



Food and Agriculture  
Organization of the  
United Nations

# Ecosystem-based Adaptation experiences in agrobiodiverse and forest ecosystems in South America

Ecosystem-based Adaptation in Action: the case of forestry

October 23rd, 2018





# Contents

- **Background**
- **EbA experiences in South America**
  - **Ecuador**
  - **Chile**
- **Conclusions**





# Background information

# Background

- Biodiverse region

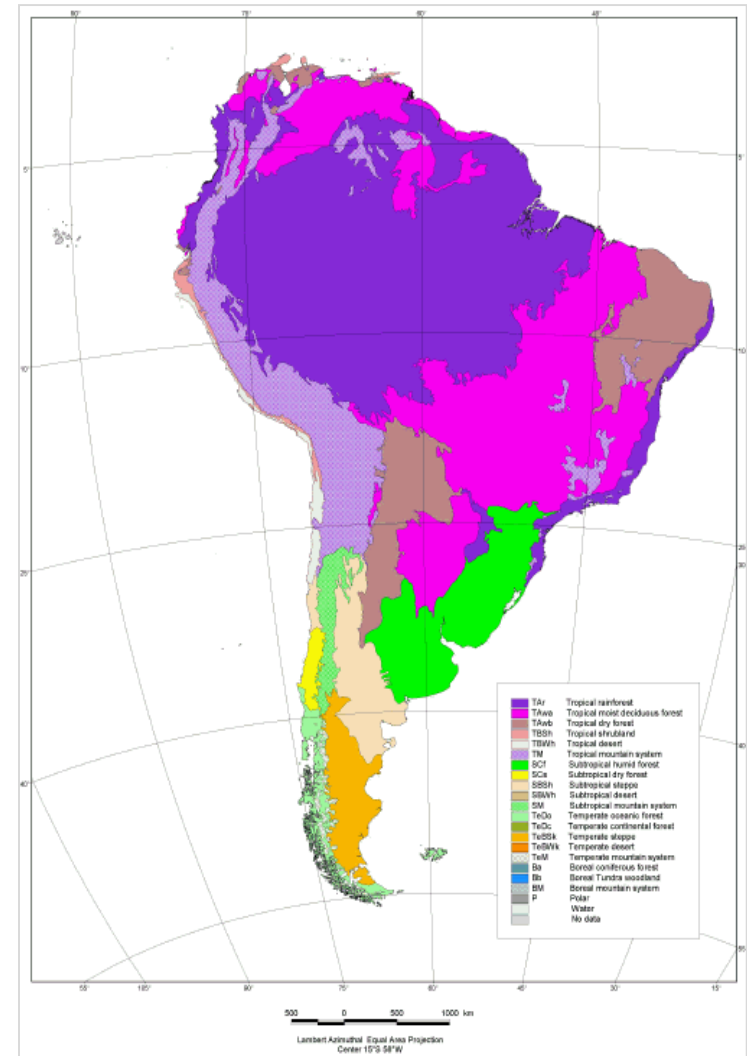


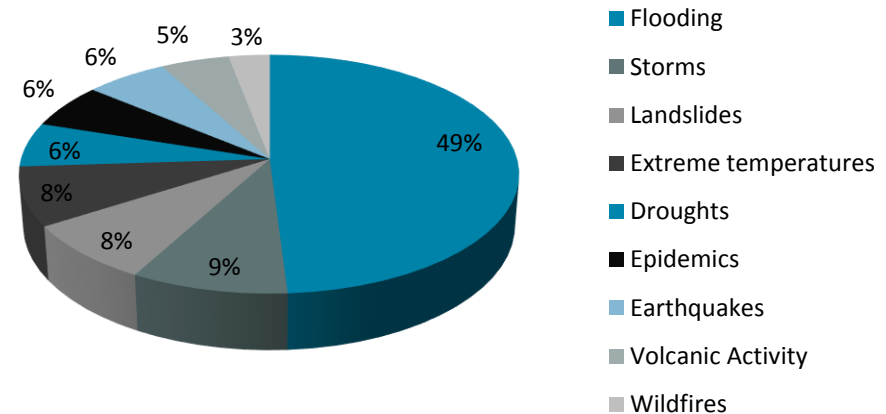
Figure 1. Global Ecological Zones in South America (FAO, 2000)



# Background

- Vulnerable to climate change and risks to disasters

- Rising sea levels
- Glacier retreat
- Extreme episodes of rainfall and water scarcity
- Decrease in the flow of rivers and the recharge of aquifers
- More intense episodes of drought, alterations in surface and underground water bodies.



