THE ECONOMICS OF LAND DEGRADATION IN TAJIKISTAN

Consultation on project objectives & methodology

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Outline of talk

- Objectives of Study
- Overview of Land Degradation in Tajikistan & Implications for Agriculture
- Draft Methodology
- Pilot study

Objectives

- Develop a methodological framework for assessing the economic impact of land degradation, with a focus on the agricultural sector
- Collate data relevant to economic assessment (national, regional, sample districts)
- Undertake an initial assessment of the costs of land degradation associated with poor water management in 6 districts

Links between land degradation – agriculture - poverty

- Only 7% of country suitable for agriculture
- 97% of Tajikistan is affected by land degradation

- Agriculture accounts for 25% of Tajikistan's GDP
- Around 70% of population in rural areas depend on agriculture
- Strong link between a productive and sustainable agricultural sector and poverty alleviation

Main causes on land degradation

- Agricultural production on steep slopes / marginal land
- Poor water management / irrigation practices (water-logging & salinization)
- Overgrazing
- Deforestation

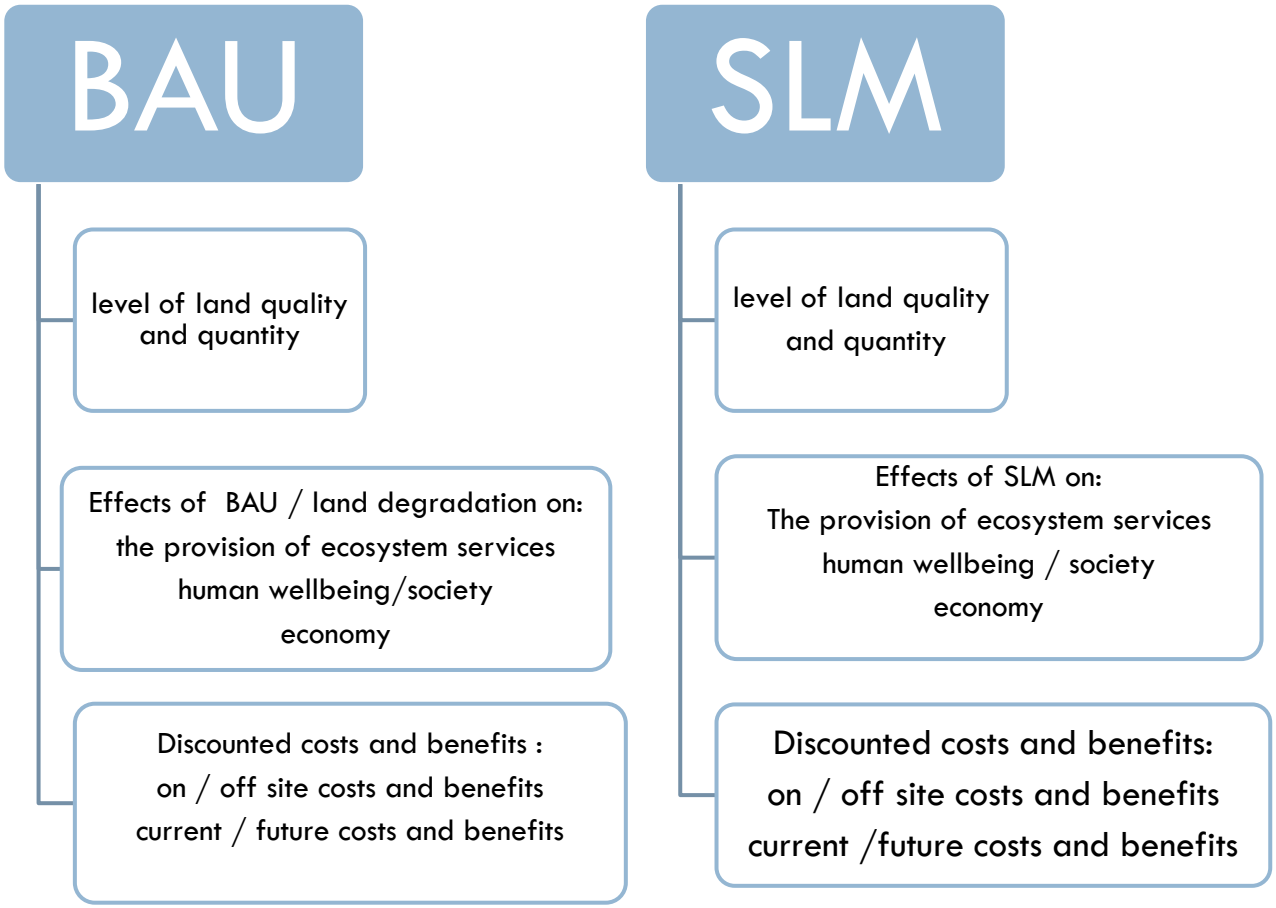
Factors contributing to land degradation

