A **substantial part of water flow from forests is from ground water storage**. Forest thus reduces flooding and erosion.

Impact of forest restoration to carbon storage

FALLOW model (van Noordwijk 2002) was used to assess the impact of landuse scenarios on C-stocks and household income.

C stock estimation at landscape level

Scenario	C stock (10^3 ton ha^{-1})	Relative to baseline
Baseline	2,047	-
Acacia expansion	1,344	-34%
Forest enrichment	2,306	+13%

- Convertion of 9,885 ha poor natural forest into acacia plantation will:
  - ✓ Generate additional income of **237 USD capita^{-1} year^{-1}** (i.e. 4-5 year cycle of acacia for pulp and paper provides 5 million VnD (≈250 USD) ha^{-1} year^{-1}
  - ✓ **Decreases C stock in the landscape by 34% as opposed to** allowing the poor natural forest to naturally regenerate.
- Income from restored forest can be enhanced through better PFES (i.e. voluntary or to propose indirect C payment in the national PFES Decree) and non-timber forest produts (e.g. rattan, honey).

Upscaling the co-investment schemes

- **Collaboration with Tuyen Hoa district (Quang Binh)**
  - ✓ Tan Ap, Tan Son and Tan Duc 3 villages
  - ✓ Land area: **2.5 ha** in Huong Hoa commune
  - ✓ Co-investors: ICRAF (26%), Tuyen Hoa DPC (17%), farmers (57%)
  - ✓ Total investment: 140 mil. VnD (not including irrigation system)
- **Collaboration with the nursery company (Ha Tinh)**
  - ✓ Village 5
  - ✓ Land area: **2.5 ha** in Huong Lam commune
  - ✓ Co-investors: Nursery company (14 %), farmers (74 %)
  - ✓ Total investment: 246 mil. VnD (including drip irrigation system)
- Agreement with IFAD's SRD project to continuously support farmers in the project site together with commune and district governments, and scaling up in other SRDP project sites in both provinces.

MoU upscaling in Tuyen Hoa district

Impacts on local and national policies

Policy	Level	Contribution
No. 71/QD-HDND	District	Formulation of Huong Khe District People Council resolution to revise the policy on homegarden size and support for all communes in Huong Khe district, Ha Tinh
Decision No. 735/QD-UBND	District	Facilitated Tuyen Hoa District People's Committee to implement the decision on funding the expansion of pilot models in Huong Hoa commune
Decision No 819/QD-BNN-KHCN dated 14 March 2016, Program 135 and New Rural development Program, Local Agricultural Restructuring Program	Province	Provided models for the provincial government of Ha Tinh and Quang Binh to implement the policy and action plan on responding to climate change under the Agriculture and Rural Development plan 2016 – 2020 and vision 2050
Decision No. 923/MARD/2017 dated 24 March 2016	Province	Provided models for the provincial government of Ha Tinh and Quang Binh to implement the policy and action plan for green growth in agriculture 2020
PFES evaluation under revision of Forest Protection and Development Law	National	Collaborated with CIFOR and Vietnam Forest Protection and Development Fund of VNFOREST in providing case studies to support the proposed amendment to the revised Law.

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http://worldagroforestry.org/regions/southeast_asia/vietnam

WORLD AGROFORESTRY CENTRE

Collaborative watershed management for better watershed function: A case from Buol watershed, Central Sulawesi, Indonesia

By Lisa Tanika

COLLABORATIVE WATERSHED MANAGEMENT FOR BETTER WATERSHED FUNCTION: A CASE FROM BUOL WATERSHED, CENTRAL SULAWESI, INDONESIA

Lisa Tanika, Betha Lusiana, Beria Leimona

" Southeast Asia Regional Workshop, Gran Melia Hotel, Jakarta – 17 May 2017"

World Agroforestry Centre (ICRAF)
l.tanika@cgiar.org

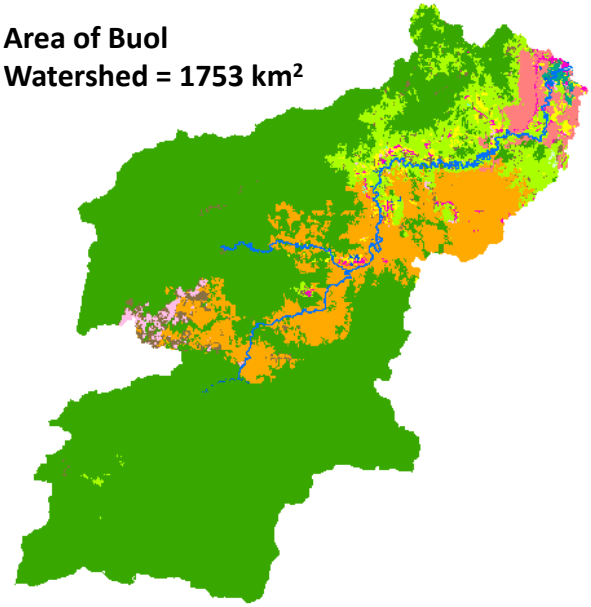
Highlight of achievements

- Establishment of working group on Watershed Management – intermediaries of co-investment
- Establishment of farmers' learning group – potential providers of ES - 2 proposed activities to village fund
- Trained champions on watershed function monitoring – potential provider of support to district program
- Scaling out - by district offices involving private sector

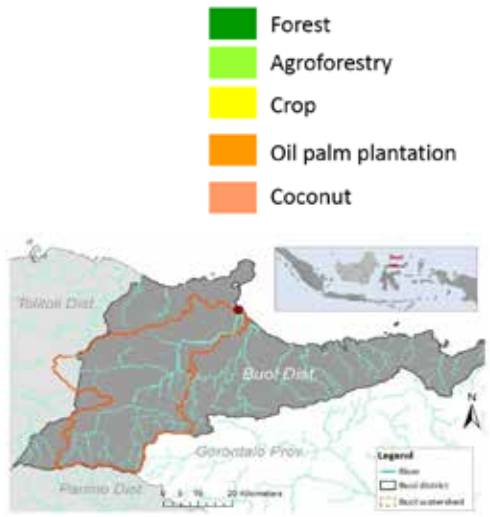
Promotion of environmental stewardship

Location of Hydrological Research in Buol

Area of Buol
Watershed = 1753 km²



Land cover map of Buol Watershed year 2014:



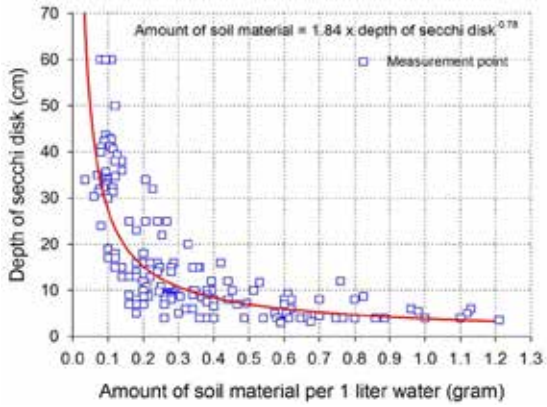
Year 1: Issues

- Flood, Landslide and drought are the main hydrological issues in Buol watershed
- Lack of community and awareness of the watershed function
- Poor of climate and hydrological data become constrain for watershed management planning

Year 2: Piloting

- Participatory climate and hydrological data collection
- Watershed game to raise community understanding and awareness on watershed function

Sedimen consentration Vs. Secchi disk measurement



Rules Of Watershed Game

Wet/dry season?