**Figure 1. Occurrence by disaster type in South America, 2000–2015**  
Source: Own elaboration based on EM-DAT (2016)







# Programmatic areas of IUCN





# EbA: a nature-based solution



Figure 6. NbS as an umbrella term for ecosystem-related approaches





# **EbA experiences in agrobiodiverse and forest ecosystems**





# Examples of Eco-DDR/EbA at regional level

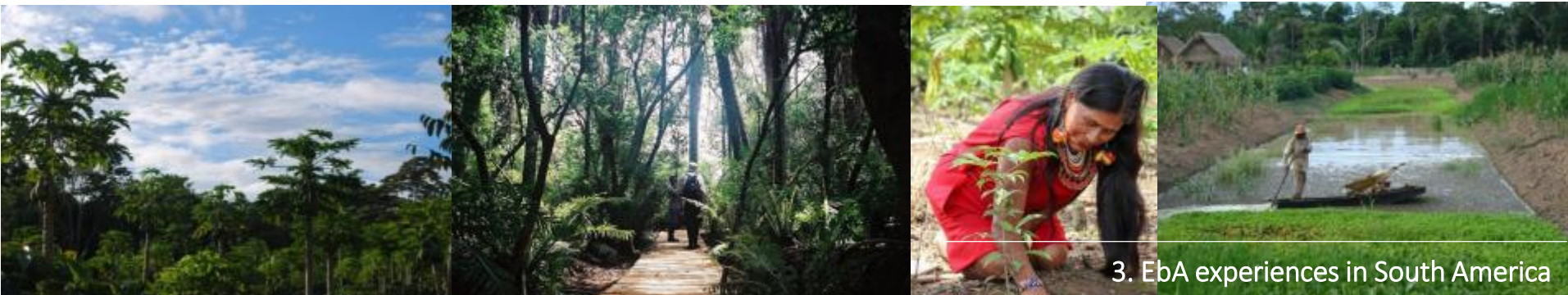
**Table 10.** Examples of projects and activities that contribute to Eco-DRR outcomes in the region (based on regional assessment)

Project type	Natural hazards	Ecosystems	Activities contributing to Eco-DRR
<b>Eco-DRR</b>	Avalanches	Forest	Vulnerability risk assessments
	Floods	Urban	Forest management
	Drought	Agricultural	Water resource management
	Landslides		Restoration of rivers
<b>Climate change adaptation</b>	Floods	Freshwater	Habitat protection
	Droughts	Forest	Restoration of wetlands and forests
	Landslides	Wetlands	Creation of private nature reserves
	Avalanches	Grasslands	Integrated water management
	Drought	Mountains	Sustainable grassland management
			Vulnerability assessment and mapping
			Sustainable livestock production
			Strengthening capacities of local stakeholders
<b>Climate change mitigation</b>	Floods	Forests	Habitat protection and restoration
<b>Conservation</b>	Soil erosion	Forest	Promoting ancient soil management systems
			Protected area management
			Strengthening local governance



Regional Assessment on Ecosystem-based  
Disaster Risk Reduction and Biodiversity in  
South America

A report for the Resilience through Investing in Ecosystems – knowledge, innovation and transformation of risk management (RIE-KIT) project







# EbA experiences in South America

## Colombia



## Perú – RPNYC



## Ecuador – Manabí



## Chile – Biobío







Food and Agriculture  
Organization of the  
United Nations

# Ecuador



## Estrategias de adaptación al cambio climático basadas en ecosistemas en Ecuador

## Estrategias de adaptación al cambio climático basadas en ecosistemas en Ecuador



Por encargo de:



