

How much is a forest worth?

Valuing ecosystems for hydropower production in Himachal Pradesh, India

WAVES PTEC 3rd Annual Meeting
October 2014

Outline

The background of the slide features a dark, muted green and blue color scheme. On the right side, there is a faint, stylized world map. On the left side, there is a silhouette of a mountain range.

- Scope of Project
- Where we are today
- Questions for discussion

Policy questions and accounts

- How has the forest wealth of HP evolved over time? (asset accounts)
- What is the contribution of timber and other forest products to the state income, who is benefitting from these good, and how can the contribution be increased sustainably? (supply-use table)
- What is the contribution of forests to hydropower (ecosystem account) and tourism sectors (eco-tourism account)?

Scope - Policy Context

- Hydropower sector is a key growth sector in Himachal Pradesh
 - Number of projects under development
 - Number of payment mechanisms to compensate affected households and reduce environmental impacts, including prevention of soil erosion
- No assessment of ecosystem services or how these could be maximized through land management practices

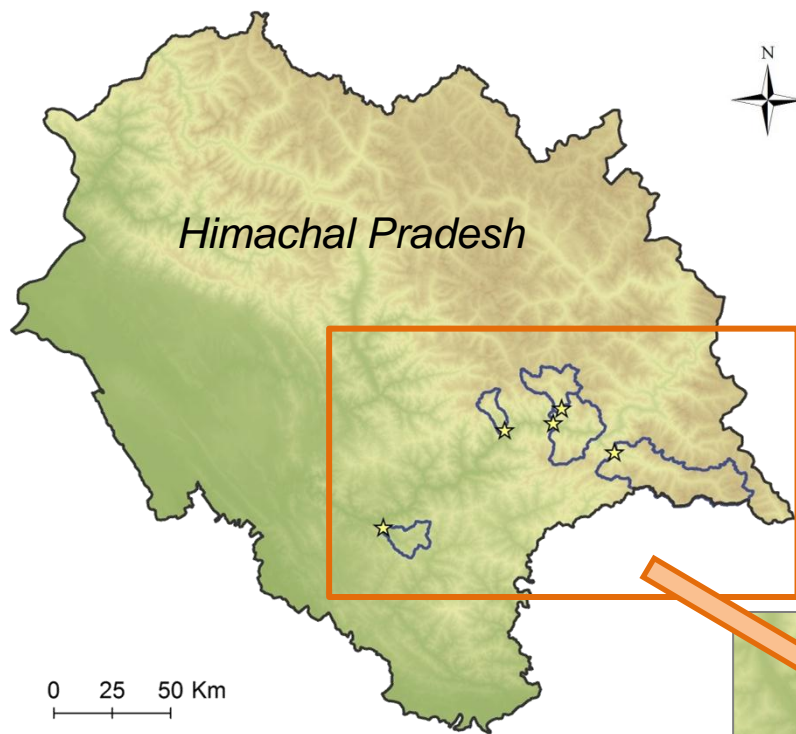
Scope - Project Objectives

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- Assess flow and value of ecosystem services and help
 - Design payment for ecosystem services scheme
 - Improve land management practices
- Which services?
 - Water supply for hydropower production
 - Sediment retention for hydropower facilities

