Why We're All Here:
The effort to align water fund prioritization in Latin America

Water Fund Prioritization Tool Technical Workshop

1 – 3 August, 2012

Lima Peru

Latin American Water Funds Platform

Where, and in what activities, should funds be invested to get greatest returns?

WF NAME	COUNTRY	STAGE
La Paz	Bolivia	1. Design
Paraiba do Sul Watershed	Brazil	1. Design
Pipiripau Watershed / Brasília	Brazil	1. Design
Taquarussu Watershed / Palmas	Brazil	1. Design
Camboriú Watershed	Brazil	1. Design
São Paulo State PES Program	Brazil	1. Design
Rio de Janeiro PES State Program	Brazil	1. Design
Paraná PES State Program	Brazil	1. Design
Feio Watershed / Patrocínio	Brazil	1. Design
Upper Tietê Watershed / São Paulo	Brazil	1. Design
São Lourenço Watershed / Pantanal	Brazil	1. Design
Santa Catarina State PES Program	Brazil	1. Design
Espírito Santo PES State Program	Brazil	2. Created
Guandu Watershed / Rio de Janeiro	Brazil	2. Created
PCJ Watershed (Cantareira System)/ São Paulo	Brazil	2. Created
Minas Gerais PES State Program	Brazil	2. Created
Santiago/Valparaiso	Chile	1. Design
Sierra Nevada de Santa Marta - Valledupar	Colombia	0. Evaluating Potential
Manizales	Colombia	0. Evaluating Potential
Cali	Colombia	0. Evaluating Potential
Cartagena	Colombia	1. Design
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Yuna	Dominican Republic	0. Evaluating Potential
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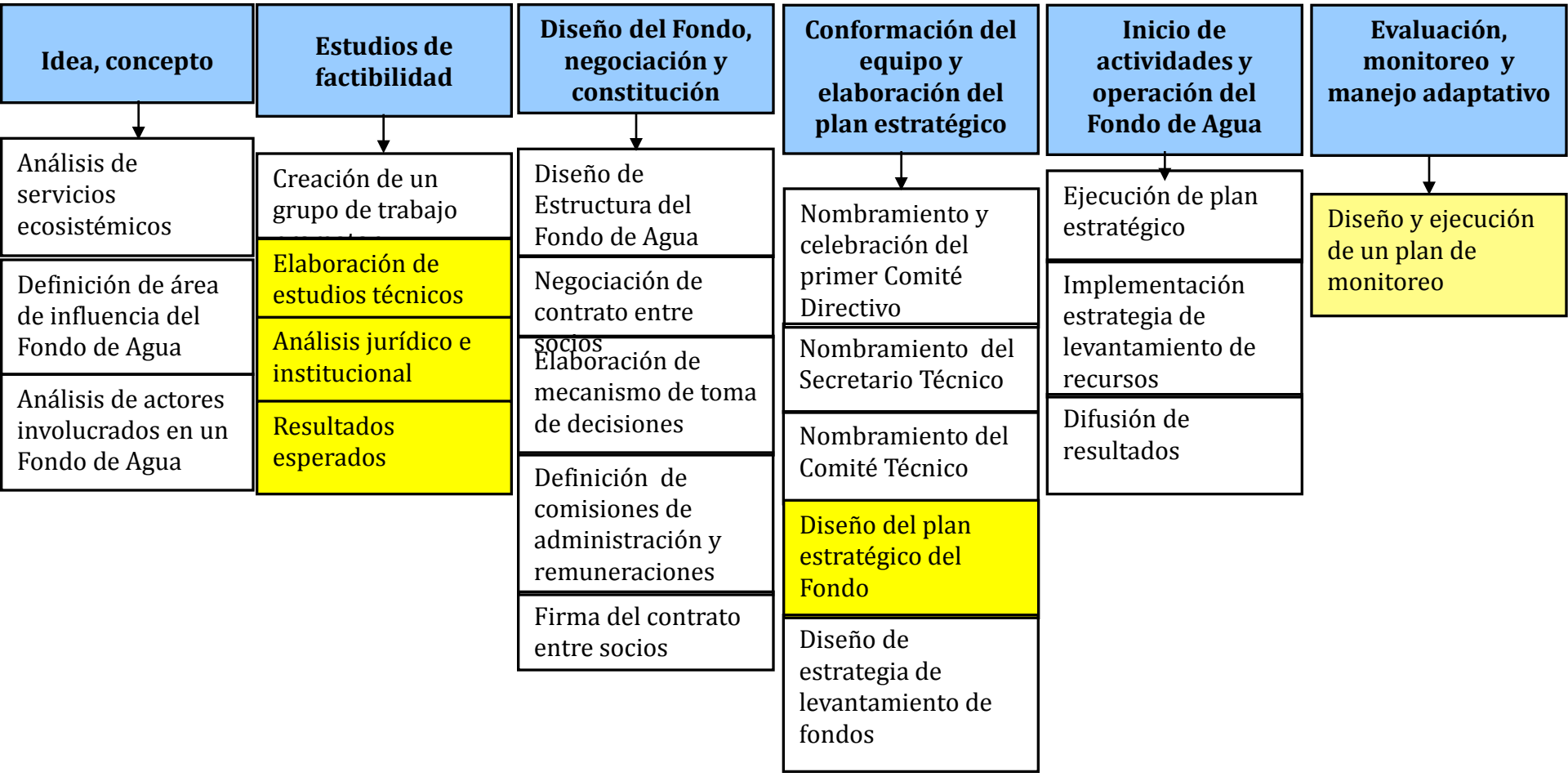
Piura	Peru	1. Design
Trujillo	Peru	1. Design
AQUAFONDO - Lima	Peru	2. Created
Mérida	Venezuela	0. Evaluating Potential

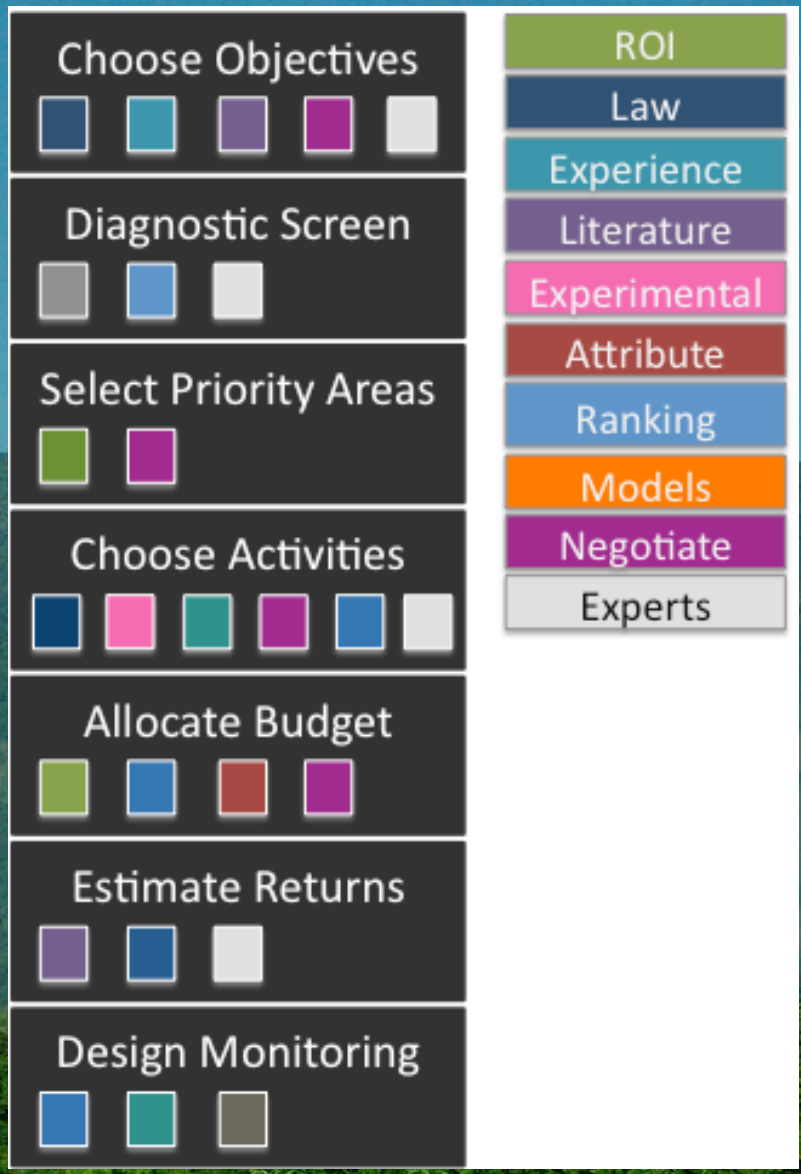
FONDOS DE AGUA:
CONSERVANDO LA INFRAESTRUCTURA VERDE
Guía de diseño, creación y operación.