de la República Federal de Alemania





# Strategies for Ecosystem based Adaptation in Colombia and Ecuador

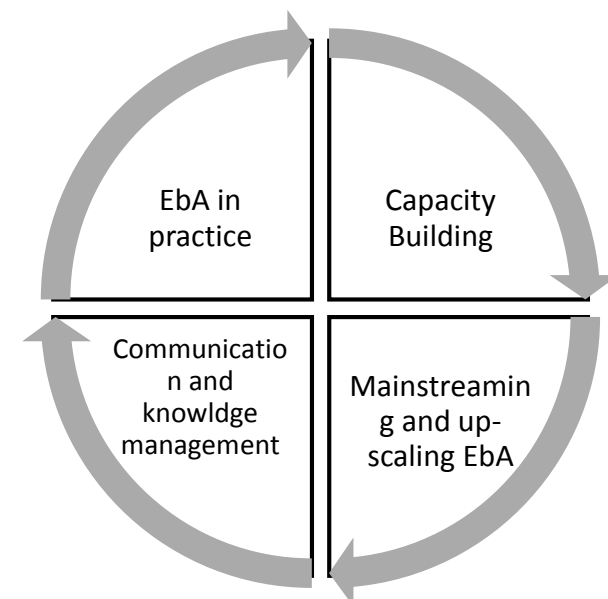
**Objective:** national and local government entities in Colombia and Ecuador integrate the EbA approach into relevant policies, plans or strategies, implement it and thus contribute to the reduction of local communities' vulnerability in coastal regions.