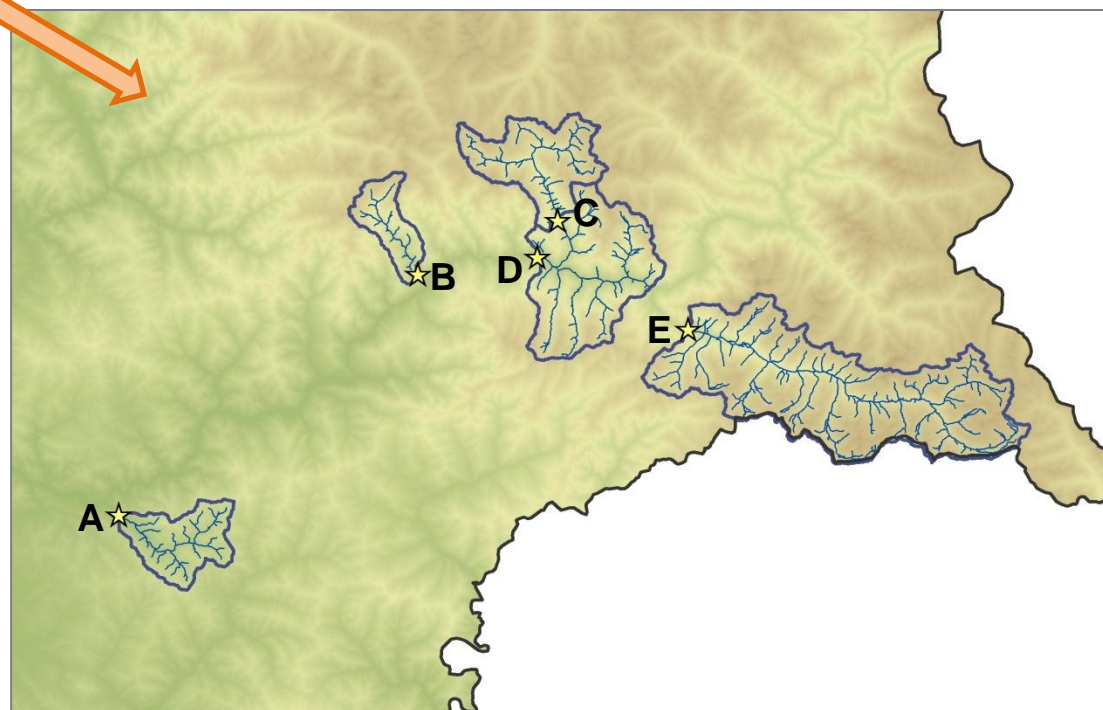
Scope - Site Selection

- 5 pilot sites
- Selection Criteria (to enable scaling-up):
 - Importance for hydropower production
 - Catchment area located within HP
 - Range of biophysical and **land use conditions**
 - Data availability
 - Land uses
 - Flow and sediment data for calibration/validation



Facility	Area (ha)
A	18,878
B	11,741
C	27,182
D	73,486
E	99,007

- Watersheds
- Streams
- Hydropower facilities



Phased approach – “products-on-route”

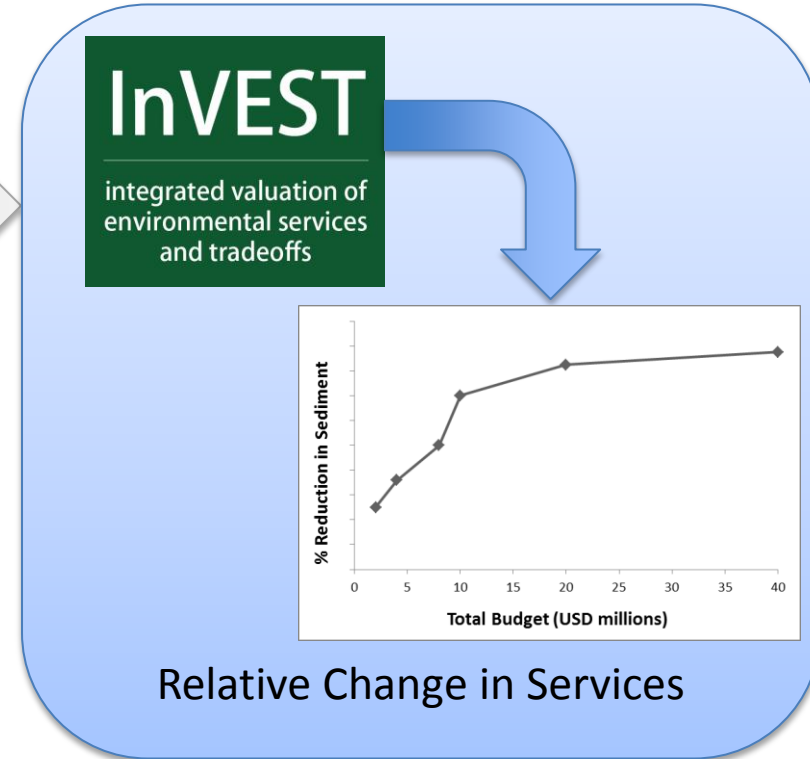
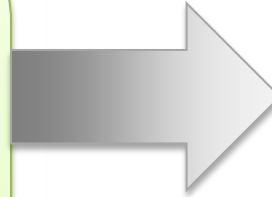
Phase I (completed)

1. Develop methodology for improving targeting of soil and water conservation investments in forests in Himachal Pradesh
2. Develop capacity in state government for use of ecosystem assessment tools

Phase 2 (about to begin)

1. Develop methodology for valuing ecosystem services for run-of-the-river hydropower facilities and inform design of PES schemes
2. Integrate analysis into forest accounts to identify value of forests to the hydropower sector – ecosystem account?
3. Continue to strengthen capacity in the government