Aligning Water Fund Investment Prioritization in Latin America

Dominican Republic, Sept. 2011

Core Components of Investment Prioritization



natural capital PROJECT

LATIN AMERICAN WATER FUNDS PARTNERSHIP

The Nature Conservancy Protecting nature. Preserving life.

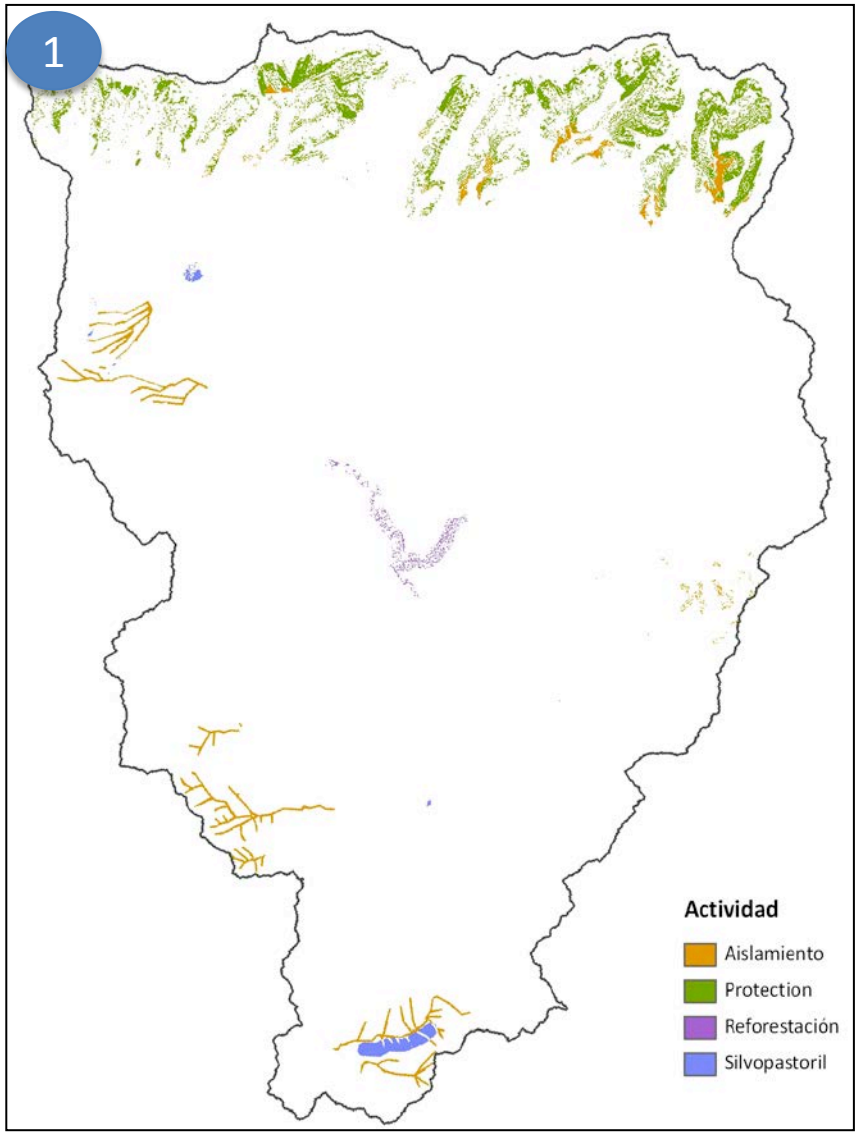
FUNDACIÓN FEMSA

IDB Water and Sanitation Initiative

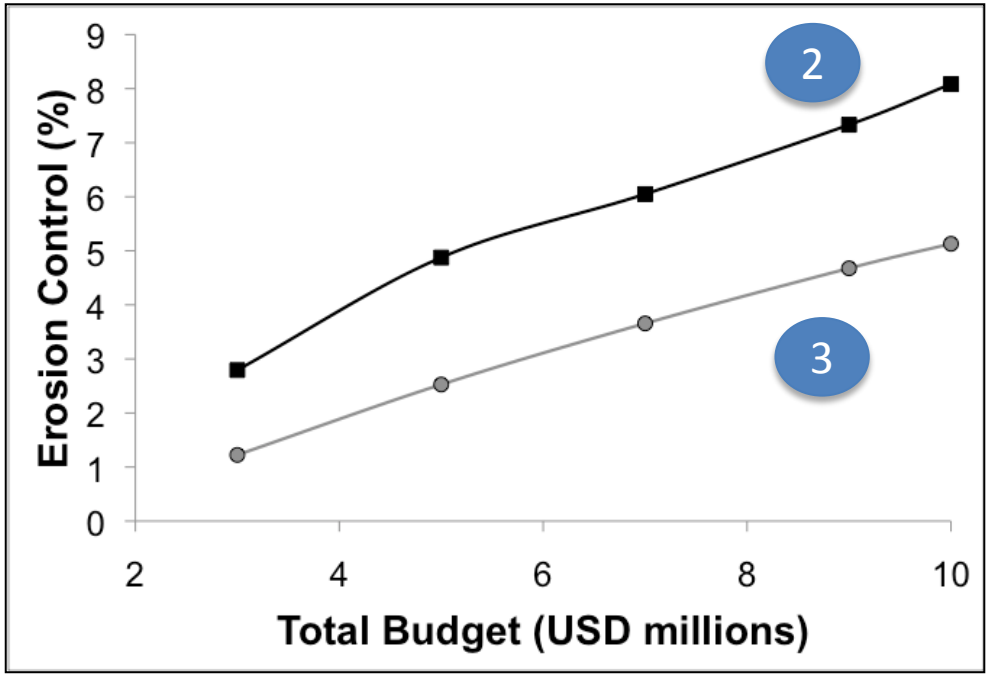
GORDON AND BETTY MOORE FOUNDATION

USAID FROM THE AMERICAN PEOPLE

The Birth of the RIOS (Resource Investment Optimization System) Tool



1. **Investment Portfolio**
   (Objectives, Activities, Budget, Diagnostic Screen, Priority Areas)
2. **Estimated Return on Investment**
   (Estimate Returns)
3. **Estimated Value of Science**
   (Business case for approach)



RIOS Development

Water Fund Investment Prioritization Working Group

Core Team

LATIN AMERICAN WATER FUNDS PARTNERSHIP

The Nature Conservancy
Protecting nature. Preserving life.