2016-2018 / International Climate Initiative (IKI) - BMUB, commissioned by GIZ

**Counterparts in Ecuador:**

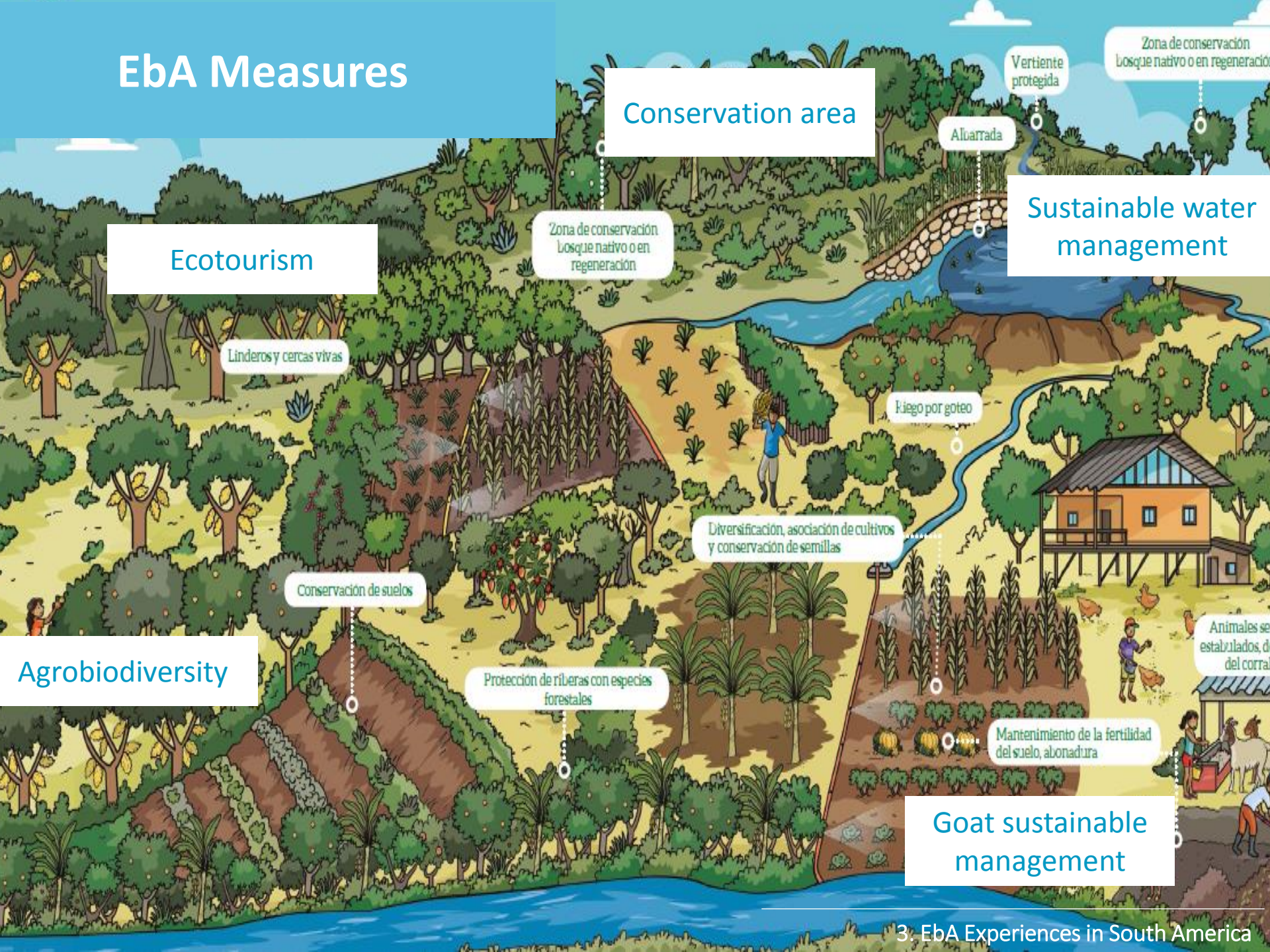
Cartagena de Indias

Jipijapa y Santa Ana





# EbA Measures



Conservation area

Vertiente protegida

Zona de conservación bosque nativo o en regeneración

Alcarrada

Sustainable water management

Ecotourism

Zona de conservación bosque nativo o en regeneración

Linderos y cercas vivas

Riego por goteo

Diversificación, asociación de cultivos y conservación de semillas

Conservación de suelos

Protección de riberas con especies forestales

Animales se estabulados, del corral

Mantenimiento de la fertilidad del suelo, abonadura

Goat sustainable management

Agrobiodiversity



# EbA Measures

Conservation area

Ecotourism

Zona de conservación  
bosque nativo o en  
regeneración

Vertiente  
protegida

Zona de conservación  
bosque nativo o en regeneración

Albarrada

Sustainable water  
management

Linderos y cercas vivas

Integral landscape management;  
strengthen livelihoods

...ación, asociación de cultivos  
... conservación de semillas

Protección de riberas con especies  
forestales

Animales se  
estabulados, d  
del corral

Mantenimiento de la fertilidad  
del suelo, abonadura

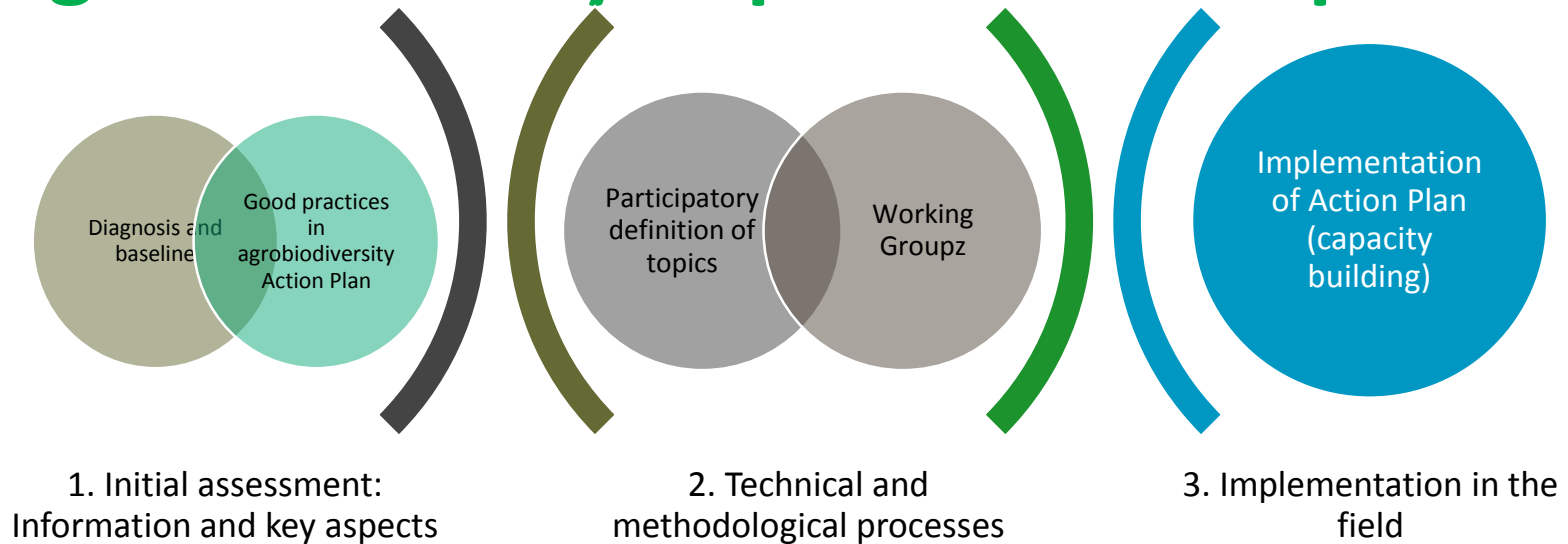
Goat sustainable  
management

Agrobiodiversity





# Agrobiodiversity implementation process



@ Paola Pinto: Specialist in Agrobiodiversity - Member of the Commission of Ecosystem Management







# Agrobiodiversity

- **Field Schools for Farmers (ECAs):** Farm's integral planning and management with an EbA Approach.
- **Exchange of experiences** → integral management of farms, conservation of agroecosystems, associativity and marketing.
- **Materials, plants and inputs.**



@ Paola Pinto







# Agrobiodiversity benefits



## Ecosystem services

- Support, provision, regulation, cultural

## Water optimization

- At farm-level and more efficient management at watershed level.