	Upstream	Downstream
Near the river	Landslide (++) Flood(+)	Flood(++) Landslide (+) Drought (+)
Far from river	Landslide (+) Drought (+)	Flood (+) Drought (++)

Option of mitigation action
1. Built infrastructures
2. Plant trees
3. Migrate to other village

Money loss

Year 3: Scaling out

Creating opportunities for scaling out by

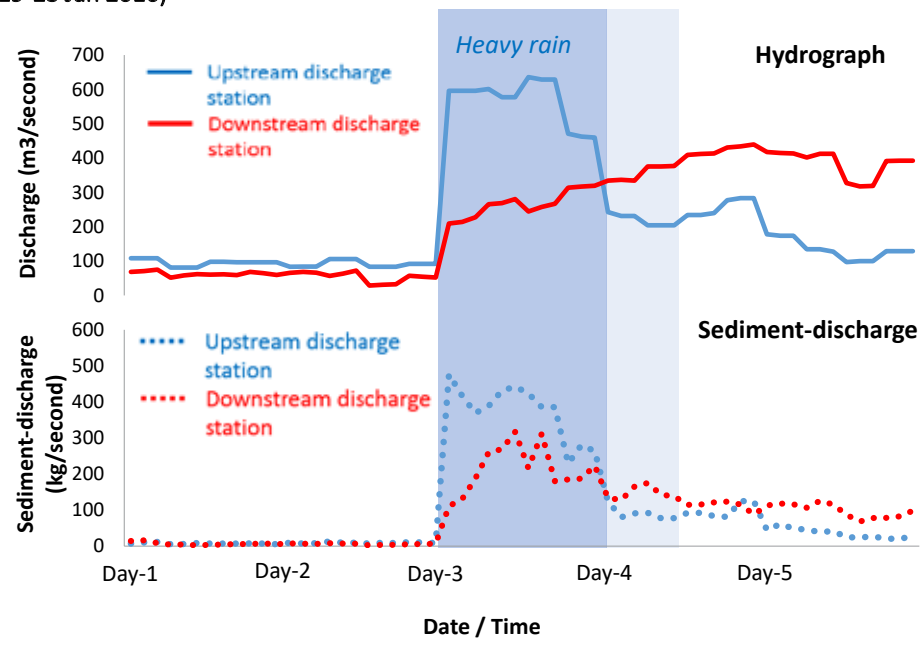
- Training on watershed monitoring and evaluation to Improve the knowledge and ability of local government (working group) and community
- Facilitating stakeholders to meet and potentially to collaborate

Achievements

- Enabling community to participate in the future watershed restoration
- Buol Working Group is currently replicating in adjacent watershed in collaboration with Oil palm plantation
- Buol have initiated a pilot model for participatory watershed management, where the community, district government and researcher collaborate in managing Buol watershed.

Example Analysis of Hydrological Data Collection

(19-23 Jan 2016)



1. Participatory data collection

Community-based, simple method, simple material and equipment, simple to replicate, but the data still can be used for monitoring

2. Watershed Game to raise community understanding and awareness on watershed function

Simulated game to increase community understanding on :

- Their current **watershed condition (risk and exposure)**
- Their **behavior** to address hydrological issues
- The **need of cooperation** in addressing hydrological issues
- **Decision making related to coping strategies and mitigation option**: flooding, drought and landslide

Research highlights
Smart-Tree Invest Philippines

By Regine Evangelista

World Agroforestry Centre

SmarTinvest

IFAD
Investing in rural people

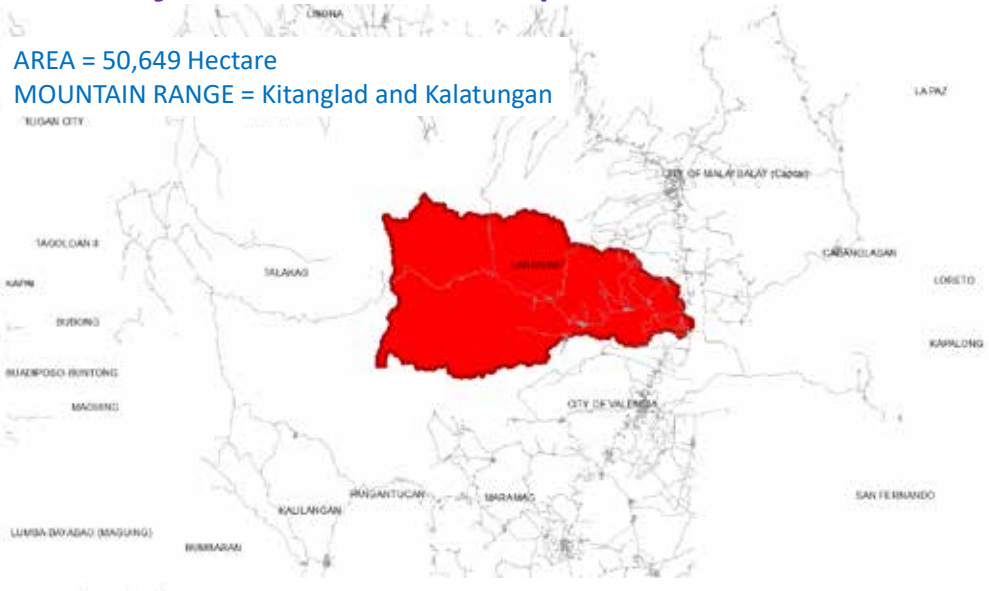
CGIAR
RESEARCH PROGRAM ON
Forests, Trees and Agroforestry