natural capital PROJECT

Advisory Group

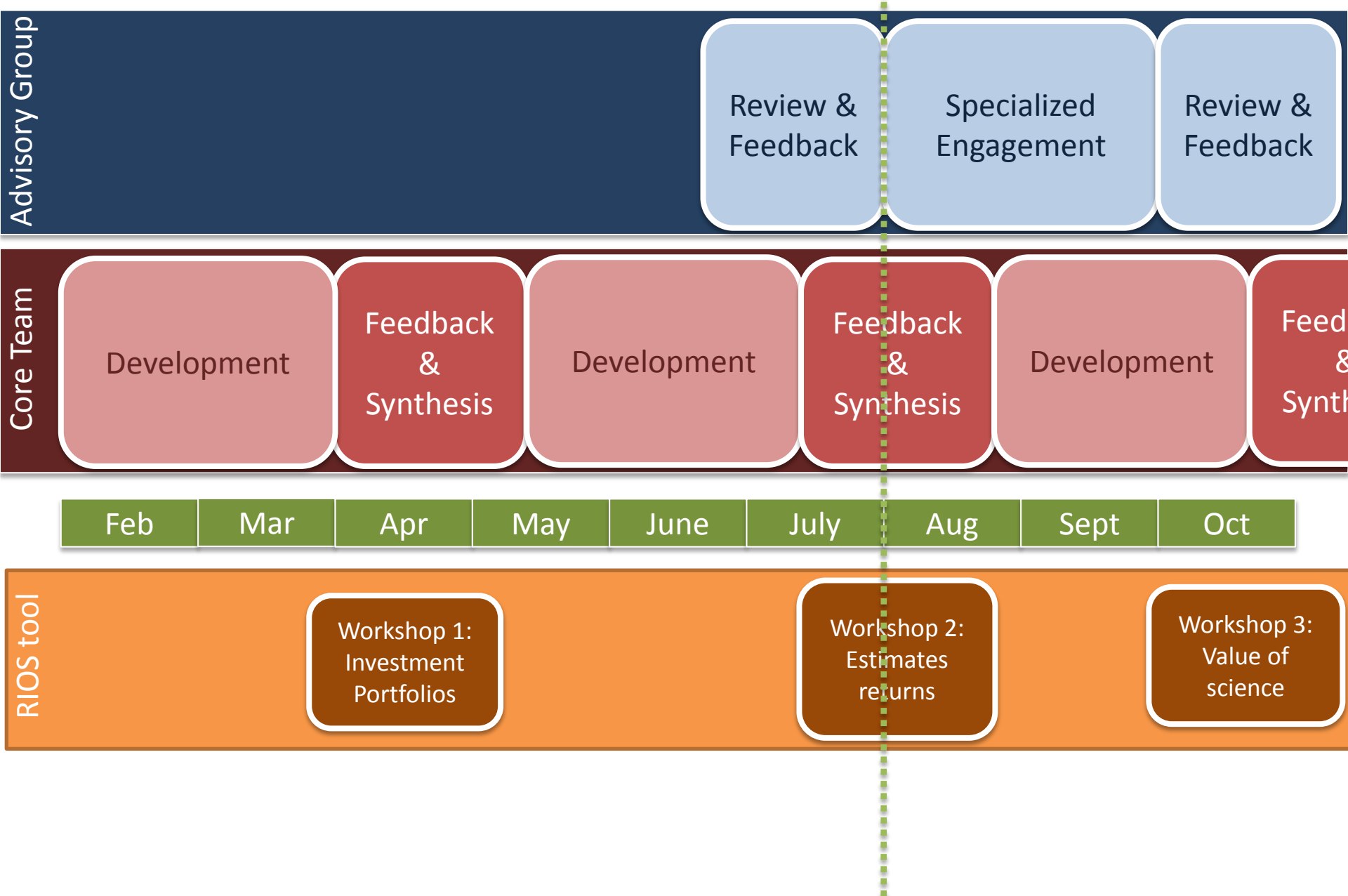
FONAPA
Fondo del agua para la conservación de la cuenca del río Paute

The Nature Conservancy
Protecting nature. Preserving life.

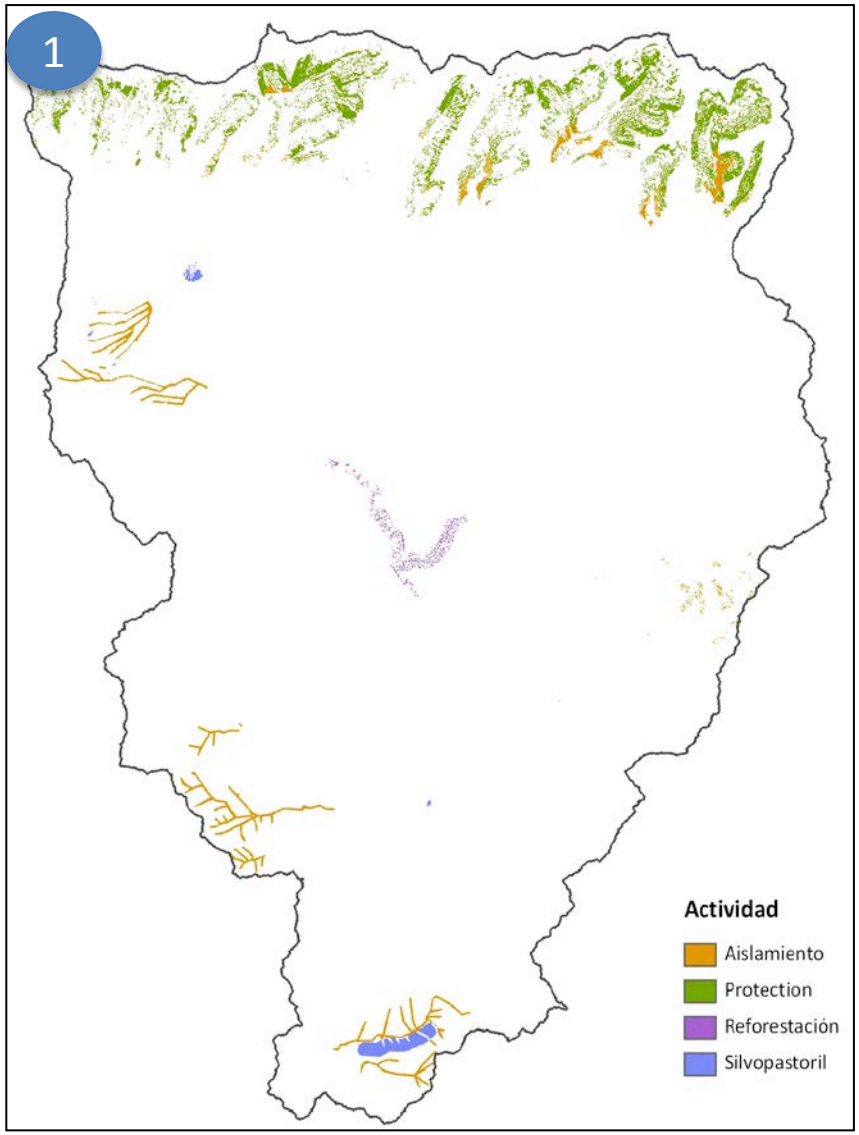
WWF

FUNDACIÓN FEMSA

Timeline


Advisory Group
Review & Feedback
Specialized Engagement
Review & Feedback
Core Team
Development
Feedback & Synthesis
Development
Feedback & Synthesis
Development
Feed & Synth
Feb
Mar
Apr
May
June
July
Aug
Sept
Oct
RIOS tool
Workshop 1: Investment Portfolios
Workshop 2: Estimates returns
Workshop 3: Value of science

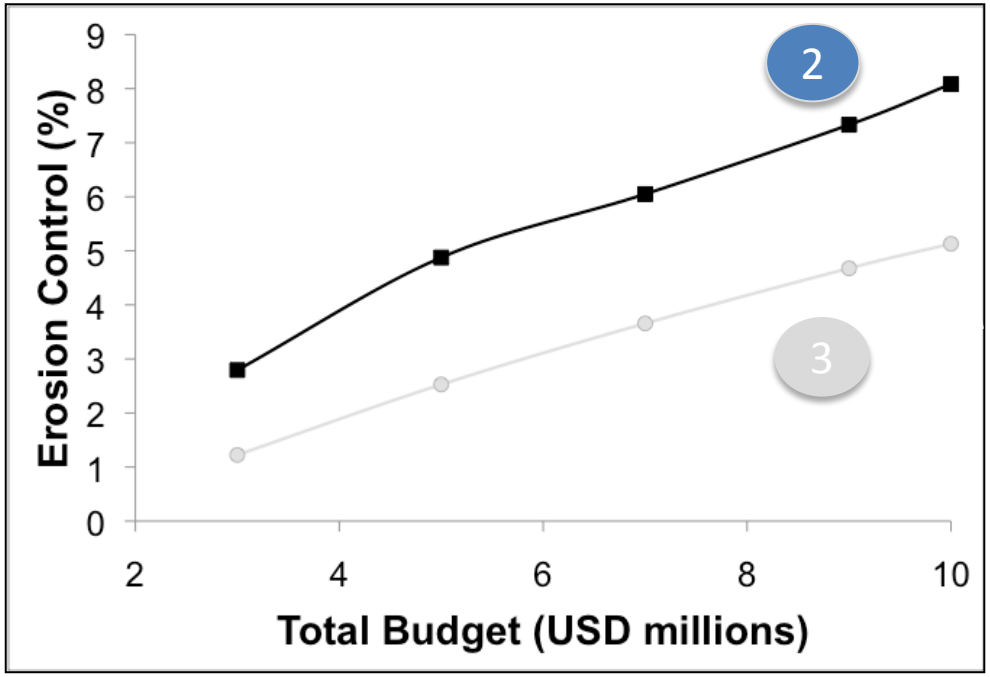
RIOS Today



1 **Investment Portfolio**
(Objectives, Activities, Budget, Diagnostic Screen, Priority Areas)

2 **Estimated Return on Investment**
(Estimate Returns- Erosion control)

3 **Estimated Value of Science**
(Business case for approach)



Latin American Water Funds Platform & Beyond

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RIOS Investment Portfolio Selection Process

Objectives

What are the fund's objectives?