## Sustainable production

- Better productivity and opportunities for biodiversity conservation





Food and Agriculture  
Organization of the  
United Nations



## Maintenance of soil fertility, fertilization; soil conservation (1)







Food and Agriculture  
Organization of the  
United Nations



## Maintenance of soil fertility, fertilization; soil conservation (2)







Food and Agriculture  
Organization of the  
United Nations



## Diversification, association of crops and conservation of seeds







Food and Agriculture  
Organization of the  
United Nations



# Planting and management of forest species in productive systems







Food and Agriculture  
Organization of the  
United Nations



# Marketing







Food and Agriculture  
Organization of the  
United Nations



# Sustainable goat management







Food and Agriculture  
Organization of the  
United Nations



## *Bambu management*



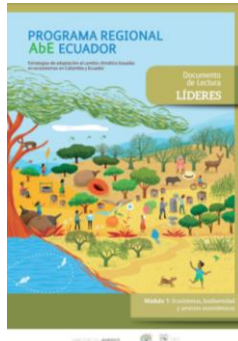
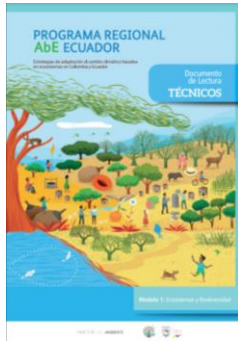
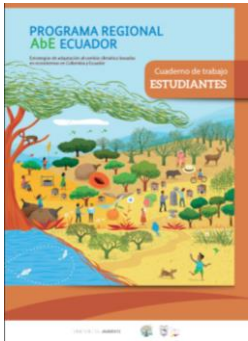




Food and Agriculture  
Organization of the  
United Nations



## Capacity building



## Mainstreaming and scaling-up EbA

## Communication and knowledge management



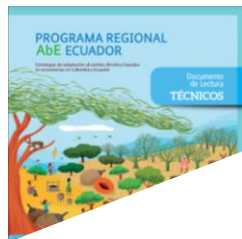
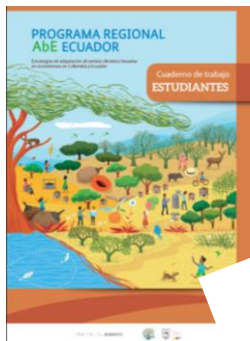




Food and Agriculture  
Organization of the  
United Nations



## Capacity building



Capacity building, innovative  
initiatives - sustainability  
and continuous communication  
and knowledge management

Planning and  
up EbA







Food and Agriculture  
Organization of the  
United Nations

# Chile





Food and Agriculture  
Organization of the  
United Nations

# Ecosystems Protecting Infrastructure and Communities

**Objective:** Recognize and promote the conservation of ecosystem services as an integral part of several global agreements and strategies, as well as CCA and DRR policies and strategies.