Phase 1: Modeling Approach



Modeling Approach – RIOS

Data used in our analysis

Rainfall erosivity (derived from WorldClim, Singh et al 1981)
Soil erodibility
Soil depth
Soil texture
(Soils data derived from Soil & Land Use Survey of India, local and global studies)
Potential Evapotranspiration (derived from WorldClim)
Annual/monthly mean precipitation (WorldClim)
Land use/ Land cover (Soil & Land Use Survey of India)
Land use coefficients (Literature review)
Upstream source index – sediment and water flow
Downstream retention index – sediment and water flow
(Indices derived from the above data with DEM from USGS-NASA)

RIOS Steps

Choose Objectives

Diagnostic Screening

Biophysical effectiveness

People impacted

Suitability maps per activity

Activity Costs

Cost-effectiveness maps per activity

Select Activities

Stakeholder preferences

Feasibility/ Restrictions

Data used in our analysis

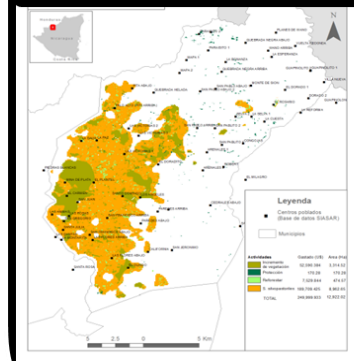
HP staff input,
expert opinion

Village locations
(HP 2001 census)

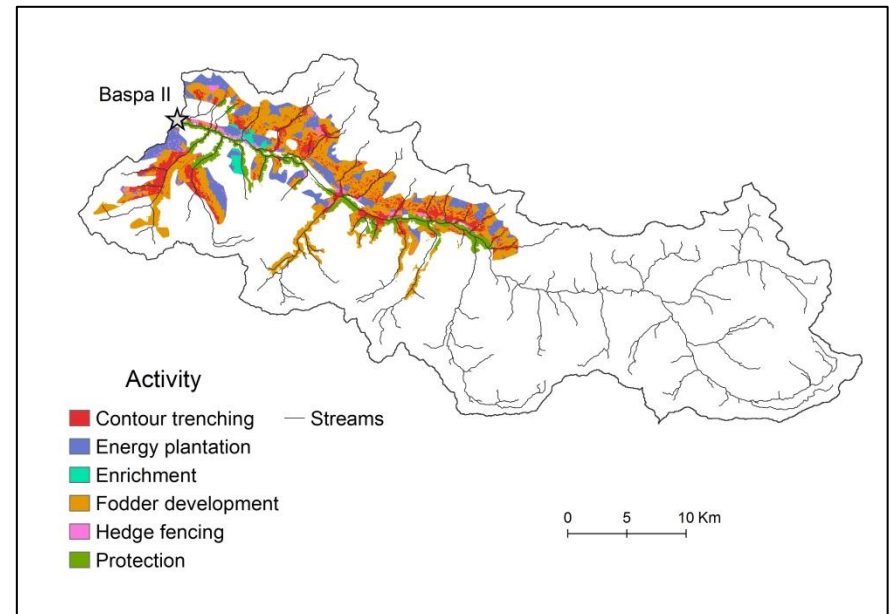
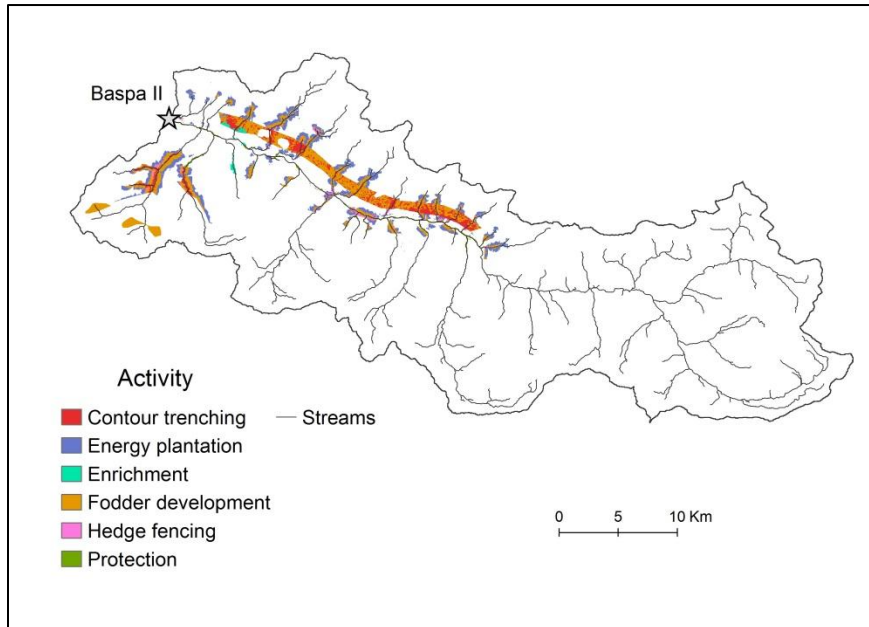
Satluj/ Luhri CAT
Reports