RESEARCH HIGHLIGHTS
Smart-Tree Invest Philippines

Transforming lives and landscapes with trees

Project Site: Manupali Watershed

AREA = 50,649 Hectare
MOUNTAIN RANGE = Kitanglad and Kalatungan



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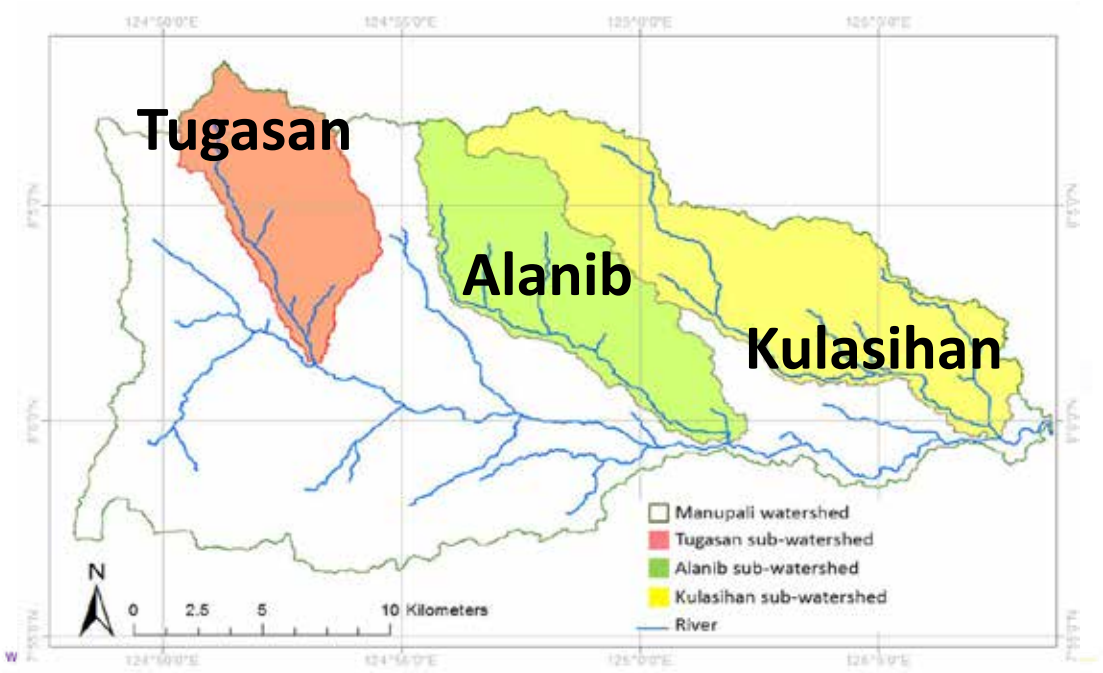
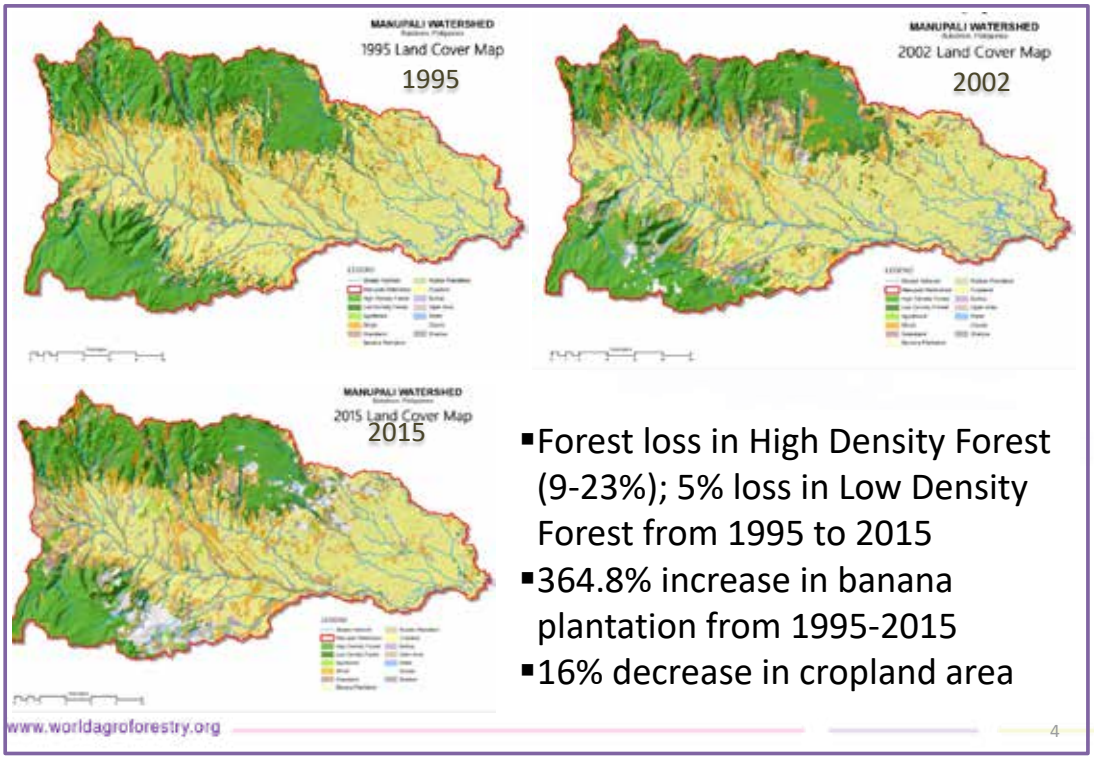
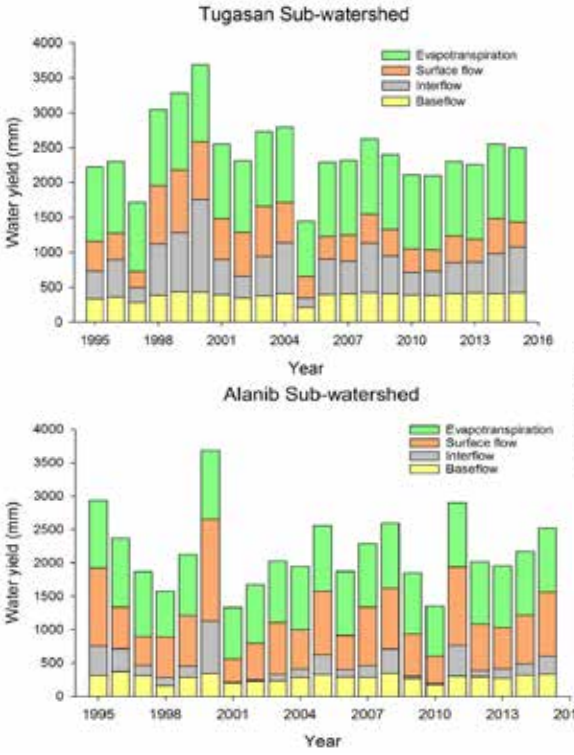
Focus on 3 Sub-watershed Clusters



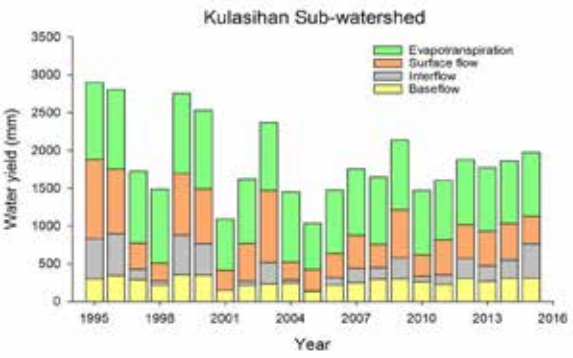
Land Use Change Analysis



Rapid Hydrological Assessment



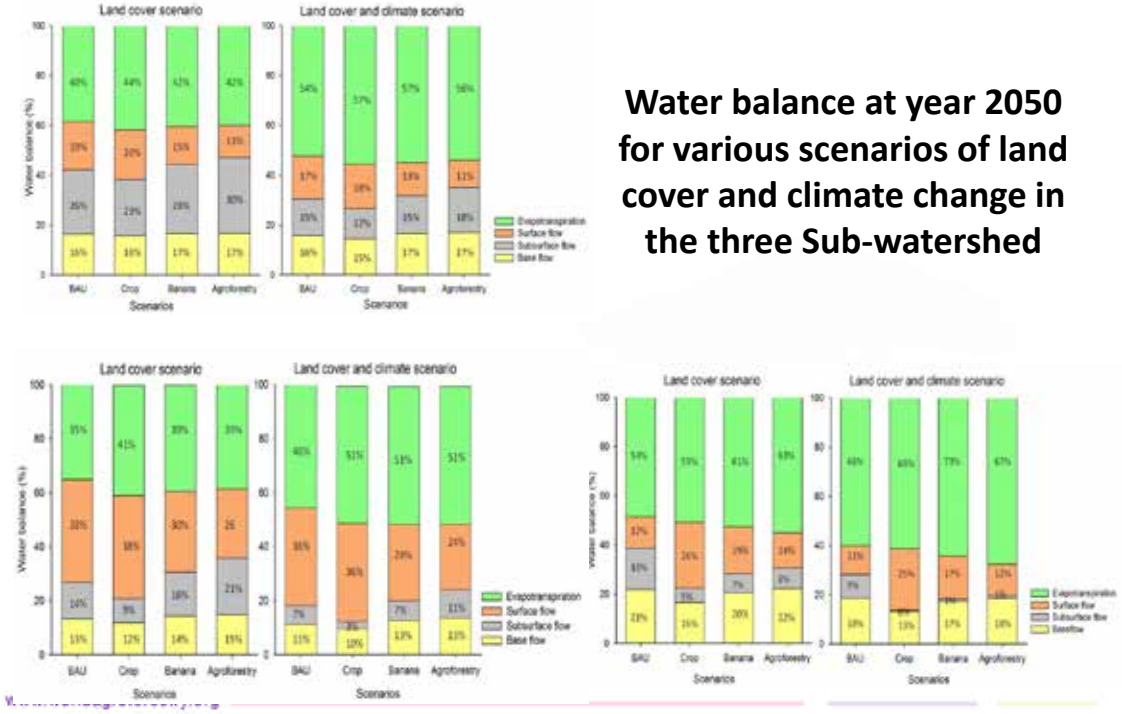
Impact of land cover change on water balance from 1995-2015