2013-2017

Biosphere Reserve – Corredor Biológico Nevados de Chillán - Laguna del Laja in the Biobío and Ñuble\* Regions (Chile)

**Counterparts:**



Fomentado por el:



Ministerio Federal  
de Medio Ambiente, Protección de la Naturaleza  
y Seguridad Nuclear

en virtud de una resolución del Parlamento  
de la República Federal de Alemania





# EPIC Components

Role of ecosystems for  
the CCA and DRR

Capacities

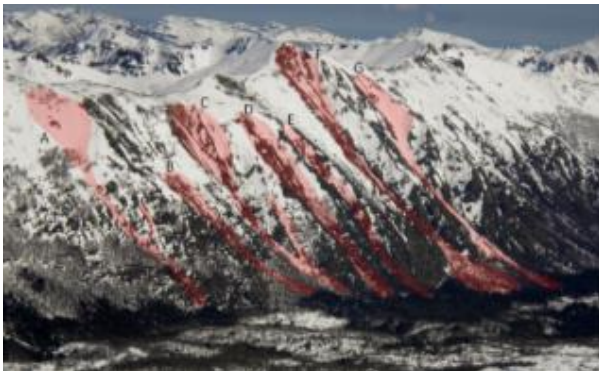
Multi-stakeholder  
dialogues: solutions and  
lessons - programs and  
public policies

**Evidence**

Capacitiy Buidling

**Policy  
advocacy**

Interaction between forests and  
natural hazards



Natural Hazards and Earth System Sciences  
An interactive open-access journal of the European Geosciences Union

[EGU.eu](#) | [EGU Journals](#) | [EGU Highlight Articles](#) | [Contact](#) | [Imprint](#)

<https://doi.org/10.5194/nhess-2017-348>  
© Author(s) 2017. This work is distributed under  
the Creative Commons Attribution 4.0 License.



Research article

**Assessing the interaction between mountain forests and natural  
hazards at Nevados de Chillán, Chile, and its implications for  
Ecosystem-based Disaster Risk Reduction**

Alejandro Casteller<sup>1,2</sup>, Thomas Häfelfinger<sup>1</sup>, Erika Cortés Donoso<sup>3</sup>, Karen Podvin<sup>3</sup>,  
Dominik Kulakowski<sup>4</sup>, and Peter Bebi<sup>1</sup>

<sup>1</sup>WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland

<sup>2</sup>Instituto Argentino de Nivología, Glaciología y Ciencias Ambientales IANIGLA, CCT-CONICET-Mendoza, Mendoza, Argentina

<sup>3</sup>IUCN, International Union for Conservation of Nature-Regional Office for South America, Quito, Ecuador

<sup>4</sup>Graduate School of Geography, Clark University, Massachusetts, USA

Received: 02 Oct 2017 – Accepted for review: 16 Nov 2017 – Discussion started: 16 Nov 2017

**Abstract.** Gravitational natural hazards such as snow avalanches, rockfalls, shallow landslides and volcanic eruptions threaten mountain communities around the world. In particular where documentary records about these processes are scarce, hazard management and land-use planning have to be based on a variety of other sources including vegetation dynamics and process models. We used a combination of these methods in order to evaluate dynamics of snow avalanches in the Valle de las Trancas, in the Biobío Region in Chile. Along this valley, natural hazards threaten not only the numerous tourists attracted by outdoor recreational activities. Given the regional scarcity of documentary records, we were applied in order to reconstruct the local history of snow avalanches and debris flow events, while related processes at respective tracks. A recent version of the model Rapid Mass Movements (RAMM)







# Identifying and analyzing landslide sites







Food and Agriculture  
Organization of the  
United Nations

# Images of the study area



Special acknowledgement to Alejandro Casteller and Peter Bebi (SLF)





# Images of the study area



In the years 1995 and 2000 avalanches occurred in many tracks (shown in pick (© Alejandro Casteller))