Diagnostic Screening

Transitions

- Which transitions do you want to cause?
- Will some be more effective than others?
- Will some factors be more important than others in determining the impact of each transition?

Activities

- Which activities can be used for each transition?
- Where can each activity be done?
- How much does each activity cost?

Priority Area Selection

Budget

- What is the budget?
- How do you want to spend it?

Activities

- How much does each activity cost?

Investment Portfolio

Objectives

What are the fund's objectives?

RIOS TOOL

6 Objectives:

Erosion Control for Drinking Water Quality
Erosion Control for Reservoir Maintenance
Phosphorus Retention for Drinking Water Quality
Nitrogen Retention for Drinking Water Quality
Flood Mitigation
Groundwater Recharge (karst)

PLANNED

Bacteria Retention for Drinking Water Quality
Baseflow Regulation for Water Supply

DISCUSSED

Landslide regulation
Biodiversity objectives
Social objectives

Diagnostic Screening

Transitions

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Activit

- Which activ
- can be used
- transition? Do
- prefer some
- others?
- Where can
- activity be d
- How much does each activity cost?

Portfolio

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Activities

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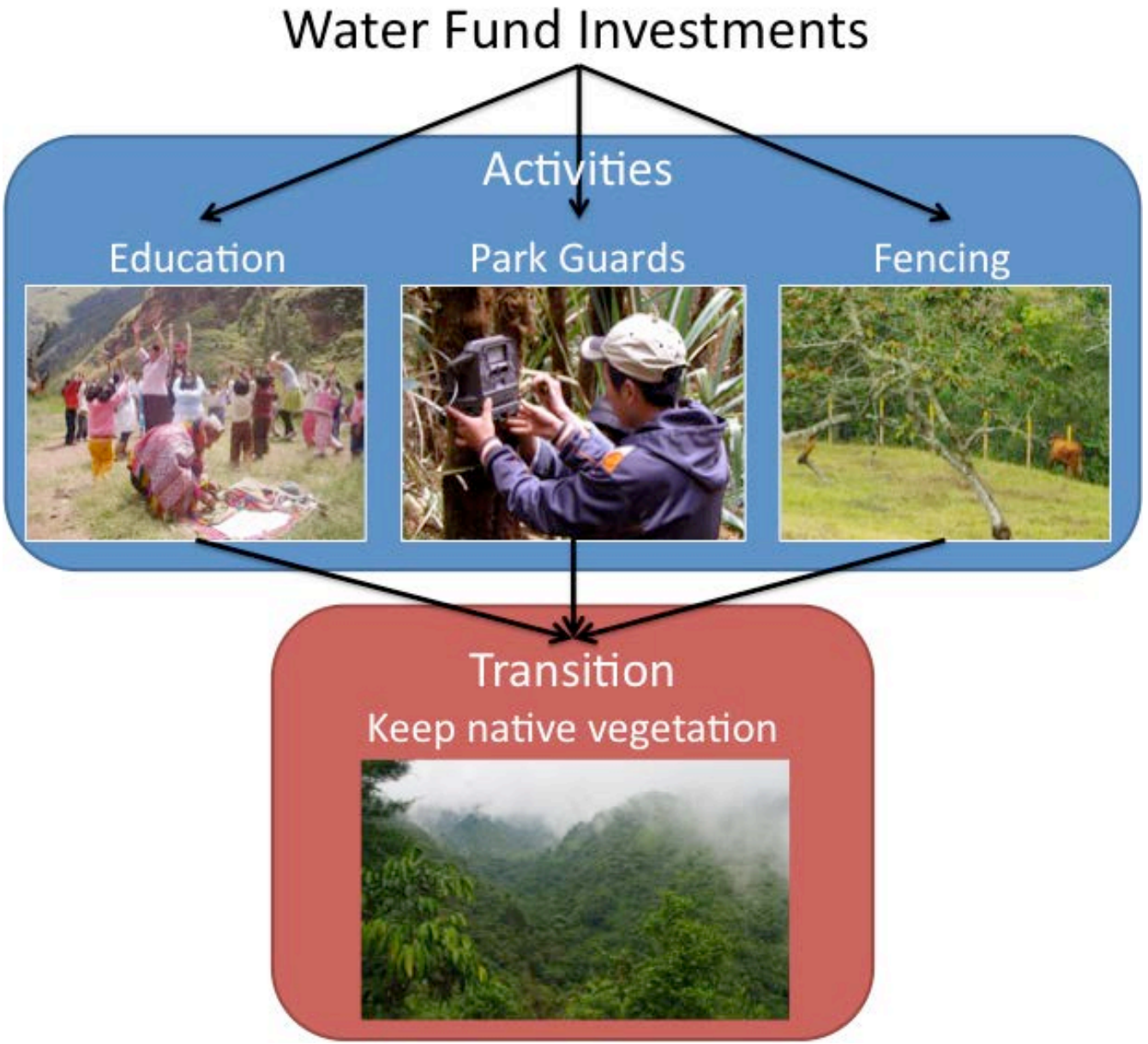
Investment Portfolio

Activities and Transitions



Activities and Transitions Options

Activities

RIOS TOOL
User-defined activities!

DISCUSSED
Non-land based activities

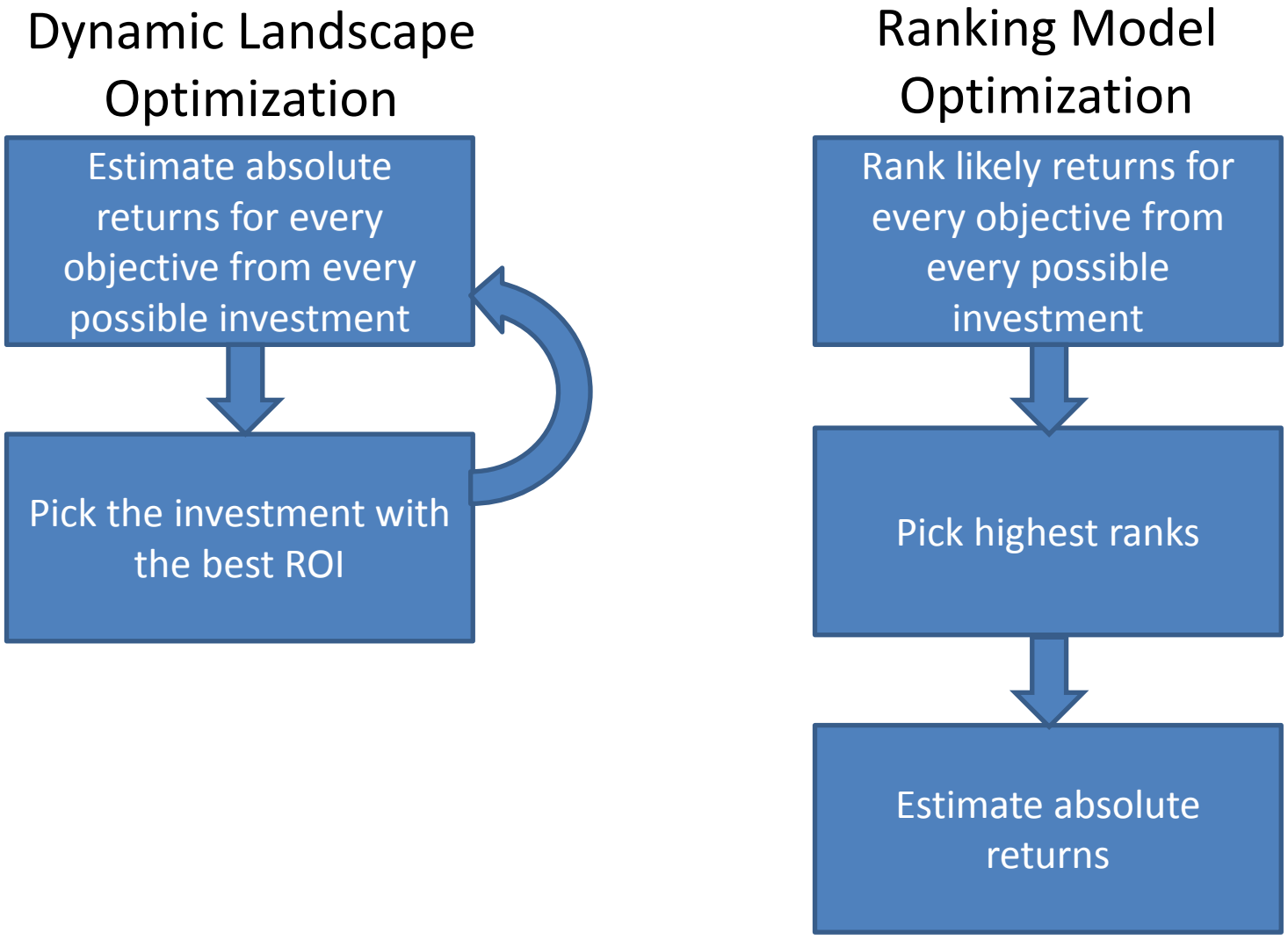
Transition

Keep native vegetation

RIOS TOOL
5 transitions:
Keep native vegetation
Unassisted re-vegetation
Assisted re-vegetation
Modify landscape structure
Increase crop cover/diversity
Reduce agricultural inputs