Rapid Hydrological Assessment

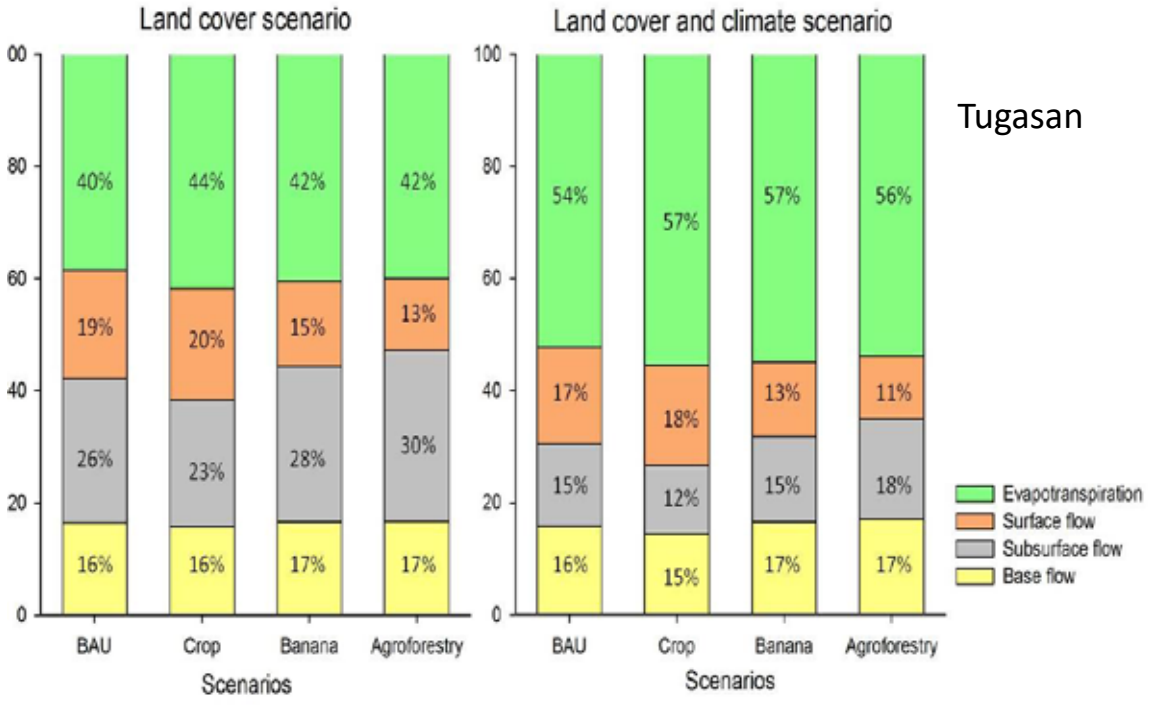
1. Business as usual (BAU, same land use change pattern as 1995-2015);
2. Conversion of lands (except forests and settlements) to cropland;
3. Conversion of lands (except forests and settlements) to banana; and
4. Conversion of lands (except forests and settlements) to agroforestry.

Rapid Hydrological Assessment



Water balance at year 2050 for various scenarios of land cover and climate change in the three Sub-watershed

Rapid Hydrological Assessment



Tugasan

Vulnerability Assessment: Exposure

SHOCKS	Tugasan	Alanib	Kulasihan
Flooding, landslide, pests and diseases	x	x	X
Drought	x	X	
Heavy rainfall and typhoon	X		x
Wildfires		X	
Number of remarkable shocks	**9**	**10**	**11**
Number of impacts	**21**	**20**	**20**

Vulnerability Assessment: Sensitivity

Component/Indicators (+/- relationship to vulnerability)	Tugasan Rank	Alanib Rank	Kulasihan Rank
% of households that practice mono-cropping (+) (%)	2	3	1
Average number of plots cultivated (-)	2	1	3
Average number of crop species (-)	2	1	3
Average number of trees per household (-)	1	2	3
Average number of farm animals owned (-)	1	2	3
% of households with sloping farms (+) (%)	3	1	2
% of households with >1 dependency ratio (+) (%)	2	3	1
%of household without hygienic toilet facilities (only open/closed pits) (+) (%)	1	3	2
Average annual household income (-) (PhP)	1	2	3
Average percentage of income from agriculture (+) (%)	1	2	3
Percentage of households below poverty line (+) (%)	1	2	3
% of households that use light materials for housing (+)	2	2	1
% of households without access to electricity (+) (%)	1	3	2

Vulnerability Assessment: Adaptive Capacity

Shocks and Hazards	Adaptive Strategies
Drought	Look for alternative source of water, use of longer hose to water plants, water pump installation, frequent watering of plants
Typhoon	Planting sunflower, using wooden stakes and twine as windbreak, replanting of crops, availing loans, alternative livelihood
Heavy rainfall	Planting trees, canal/drainage construction
Pests and diseases	Change the type of crop, multiple cropping, use of pesticides, smoking
Flooding, landslide	Contour farming, replanting of crops

Vulnerability based on capital assets framework

- Overall, smalholder households in Tugasan are the most vulnerable
- Poverty seems to contribute most to their vulnerability (poor on financial and physical assets)
- Practice of monocropping and not planting trees on their farms also make them more susceptible to climate impacts

Smallholder farmers are crucial in providing food for the growing population while serving as custodians of the natural resources they depend on, particularly watersheds that are the major water source of these upland communities.

But smallholder farmers themselves remain food insecure and in poverty because of the many challenges they face on a daily basis: degrading natural resources, low productivity; poor infrastructure; lack of access to social and market based support services; and now, CLIMATE CHANGE.

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To improve the resilience of smallholder farmers to the impacts of climate change while at the same time ensuring the sustainable management of the watersheds they live in, the Smart-Tree Invest Project developed a Co-Investment Scheme in the Manupali Watershed in Lantapan Bukidnon.

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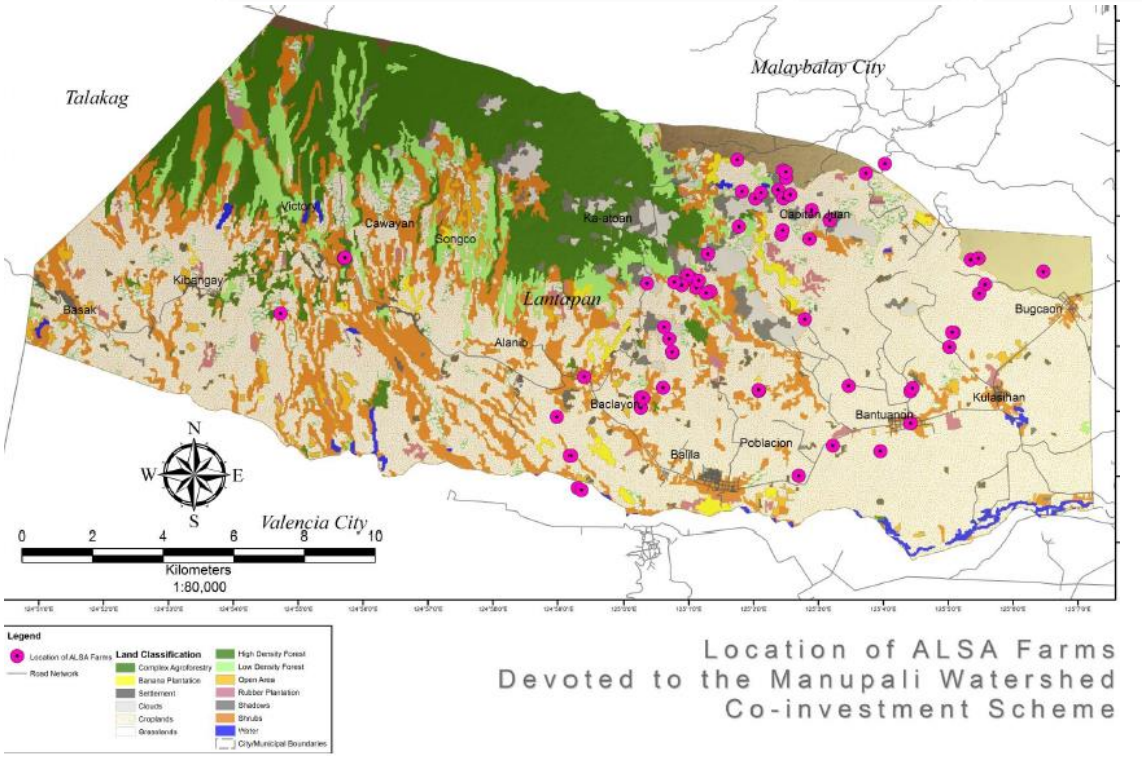
Practical Steps to Developing a CIS