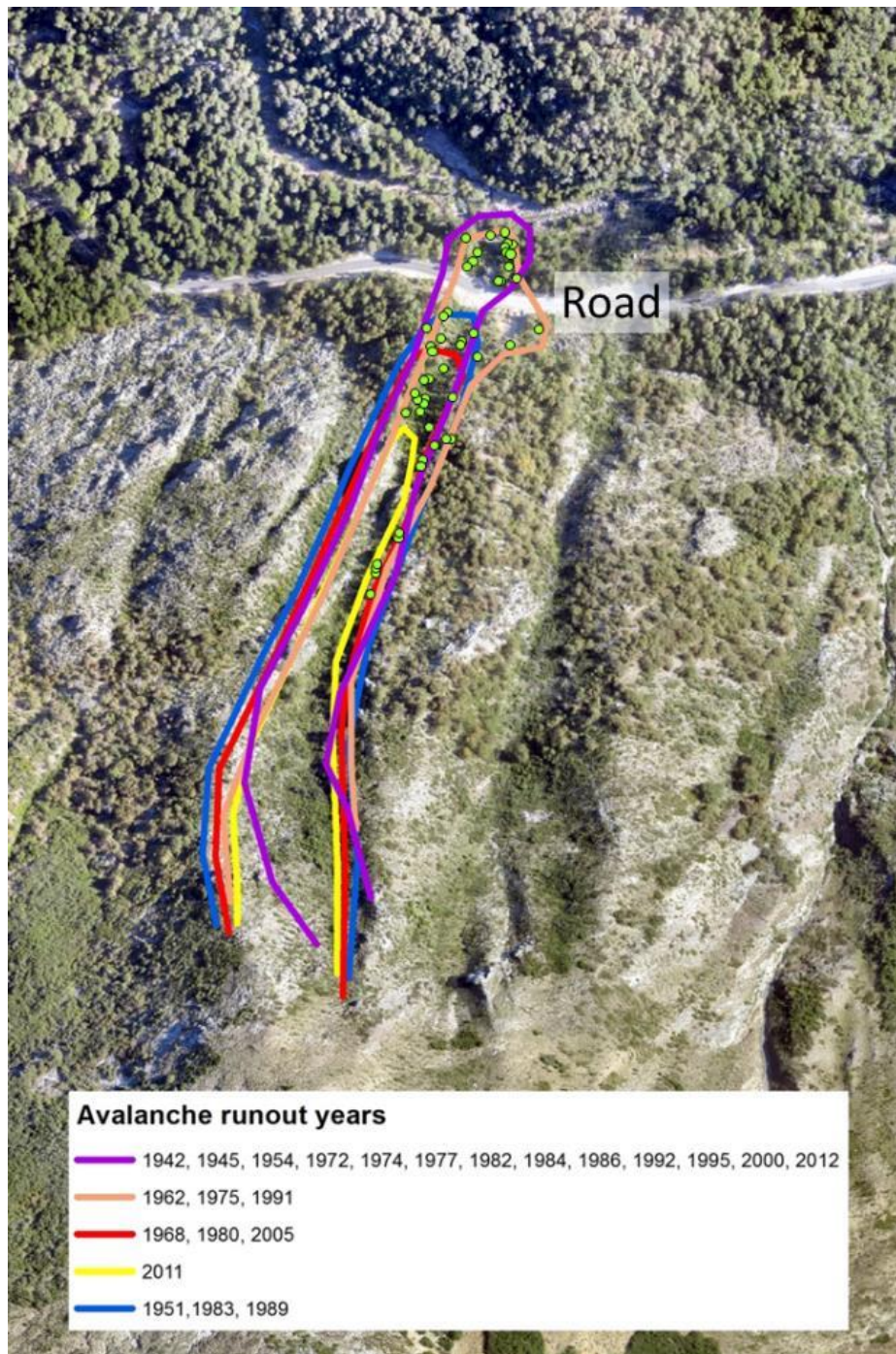


# Dendrochronological sampling: reconstruction of spatio-temporal patterns of past events





# Reconstruction of avalanche run-out zones based on dendrochronological data and (limited) available records



Special acknowledgement to Alejandro Casteller and Peter Bebi (SLF)





# Avalanche simulation with RAMMS (flow height)



Special acknowledgement to Alejandro Casteller and Peter Bebi (SLF)



# Main conclusions and future implications

- Protecting forests → particularly relevant when they fulfil the role of protection against avalanches/landslides
- Combination of different methods to learn more about natural hazards → decision support.
- Integration of the results → in planning and policy instruments (e.g. BR management plan).