Diagnostic Screening Approach

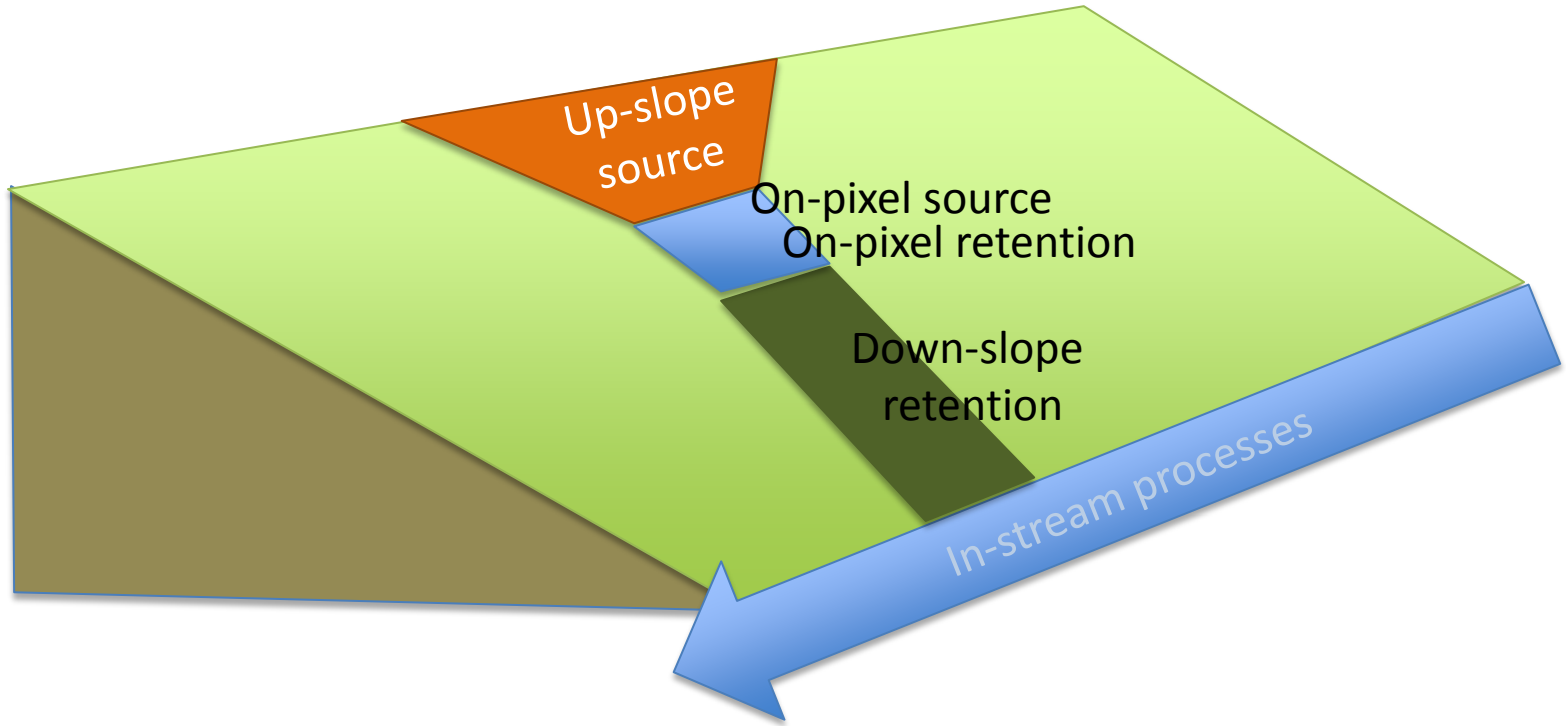
What are the best activities to do in each part of the landscape to meet all of our objectives?



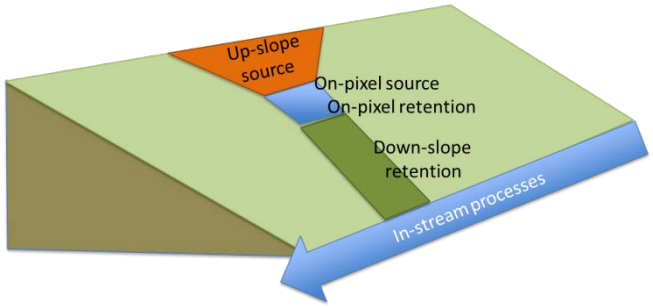
InVEST Software

Steve Polasky, Erik Nelson, Guillermo Mendoza, Driss Ennaanay, Stacie Wolny, Heather Tallis, Marc Conte, Jim Regetz, Peter Kareiva, Taylor Ricketts, Gretchen Daily, Mary Ruckelshaus, Anne Guerry, Katie Arkema, Greg Guannel, Jodie Little, Chong Ki Kim, Mike Papenfus, Apollo Qi, Nasser Olwero, Nirmal Bhagabati, Robin Naidoo, Eric Lonsdorf, Kai Chan, Rebecca Shaw, Dick Cameron, Neil Burgess, Andrew Balmford

Factors for Transition Effectiveness



Erosion Control



Up-slope Source

- Slope
- Retention + Source Factors
- Source area

On-pixel

Source:

- Rainfall erosivity
- Soil erodibility
- Soil Depth
- Export (USLE C factor)

Retention:

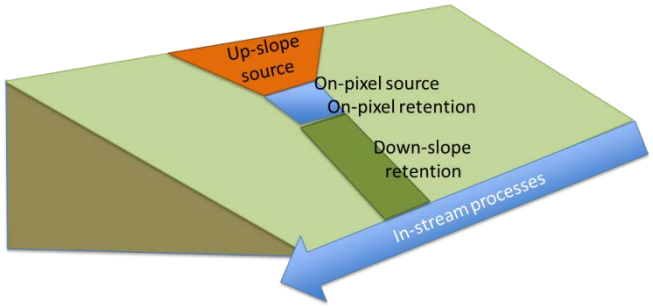
- % Sediment Retention
- Riparian Continuity

Downslope Retention

- Slope
- Sediment Retention
- Flow length to stream

Beneficiaries

Erosion Control



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Downslope Retention

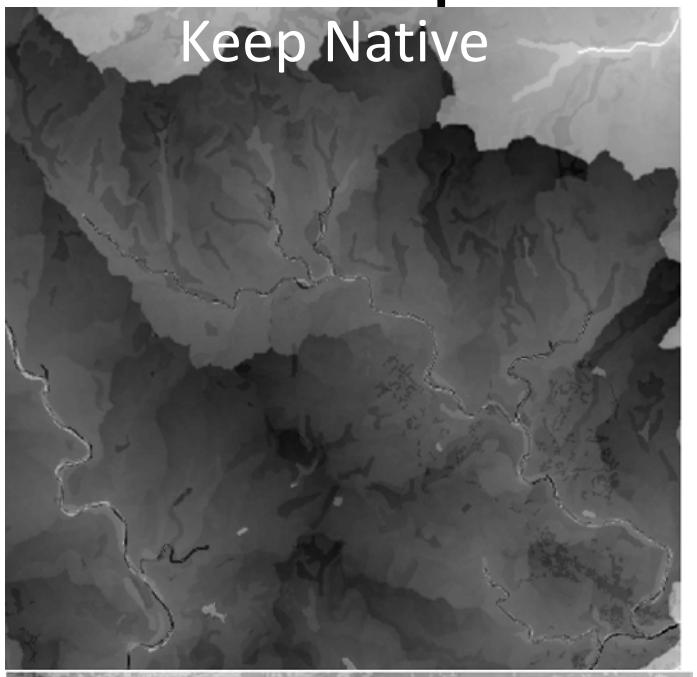
- Slope
- Sediment Retention
- Flow length to stream