1. Identifying the ES + PES Players
2. Establishing Stakeholder Support
3. Vision Setting and Outcome Mapping
4. Identifying the Sellers/Beneficiaries
5. Developing the Business Case (Conditionality)
6. Identifying the Fund Manager
7. Finding Buyers/Co-investors
8. Finalize and Sign the Contract/Implement

Challenges and Opportunities

- **A learning process**: No manual/handbook available but was guided by the experience of the Mt. Kalatungan PES.
- Using the **research results** of the Smart-Tree Invest Project as foundation.
- **Stakeholder led process:** collaborative and participatory.
- Supportive LGU + government partners.
- Steps as it was done: **adaptable** to the local setting/circumstances.



Location of ALSA Farms Devoted to the Manupali Watershed Co-investment Scheme

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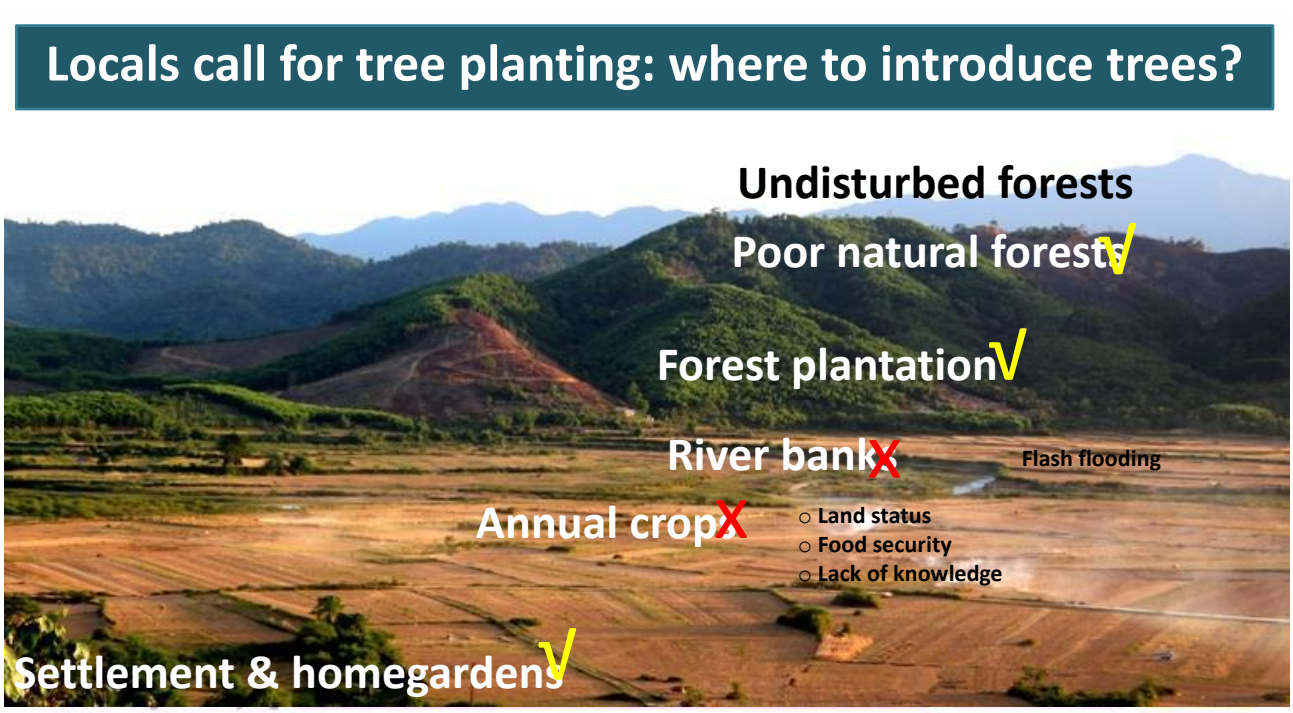
Farmers' Training – Introduction to Agroforestry

Farmers' Training – Hands-on training on Cacao and Coffee Agroforestry

Business Case Development

Project highlight on co-investment schemes in Viet Nam

By Dr Rachmat Mulia



Co-investments with tree planting in Ho Ho sub-watershed

Homegardens before project intervention

Ex-forest plantation in sloping land before project intervention

Local preferences on tree species

For homegarden and forest plantation (smallholder farmers)

Citrus grandis Osbeck (Phuc Trac pomelo): http://grapefruitofphuctrach-vi.tk/category/learn-about-phuc-trach-pomelo/

Start to fruit at year 3-4, peak production at year 11-15, 90-120 fruits for one season, local price 3.5-4 USD/fruit

Orange Valencia 2 (Cam bu orange): http://sieuthinhanong.vn/giong-cam-bu-ha-tinh

Start to fruit at year 3-4, production 30-70 kg/tree/year, local price 3.5-5 USD/kg

For degraded forest lands (Forest Management Board and State Forest Entreprise)

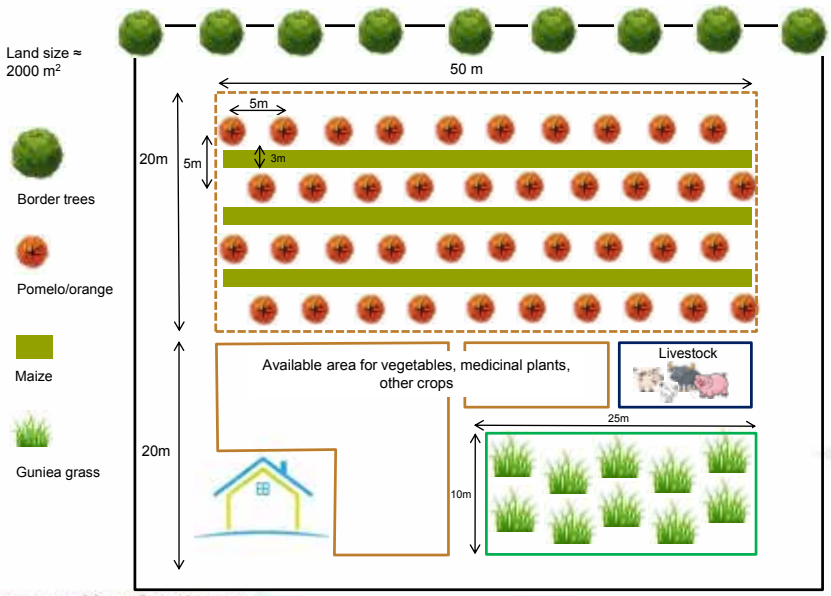
Erythrophleum fordii (lim xanh): https://vi.wikipedia.org/wiki/Lim_xanh

10-30 m tall, good quality timber, endagered tree species (IUCN)

Canarium tramdenum (tram den): http://vafs.gov.vn/vn/2014/12/ky-thuat-trong-tram-den/

25-30 m tall, dbh 40-50 cm, good quality timber

Design of homegarden co-investment model



- **Concept:** homegarden with pomelo/orange-based agroforestry practice for subsistence and income generation
- **Environmental benefits**:
  - ✓Border trees as wind-break and improve micro-climate
  - ✓Increased C storage
  - ✓Increase soil capacity for water storage
- **Socio-economic benefits**:
  - ✓ Stable and diversified income
  - ✓ Potential annual income of **16-17 mil. VnD (800 USD) from 2000 m² land**
  - ✓ Diversify food and nutrition
  - ✓ Uplifting the status of women and youth