Reporte final

## *Ecosistemas para la Protección de la Infraestructura y Comunidades en Chile*

Eirka Cortés-Bonmati, Peter Bebi y Alejandro Casteller



Special acknowledgement to Alejandro Casteller and Peter Bebi (SLF), Eirka Cortés (UICN, María Cecilia Jiménez y Daniel Álvarez (MMA)





# Main conclusions and future implications

- Protecting forests → particularly relevant when they fulfil the role of protection against avalanches/landslides
- Combination of scientific evidence to inform decision-making  
learn more  
decision support
- Integration of the results → in planning and policy instruments (e.g. BR management plan).

Scientific evidence to inform  
decision-making



Special acknowledgement to Alejandro Casteller and Peter Bebi (SLF), Eirka Cortés (UICN), María Cecilia Jiménez y Daniel Álvarez (MMA)



# EbA Approaches: assessing effectiveness

To what extent does the EBA  
generate benefits for adapting to  
climate change and generate other  
co-benefits?

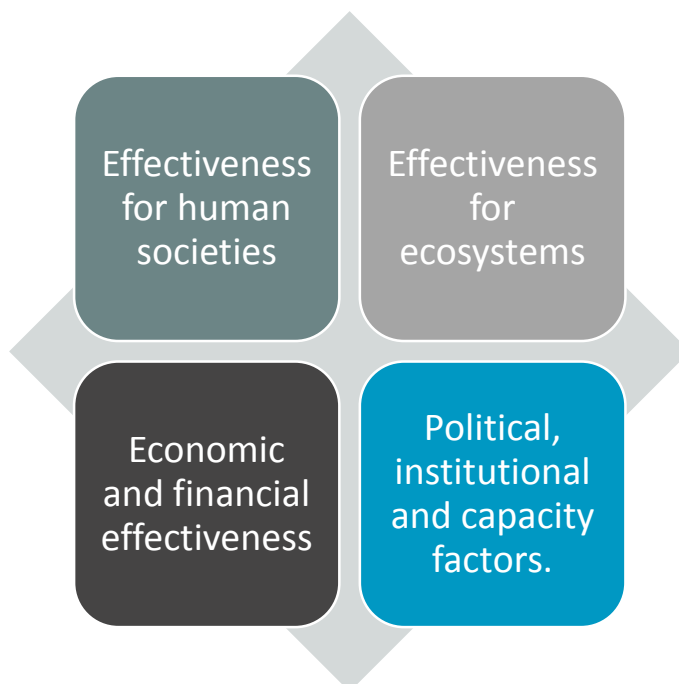




# EbA Effectiveness in EPIC



- Basis → better social resilience
- Participatory processes → mobilized local and regional stakeholders.
- Knowledge → adaptive capacities



- Institutional support → aligned to all three levels.
- Still: strengthen knowledge and capacities to continue integrating the approaches.
- Interinstitutional and multi-sector collaboration.



- Knowledge → community and ecosystem resilience
- Implement concrete projects → forest management and conservation for CCA and DDR



# EbA Effectiveness in EPIC



- Basis → better social resilience
- Participatory processes → mobilized local regional stakeholders.
- Knowledge → adaptive capacities

Effectiveness  
for human  
societies

Effectiveness  
for  
ecosystems

Economic  
and financial

Ensure effective EbA interventions

Institutional support → aligned to all three levels.

- Still: strengthen knowledge and capacities to continue integrating the approaches.
- Interinstitutional and multi-sector collaboration.



- Knowledge → community and ecosystem resilience

Implement concrete projects → forest management and conservation for CCA and DDR







Food and Agriculture  
Organization of the  
United Nations



# Conclusions

Key aspects to implement EbA



# Conclusions (1)

- EbA: cost-efficient option; multiple benefits
- EbA initiatives in the region → potential to up-scale and integrate into CCA and DRR efforts.
- Resources available: information, tools, communities of practice.
- Comprehensive design of the EbA measures







## Conclusions (2)

- Evidence → planning and decision-making processes.
- Implementation → results, flexibility, learning and participation of the different stakeholders.
- Robust M&E systems → EbA effectiveness and sustainability
- Integrate/mainstream EbA → plans, strategies and instruments at multiple levels and sectors.





Food and Agriculture  
Organization of the  
United Nations

# Thank you!

Karen Podvin – Climate Change Adaptation  
Programme Officer

[Karen.podvin@iucn.org](mailto:Karen.podvin@iucn.org)