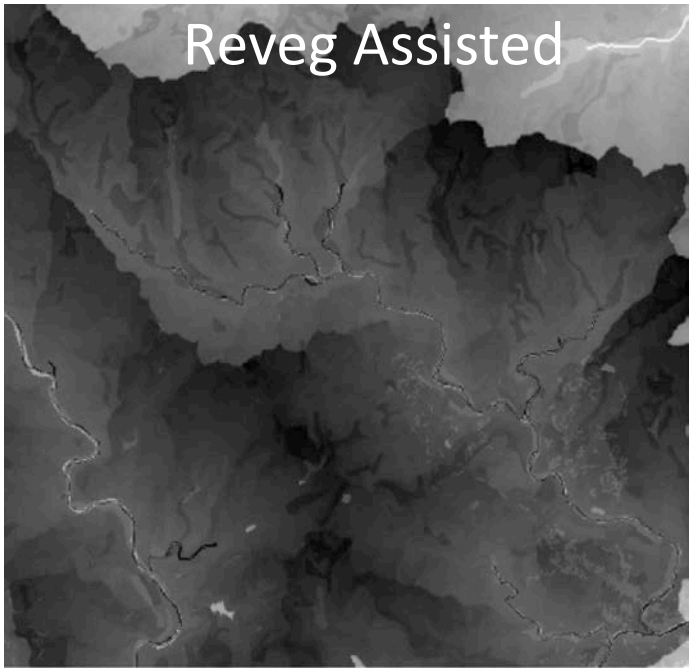
Beneficiaries

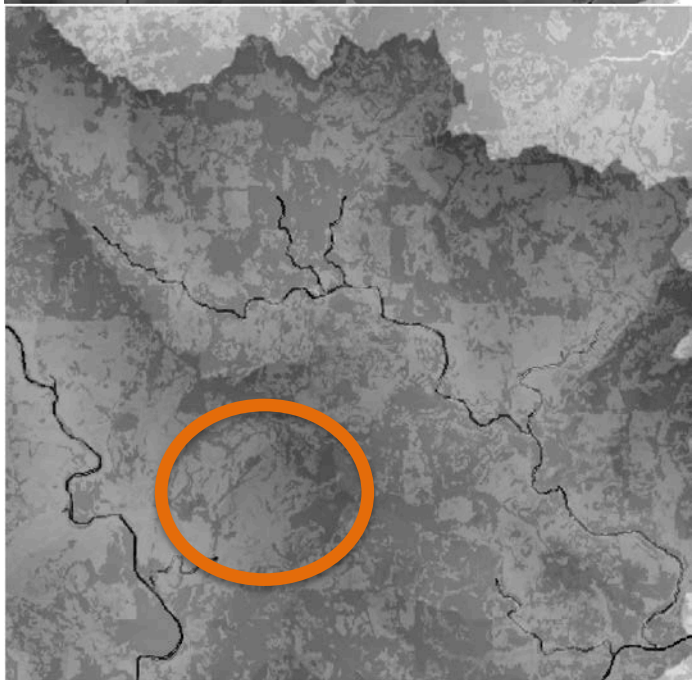
Transition Maps

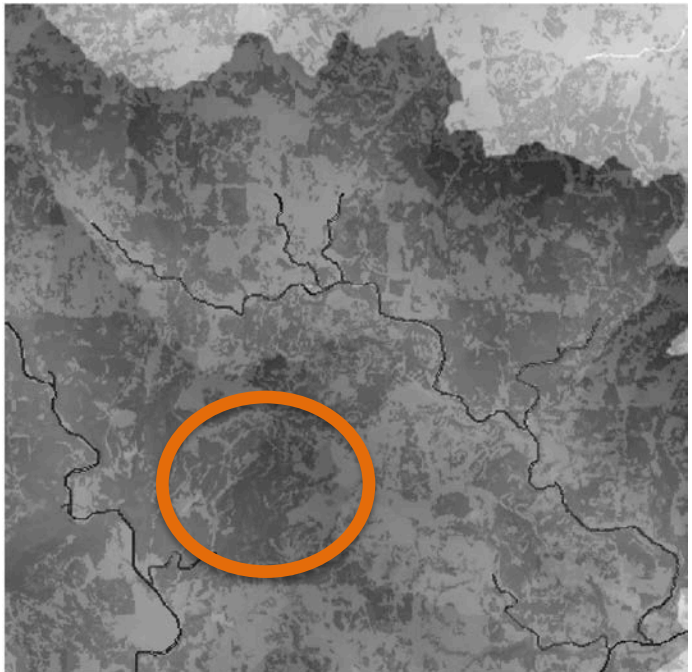
Erosion Control DW

Flood Mitigation









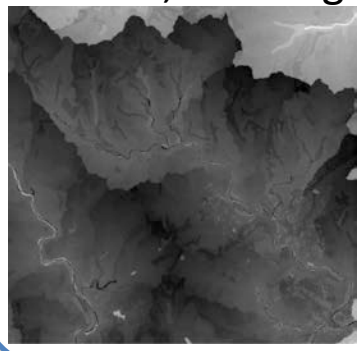
Transition Data

Objective Weights: Are transitions more effective at achieving some objectives?

Objective	Keep Native	Assisted Reveg	Unassisted Reveg	Fertilizer Management
Erosion control, drinking	1.0	1.0	1.0	0.25
Erosion control, reservoirs	1.0	1.0	1.0	0.25
Phosphorus retention	1.0	1.0	1.0	0.25
Nitrogen retention	1.0	0.5	0.5	1.0
Flood mitigation	1.0	0.5	0.5	0.0
Groundwater recharge	1.0	0.5	0.5	0.25

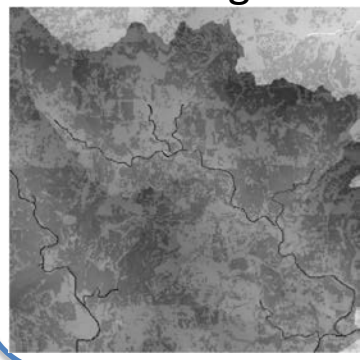
Revegetation- Assisted

Erosion, drinking



* 1.0 +

Flood mitigation



* 0.5 +

Activities & Transitions Data

Which activities can be used to make which transitions?

Activity	Keep Native	Assisted Reveg	Unassisted Reveg	Fertilizer Management
Fencing	✔		✔	
Park Guards	✔			
Silvo pasture		✔		✔

Which activities can be done on which kinds of land use and land cover?

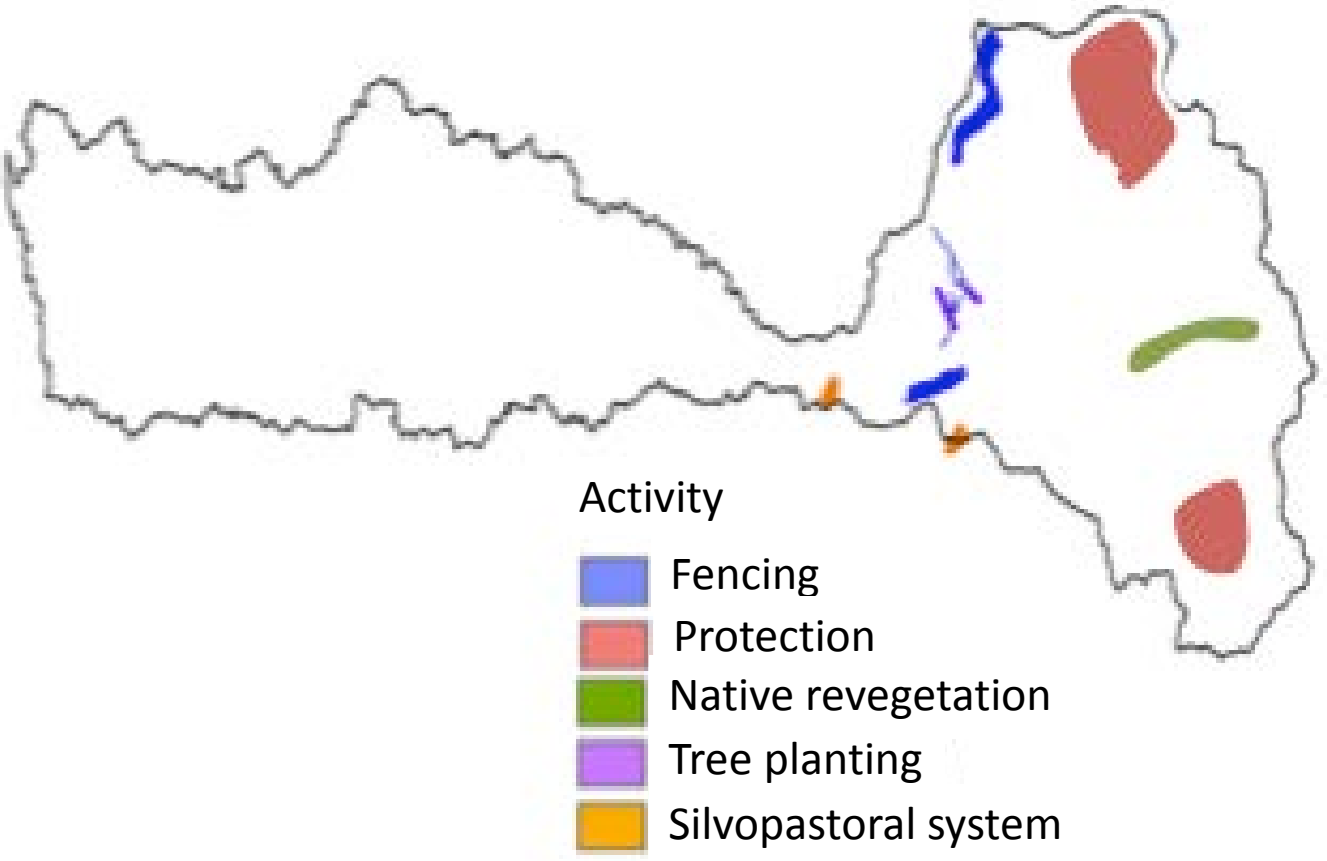
LULC	Fencing	Park Guards	Silvo pasture
Native forest	✔	✔	
Native grassland	✔	✔	
Sugarcane			
Pasture	✔		✔