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Profitability analysis of homegarden (15 years with pomelo)

All income and cost in million VnD for 2,000 m² land size

	Year														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total cost	-20	-6	-6	-4	-4	-5	-4	-5	-5	-5	-5	-6	-5	-5	-5
Revenue															
Pomelo	0	0	6	42	42	42	42	42	42	42	42	42	42	42	42
Peanut	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Maize	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Grass gunea	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Potato	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Income	-15	0	**5**	**40**	**40**	**39**	**40**	**40**	**40**	**40**	**39**	**38**	**39**	**39**	**39**

Total income **463**

Annual income **30** mil VnD (≈ 1500 USD)

- The pomelo-based homegarden will require **investment of 20 mil VnD** for 2,000 m² land size
- The income will become **positive and stable after the second year**
- Annual income is 30 mil VnD, and **the payback for loan can be set at year 4** since the total income at year 4 has reached 45 mil VnD

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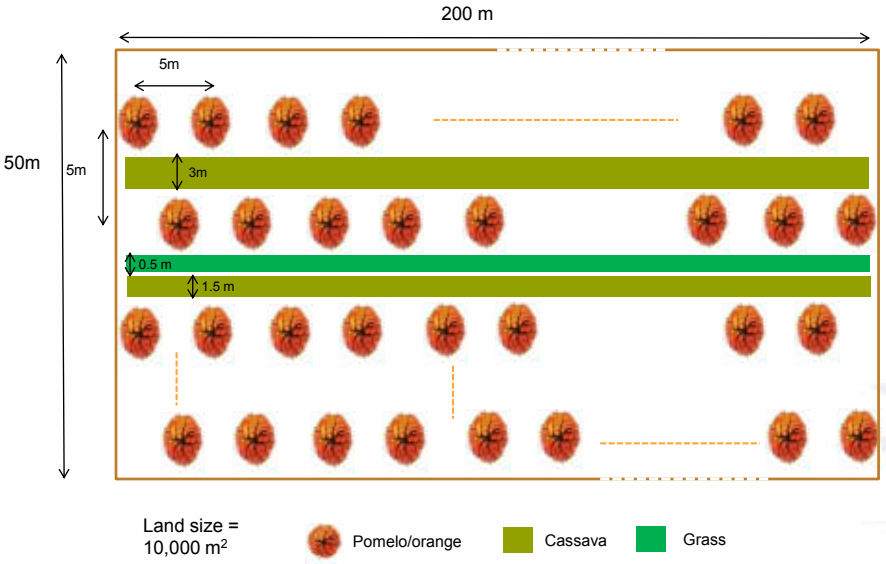
Profitability analysis of homegarden (15 years with orange)

All income and cost in million VnD for 2,000 m² land size

	Year														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total cost	-22	-7	-7	-4	-5	-6	-5	-6	-6	-6	-6	-8	-8	-8	-8
Revenue															
Orange	0	0	2	25	25	25	25	25	25	25	25	25	25	25	25
Peanut	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Maize	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Grass guinea	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Potato	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Income	-17	-2	**0**	**23**	**23**	**22**	**22**	**21**	**21**	**21**	**21**	**20**	**20**	**20**	**19**
Total income	**233**														
Annual income	**16** mil VnD (≈800 USD)														

- The orange-based homegarden will require **investment of 22 mil VnD** for 2,000 m² land size
- The income will become **positive and stable after the third year**
- Annual income is 16 mil VnD, and the **payback for loan can be set at year 5** since the total income at year 5 has reached 46 mil VnD

Design of sloping land co-investment model



- **Concept:** agroforestry practices with pomelo/orange-cassava-grass in sloping lands
- **Environmental benefits**:
  - ✓ Contour design and grass strips for **erosion mitigation**
  - ✓ **Reduce GHG emission by avoiding frequent slash and burn practice** (usually conducted with 4-year acacia rotation)
- **Socio-economic benefits**:
  - ✓ Stable and diversified income
  - ✓ Potential annual income up to **230 mil VnD (11,000 USD) from 1 ha of land**
  - ✓ Diversified foods and nutritions

Profitability analysis of sloping land (15 years with pomelo)

All income and cost in million VnD for 1 hectare land size

	Year														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total cost	-108	-30	-36	-37	-37	-38	-37	-41	-41	-45	-48	-49	-48	-48	-48
Revenue															
Pomelo	0	0	45	336	336	336	336	336	336	336	336	336	336	336	336
Cassava	18	18	18	0	0	0	0	0	0	0	0	0	0	0	0
Grass guinea	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Income	-85	-7	**32**	**304**	**303**	**302**	**303**	**299**	**299**	**296**	**293**	**292**	**293**	**293**	**293**
Total income	**3,510**														
Annual income	**234** mil VnD (≈11,700 USD)														

- The pomelo-based sloping land will require **investment of 108 mil. VnD** for 1 hectare land size
- The income will become **positive and stable after the second year**
- Annual income is 234 mil VnD, and the **payback for loan can be set at year 4** since the total income at year 4 has reached 336 mil VnD

Profitability analysis of sloping land (15 years with orange)

All income and cost in million VnD for 1 hectare land size

	Year														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total cost	-116	-31	-36	-36	-40	-41	-45	-49	-52	-54	-58	-62	-64	-65	-66
Revenue															
Orange	0	0	16	200	200	200	200	200	200	200	200	200	200	200	200
Cassava	18	18	18	0	0	0	0	0	0	0	0	0	0	0	0
Grass guinea	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Income	-93	-8	**3**	**169**	**165**	**164**	**160**	**156**	**153**	**151**	**147**	**143**	**141**	**140**	**139**
Total income	**1,728**														
Annual income	**115** mil. VnD (≈5,750 USD)														

- The orange-based sloping land will require **investment of 116 mil. VnD** for 1 hectare land size
- The income will become **positive and stable after the second year**
- Annual income is 115 mil. VnD, and the **payback for loan can be set at year 4** since the total income at year 4 has reached 172 mil VnD

Summary table for the profitability analysis

All income and cost in million VnD

System	Establishment cost*	Annual income*	Payback period (year)
Homegarden			
Pomelo-based	20	17	4
Orange-based	22	16	5
Sloping land			
Pomelo-based	108	234	4
Orange-based	116	115	4
Household annual income from homegarden and sloping land			
Pomelo-based	**251** mil VnD (12,550 USD)		
Orange-based	**131** mil VnD (6,550 USD)		

* For homegarden, the cost and income is for 2,000 m^2 land size, for sloping land 1 hectare

- The high establishment cost can be overcome by **longer loan payback period or co-investment scheme** as introduced in the STI project
- **The annual income from the pomelo or orange-based systems is much higher than from acacia plantation** which is around 5 mil. VnD ha^{-1} $year^{-1}$ only

Co-investment schemes in Ho Ho sub-watershed

	Homegarden	Forest plantation (sloping land)
System	AF with different trees, crops, forages	AF with trees, crops and forages
Intermediary	ICRAF	ICRAF
Land providers	Farmers with HG size > 1000 sqm	Farmers with forest land
Co-investors	ICRAF, farmers, tree seedling companies, local authorities	ICRAF, farmers
No of households involved	27 and 161 volunteers	3
Total area (ha)	7.5 ha (in 7 villages)	3 ha (in 2 villages)
Total budget (USD)	2,000 USD per village	2,000 USD per village
Components	Pomelo, orange, guinea, mulato II grass	Pomelo, orange, guinea, mulato II
Year started	June 2015	June 2015

Homegarden after project intervention and first harvest

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Homegarden after project intervention and first harvest

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Sloping land after project intervention

Training on tree planting and management

- **Homegarden** design with ICRAF scientist, local people and DARD

- **Sloping land** design with ICRAF scientist, local people and DARD

Training on tree planting and management

- Plot management for citrus (i.e. pomelo or orange trees): planting and pruning

- Pest and disease control with bio-pesticide

Upscaling the co-investment schemes

- **Collaboration with Tuyen Hoa district (Quang Binh)**
  - ✓ Village: Tan Ap, Tan Son and Tan Duc 3
  - ✓ Land area: **2.5 ha** in Huong Hoa commune
  - ✓ Co-investors: ICRAF (26%), Tuyen Hoa DPC (17%), farmers (57%)
  - ✓ Total investment: 140 mil. VnD (not including irrigation system)
- **Collaboration with tree nursery company (Ha Tinh)**
  - ✓ Village: Village 5
  - ✓ Land area: **2.5 ha** in Huong Lam commune
  - ✓ Co-investors: Tree seedlings company (14 %), farmers (74 %)
  - ✓ Total investment: 246 mil. VnD (including drip irrigation system)
- **No co-investment for degraded forests lands** since the FMB and SFE plans are financially supported by the local government. The project helped to assess the impacts of forest restoration to hydrological services and C storage in the sub-watershed.