HP staff input,
expert opinion

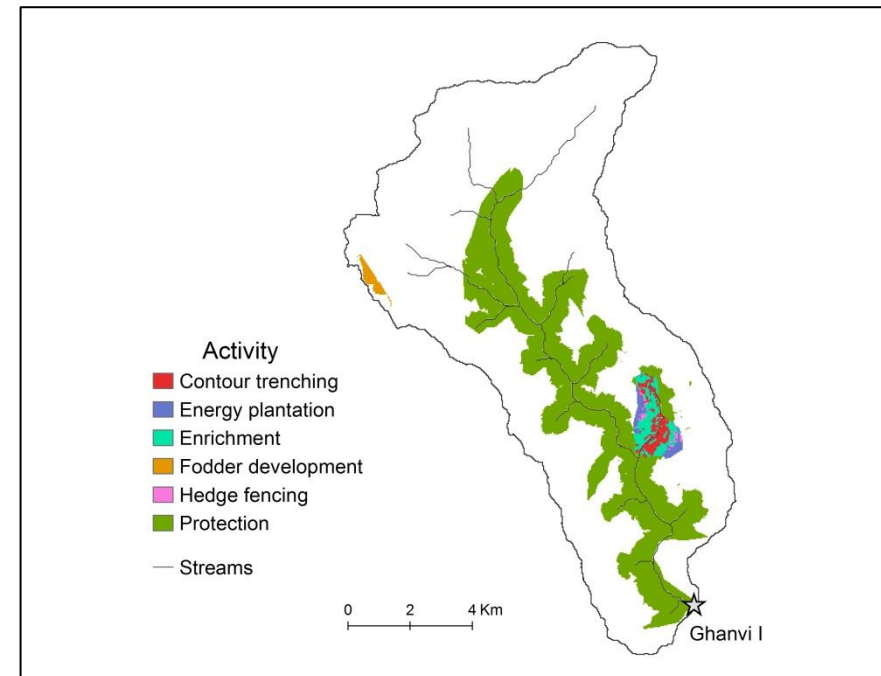
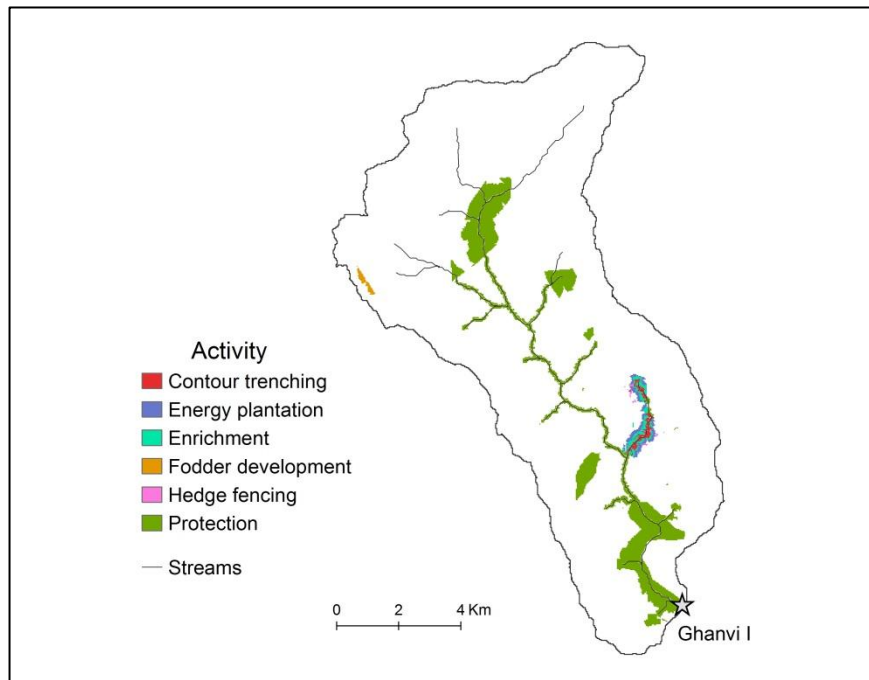
Investment Portfolio