How much does each activity cost?

Activity	Cost
Fencing	$150/ha
Park Guard	$100/ha
Silvopastoril	$1200/ha

Activities & Transitions Data

Where do stakeholders prefer activities to be allowed or prevented?

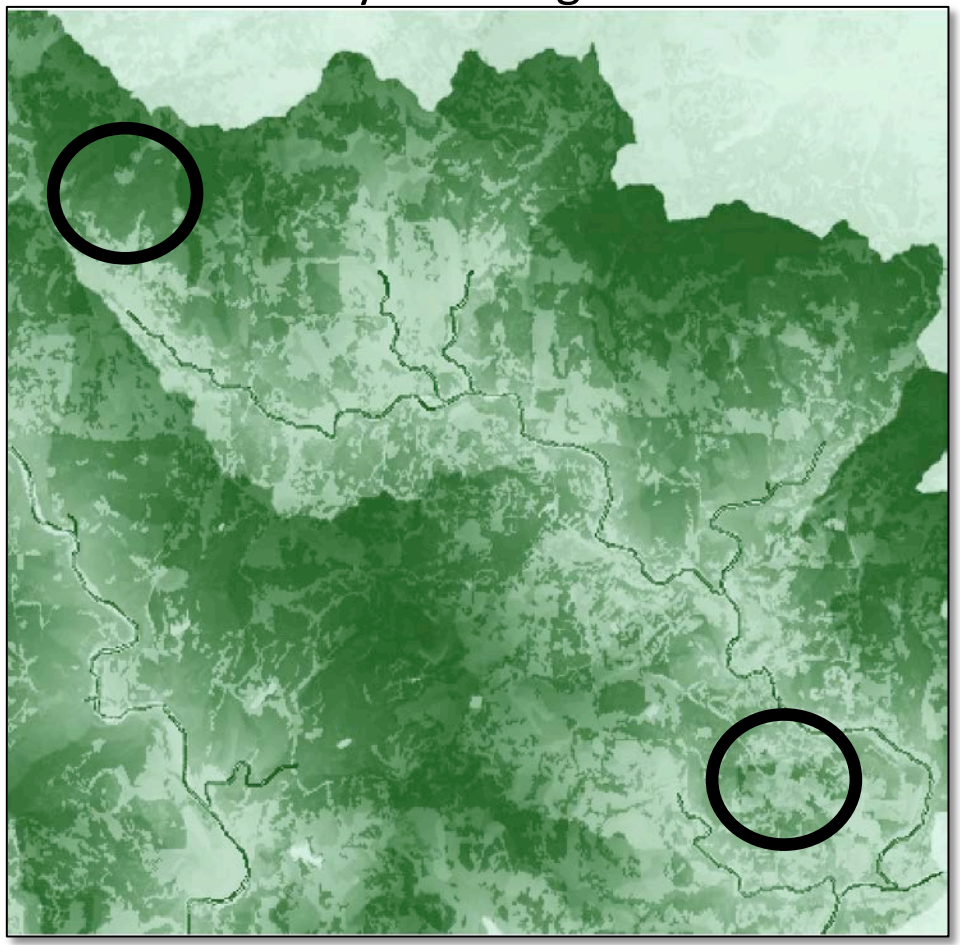


Activities Maps

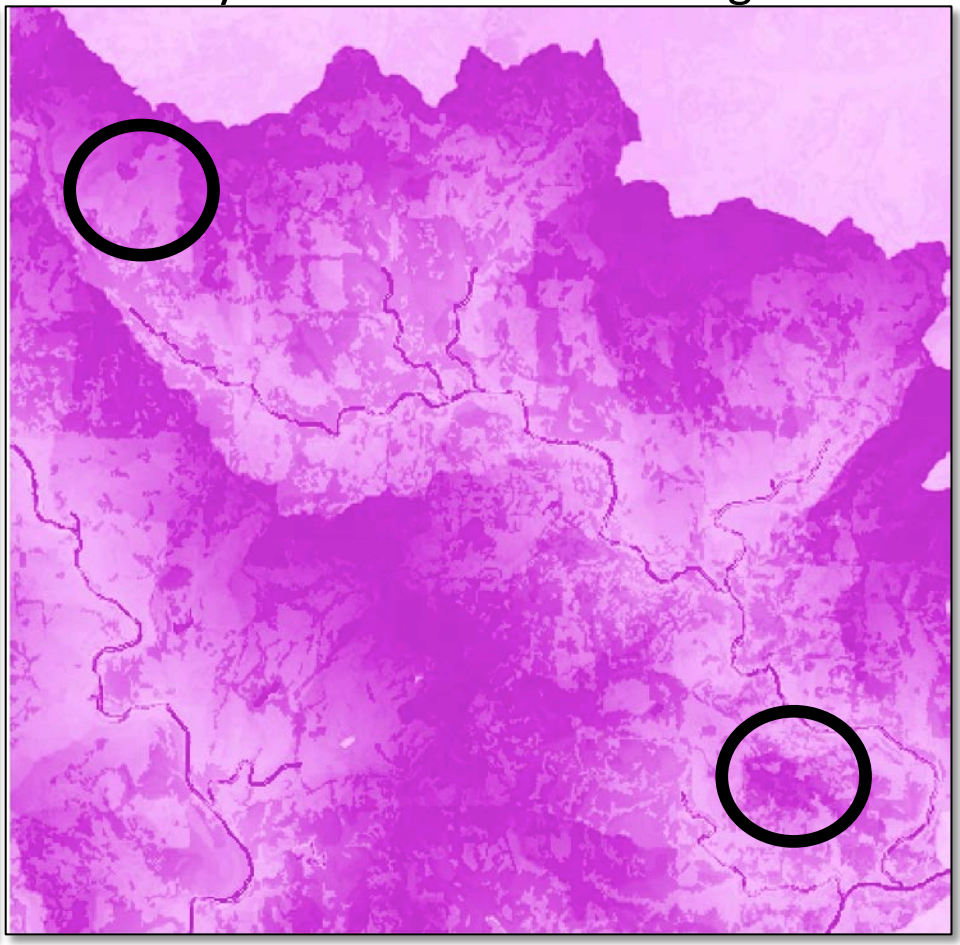
What are the best activities to do in each part of the landscape to meet all of our objectives?

Relative Return on Investment per Activity

Activity: Planting Trees



Activity: Protected Area Management



Activities Maps

What are the best activities to do in each part of the landscape to meet all of our objectives?

Relative Return on Investment per Activity

Activity: Planting Trees

Activity: Protected Area Management

But which do we pick first??

Objectives

What are the fund's objectives?