MoU upscaling in Tuyen Hoa district

Thank you!

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Impacts on local and national policies

Policy	Level	Project's contributions
No. 71/QD-HDND	District	Contributed to the formulation of Huong Khe District People Council resolution to revise the policy on homegarden size and support for all communes in Huong Khe district, Ha Tinh
Decision No. 735/QD-UBND	District	Facilitated Tuyen Hoa District People's Committee to implement the decision on funding support for expansion of pilot models in Huong Hoa commune
Decision No 819/QD-BNN-KHCN dated 14 March 2016, Program 135 and New Rural development Program, Local Agricultural Restructuring Program	Province	The project pilot models provide concrete models for the provincial government of Ha Tinh and Quang Binh to implement the policy and action plan on responding to climate change under the agriculture and rural development plan 2016 – 2020 and vision 2050
Decision No. 923/MARD/2017 dated 24 March 2016	Province	The project pilot models provide concrete models for the provincial government of Ha Tinh and Quang Binh to implement the policy and action plan for green growth in agriculture to 2020
PFES evaluation under revision of Forest Protection and Development Law	National	Collaborated with CIFOR and Vietnam Forest Protection and Development Fund of VNFOREST in providing case studies of measuring hydrological services in Ho Ho sub-watershed linked to PFES

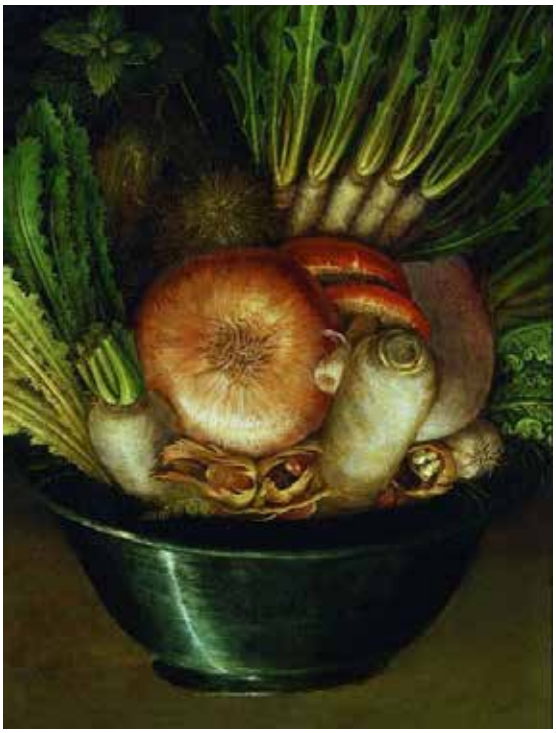
Synthesis and food for thought

By Prof Meine van Noordwijk

Synthesis and food for thought

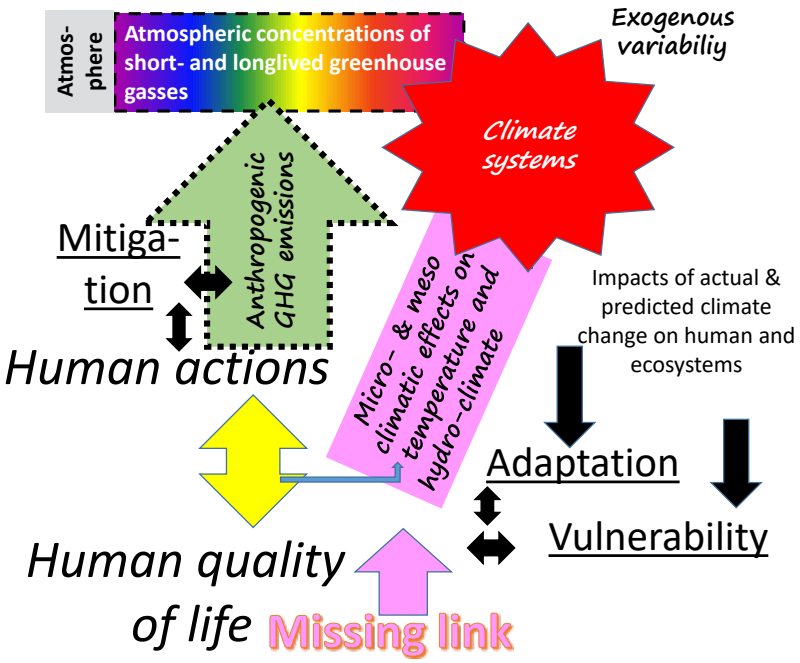
Meine van Noordwijk
World Agroforestry Centre
Wageningen University & Research