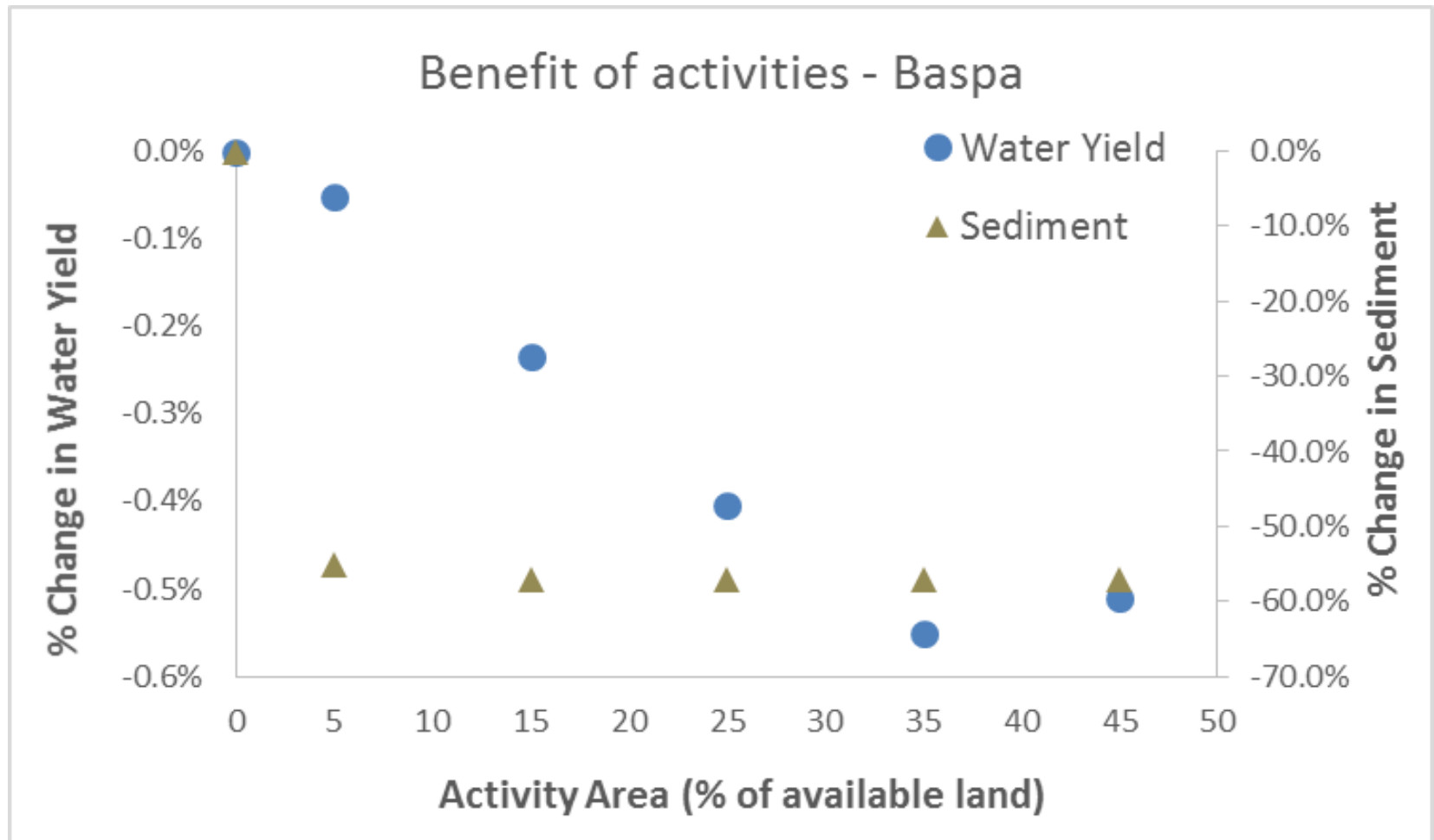
Results – Priority Investment Portfolio (BASPA – 15% and 45% land treated)