Diagnostic Screening

Transitions

- Which transitions do you want to cause?
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Activities

- Which activities can be used for each transition?
- Where can each activity be done?
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Priority Area Selection

Budget

- What is the budget?
- How do you want to spend it?

Activities

- How much does each activity cost?

Budget Amount

Objectives

What are the fund's objectives?

Diagnostic Sc

• can be used for each transition? Do you prefer some over others?

• Where can each activity be done?

• How much does each activity cost?

RIOS TOOL
Total or annual budget

DISCUSSED
Define based on objectives

Priority Area Selection

Budget

- What is the budget?
- How do you want to spend it?

Activities

- How much does each activity cost?

Budget Allocation

Objectives

What are the fund's objectives?

Diagnostic Scr

• Which activities can be used for each transition? Do you prefer some over others?

• Where can each activity be done?

• How much does each activity cost?

RIOS TOOL

Pre-allocate by activity

Return on investment

Both

Priority Area Selection

Budget

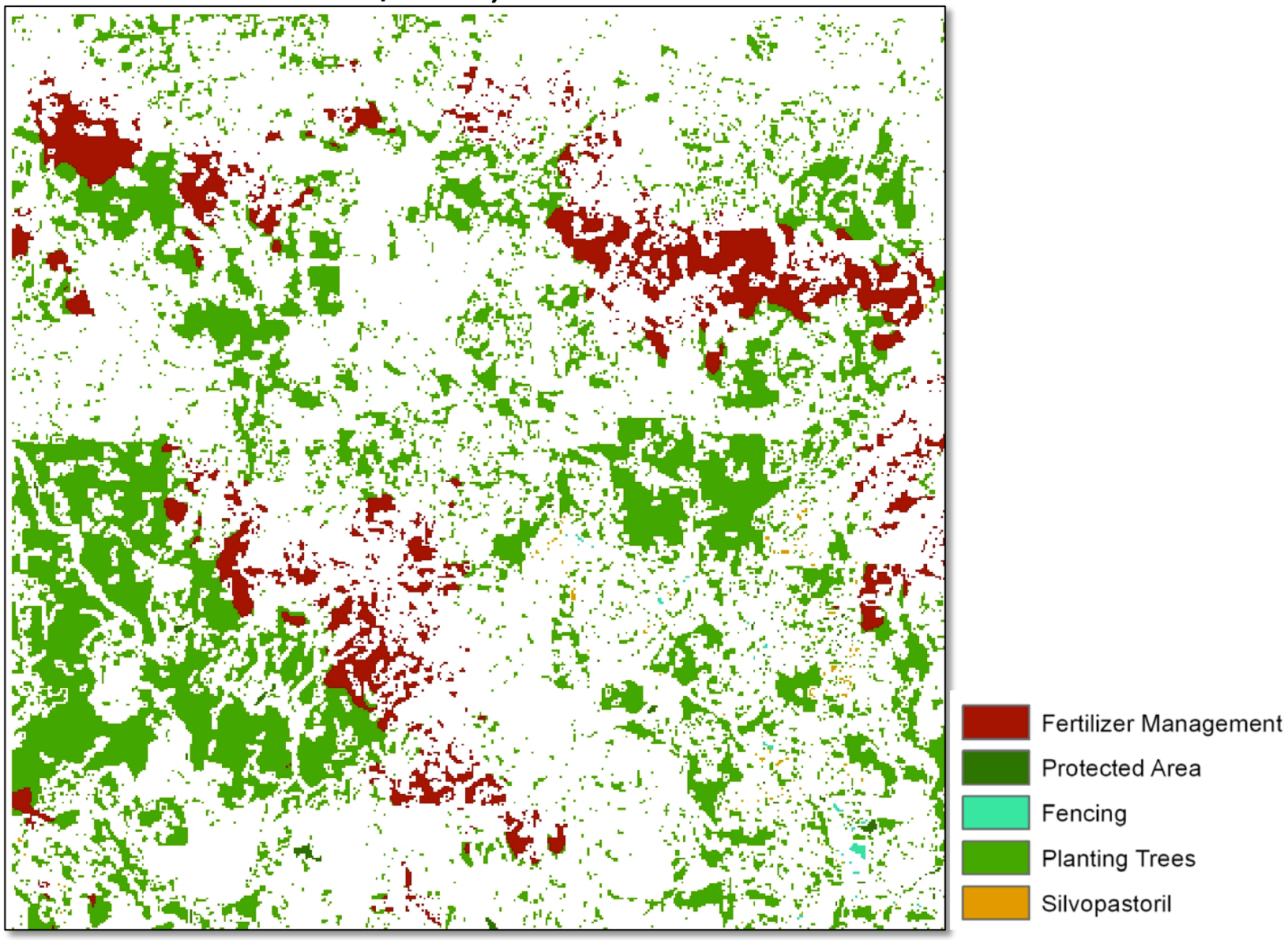
- What is the budget?
- How do you want to spend it?

Activities

- How much does each activity cost?

Investment Portfolio

$222,000



Report

Activity	Amount Allotted	Amount Reallocated	Spent	Total Area Applied (ha)	Per Pixel Cost
Fencing	$200,000	0	$10,368	8.6	$108
Fertilizer management	$200,000	0	$199,989	1,111	$16
Protected area management	$200,000	0	$4,545	25.5	$16
Planting trees	$200,000	0	$163,134	4,028	$40
Silvopasture	$200,000	0	$7,371	16.4	$40
Total Activity Budget			$1,000,000		
Total Spent			$222,312		
Remaining			$777,688		

Check-in with RIOS development

Tasks discussed in 1st workshop

Software & Functionality

Change	Status	Notes
Users input stakeholder preference areas, allow or prevent activities in different areas	Approach decided	Implemented in Oct release
Include activity likelihood of success in estimation of returns	Approach decided	Discuss in workshop, implement in 4-6 wks
Provide option to adjust clumping factor	DONE	
Make activities user-defined	DONE	
Improve fencing cost algorithm	Approach decided	Implement in Oct release
Incorporate data pre-processing into tool	Pre-processing tool for ArcGIS DONE	Merge into RIOS for Oct release
Provide activity and transition maps as outputs	DONE	
Add output table that summarizes area and cost by activity	DONE	
Add output map that shows transition scores across all objectives	DONE	

Software & Functionality (continued)

Change	Status	Notes
Improve general LULC classes to be more representative	DONE	
Allow users to edit LULC coefficients table	DONE	
Expert elicitation to derive objective weights	Approach decided	Conduct surveys Aug-Sept 2012
Update Advisory Group on progress, identify specific engagement opportunities	In progress	
Make RIOS, estimation of returns independent of ArcGIS	DONE	
Spanish version of RIOS	Approach decided, text translation DONE	Implement as Spanish version installer
Sensitivity analyses	Approach decided	

Documentation/Guidance

Change	Status	Notes
Add guidance on how to use RIOS to set budget	In progress	Finalize with estimation of returns model
Improve guidance on beneficiaries data	DONE	Will discuss in technical training and incorporate feedback
Improve guidance on mapping of LULC classes to general categories	DONE	New LULC tables & descriptions
Improve guidance on preparing factor data	DONE	
Improve language describing education activity and agriculture activities	In progress	
Improve guidance on using RIOS outputs to inform monitoring	In discussion	Present approach in Lima workshop, incorporate feedback

Points Under Discussion

Change	Status	Notes
Nonlinear effects (diminishing returns, cost benefit of aggregation)		
Incorporating point sources (portfolio design and estimation of returns)		
Add objectives: baseflow, bacteria retention, carbon, landslides		
Add Activities: Regulation, conservation agreement, land acquisition, fire management		

Things We Will Discuss (from Mexico City workshop)

- Weight of cost in ROI in absolute vs. relative models
- Include user-defined factors?
- Dealing with diminishing returns
- Economics of scale and non-additive effects
- Allow more than one activity per pixel
- Compare grey vs green: do in tool or just provide input to such analyses
- Provide some guidance on low-end thresholds, when it's worth investing
- Ways to allow alternatives for data inputs (less or better data, e.g. from other models)

Things We Will Discuss (from Mexico City workshop)

- What to do about point sources (include in models or represent proportional contribution of point vs. non)
- Revisit agricultural transitions and activities
- Need more or different outputs to guide monitoring site selection?
- How to account for deposition in-stream in erosion models
- Resampling data to account for error
- Social objectives (income, poverty, quality of life, tenure, human loss, consider op cost of activities
- Biodiversity objectives (building off suggestions)
- Validation of ranking models