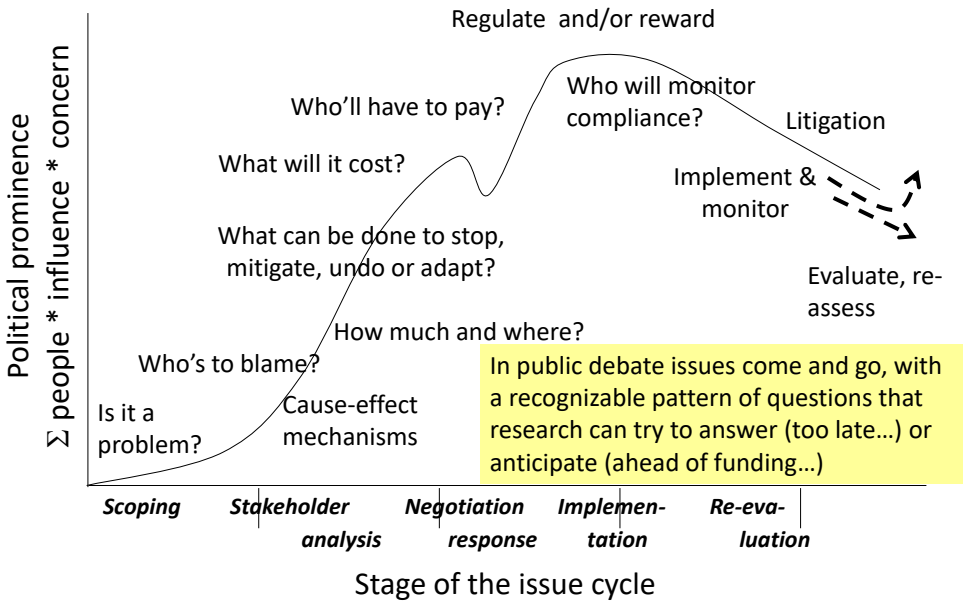
Focus on the food

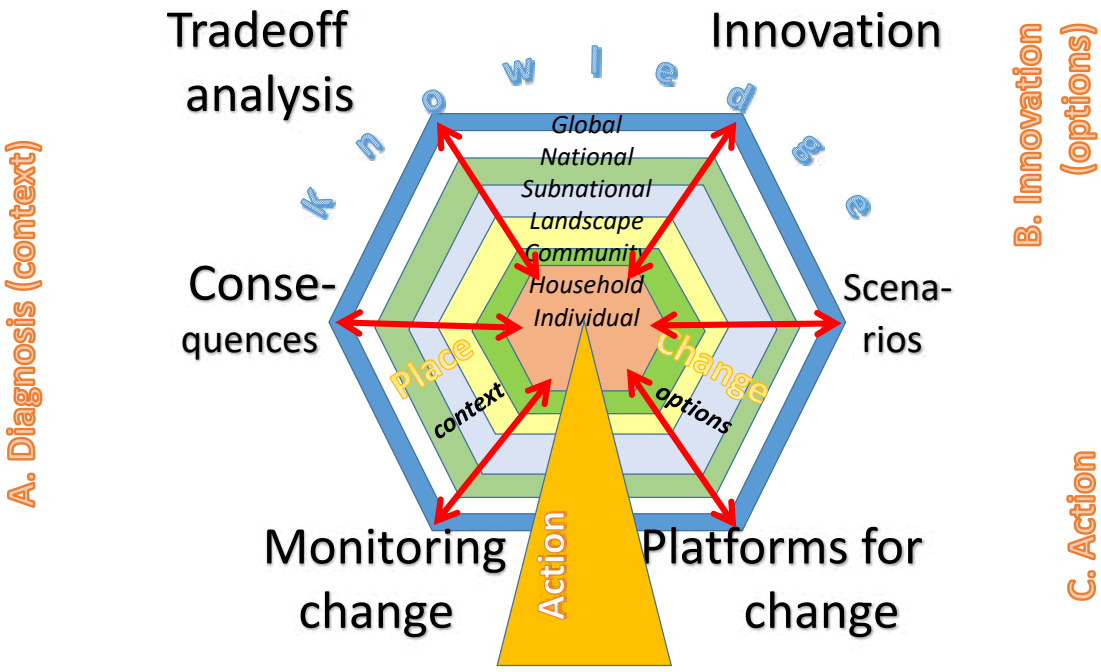


or

the farmer – consumer chain or

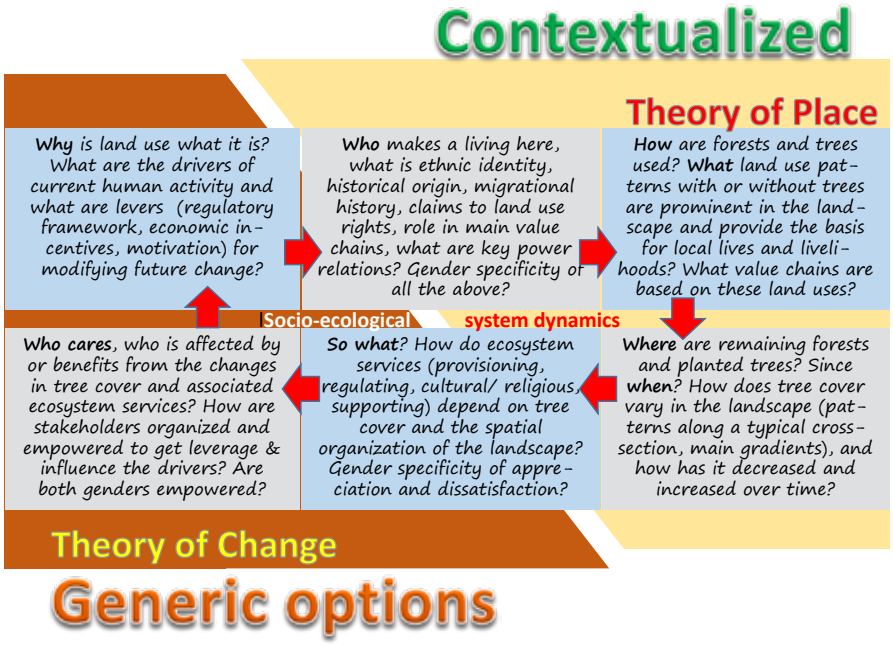

Atmos-phere
Atmospheric concentrations of short- and longlived greenhouse gasses
Exogenous variabiliy
Climate systems
Anthropogenic GHG emissions
Mitiga-tion
Human actions
Micro- & meso climatic effects on temperature and hydro-climate
Impacts of actual & predicted climate change on human and ecosystems
Adaptation
Vulnerability
Human quality of life
Missing link


Political prominence
Σ people * influence * concern
Regulate and/or reward
Who'll have to pay?
Who will monitor compliance?
Litigation
What will it cost?
Implement & monitor
What can be done to stop, mitigate, undo or adapt?
Evaluate, re-assess
How much and where?
Who's to blame?
Is it a problem?
Cause-effect mechanisms
In public debate issues come and go, with a recognizable pattern of questions that research can try to answer (too late…) or anticipate (ahead of funding…)
Scoping
Stakeholder analysis
Negotiation response
Implemen-tation
Re-eva-luation
Stage of the issue cycle


A. Diagnosis (context)
B. Innovation (options)
C. Action
Tradeoff analysis
Innovation
Conse-quences
Scena-rios
Monitoring change
Platforms for change
Action
knowledge
Global
National
Subnational
Landscape
Community
Household
Individual
Place
context
Change
options


Education, gender, inequity, conflict, cooperation
Income, food, energy, water, climate, biodiversity
Goals
6. Agency, decisions
5. Communicate, platforms for change
questions
evidence
Policy
Science
Issues
Adaptive, learning loops
1. Monitor, observe
2. Analysis of issues, tradeoffs
Options
At multiple, nested scales
4. Strategize, use scenarios
3. Innovate
Contexts


Jhantsi (India), ES training Dec 2016
Education, gender, inequity, conflict, cooperation
Income, food, energy, water, climate, biodiversity
Goals
At start of interventions:
Vulnerability to climate variability
Declining buffering of water flows
Drudgery in water acquisition
Low crop productivity
Youth migrates to cities
Social capital declining
Low diversity of local food supply
6. Agency, decisions
5. Communicate, platforms for change
1. Monitor, observe
questions
evidence
Policy
Science
Adaptive, learning loops
2. Analysis of issues, tradeoffs
4. Strategize, use scenarios
3. Innovate
Issues
Options
At multiple, nested scales
Combination of:
Engineering of water retention & infiltration in the landscape
Increased GW extraction through wells and pumps
Water-efficient crops, improved crop varieties and management
Improved (fruit) tree germplasm
Local watershed mngmnt committee
Contexts
Rocky outcrops with low productivity, source of water harvesting
Social structure, demography, expectations
Climate, soil, cropping patterns, manure use as fuel, livestock
Proximity to urban market (Jhansi)
History of collective action in water management


Contextualized
Theory of Place
Why is land use what it is? What are the drivers of current human activity and what are levers (regulatory framework, economic incentives, motivation) for modifying future change?
Who makes a living here, what is ethnic identity, historical origin, migrational history, claims to land use rights, role in main value chains, what are key power relations? Gender specificity of all the above?
How are forests and trees used? What land use patterns with or without trees are prominent in the landscape and provide the basis for local lives and livelihoods? What value chains are based on these land uses?
Socio-ecological system dynamics
Who cares, who is affected by or benefits from the changes in tree cover and associated ecosystem services? How are stakeholders organized and empowered to get leverage & influence the drivers? Are both genders empowered?
So what? How do ecosystem services (provisioning, regulating, cultural/ religious, supporting) depend on tree cover and the spatial organization of the landscape? Gender specificity of appreciation and dissatisfaction?
Where are remaining forests and planted trees? Since when? How does tree cover vary in the landscape (patterns along a typical cross-section, main gradients), and how has it decreased and increased over time?
Theory of Change
Generic options

RESEARCH
PROGRAM ON
Forests, Trees and
Agroforestry