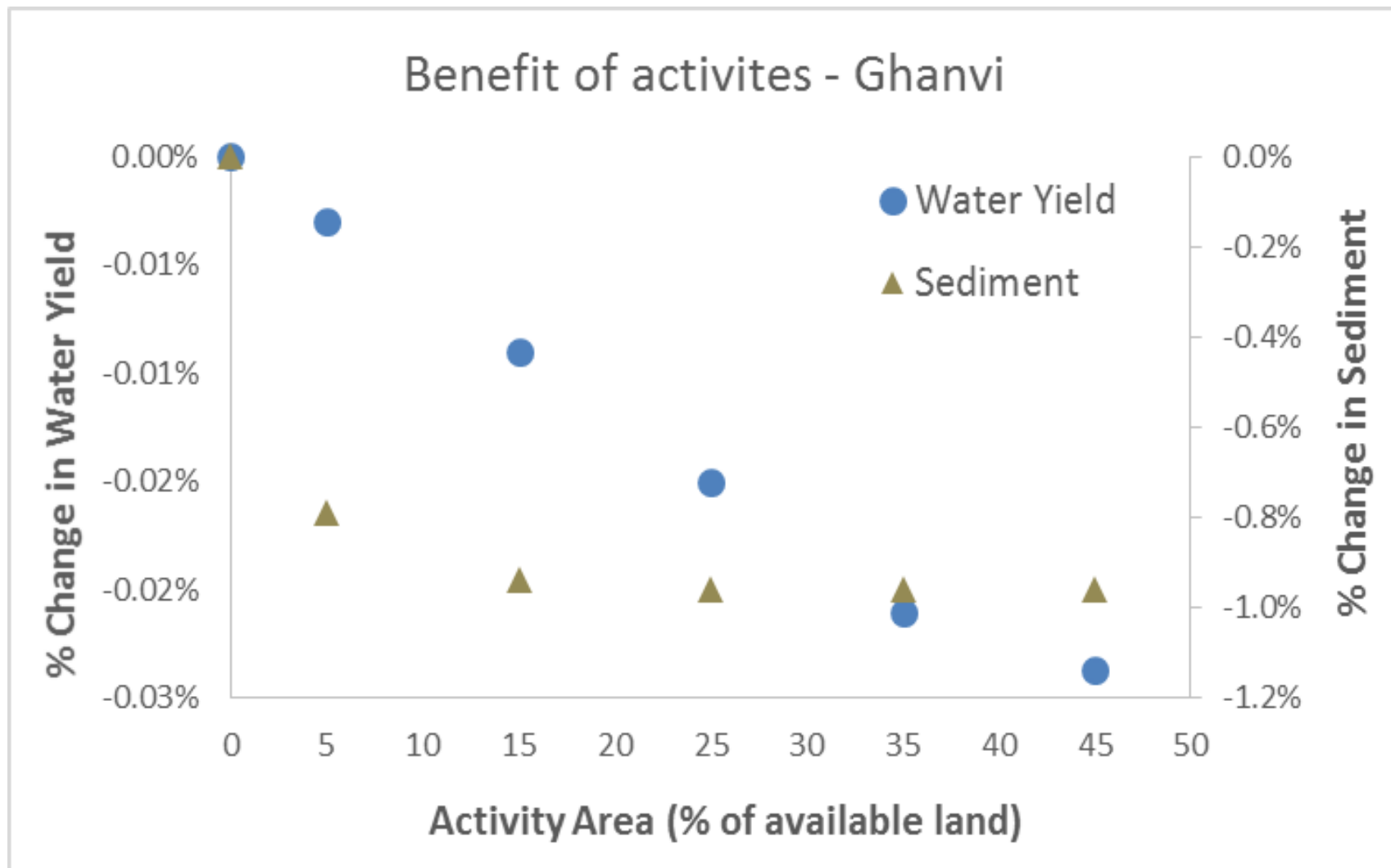
Results – Priority Investment Portfolio (GHANVI – 15% and 45% land treated)



Results – Benefits of targeting – BASPA



Results – Benefits of targeting – GHANVI



Phase 2

Phase 2 (about to begin)

1. Develop methodology for valuing ecosystem services (InVEST versus SWAT)
2. Develop ecosystem account (Scaling up and integration)
3. Continue to strengthen capacity in the government (including to work with experts)

Questions for discussion

A faint, stylized world map is visible in the background of the top header, showing the continents in a light gray color against a darker background.

1. Is SWAT the right model choice for us?
2. Ecosystem account – how comprehensive should they be? How do we best meet the needs of the policymakers?