Natural factors	Direct anthropogenic factors	Underlying causes
Heavy rains Steep slopes Acidic soils (that result in soil fertility decline) Arid climates (contribute to salinisation and lowering of the water table)	Overcutting of vegetation Deforestation Overgrazing Inappropriate use of fertilizers Non-adoption of soil conservation practices Mismanagement of canal irrigation Overpumping of groundwater	Inappropriate land tenure Land shortage Population growth Poverty

Available Estimates (ADB, 2003 as reported in Tajik National Action Program)

- Estimates the decrease in production of only four agricultural plants caused a loss of US$ 224 million
- Raw cotton, potato, vegetables, and melons and gourds

Conceptual framework - the costs of land degradation / benefits of sustainable land management



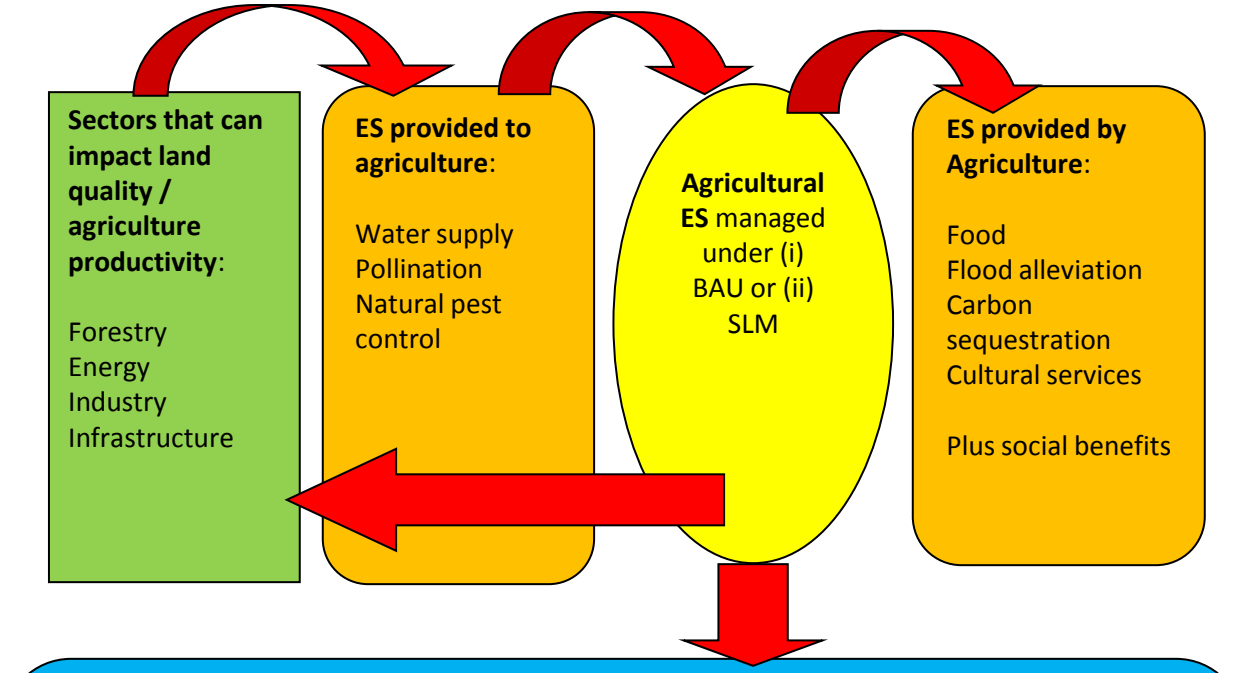
Key features of methodology

- Ecosystem Services Approach
- Consideration of economic, social and environmental impacts ***on and off site***
- Recognises the importance of temporal aspects
- Applicable at different scales
- Recommends reporting of key macro indicators

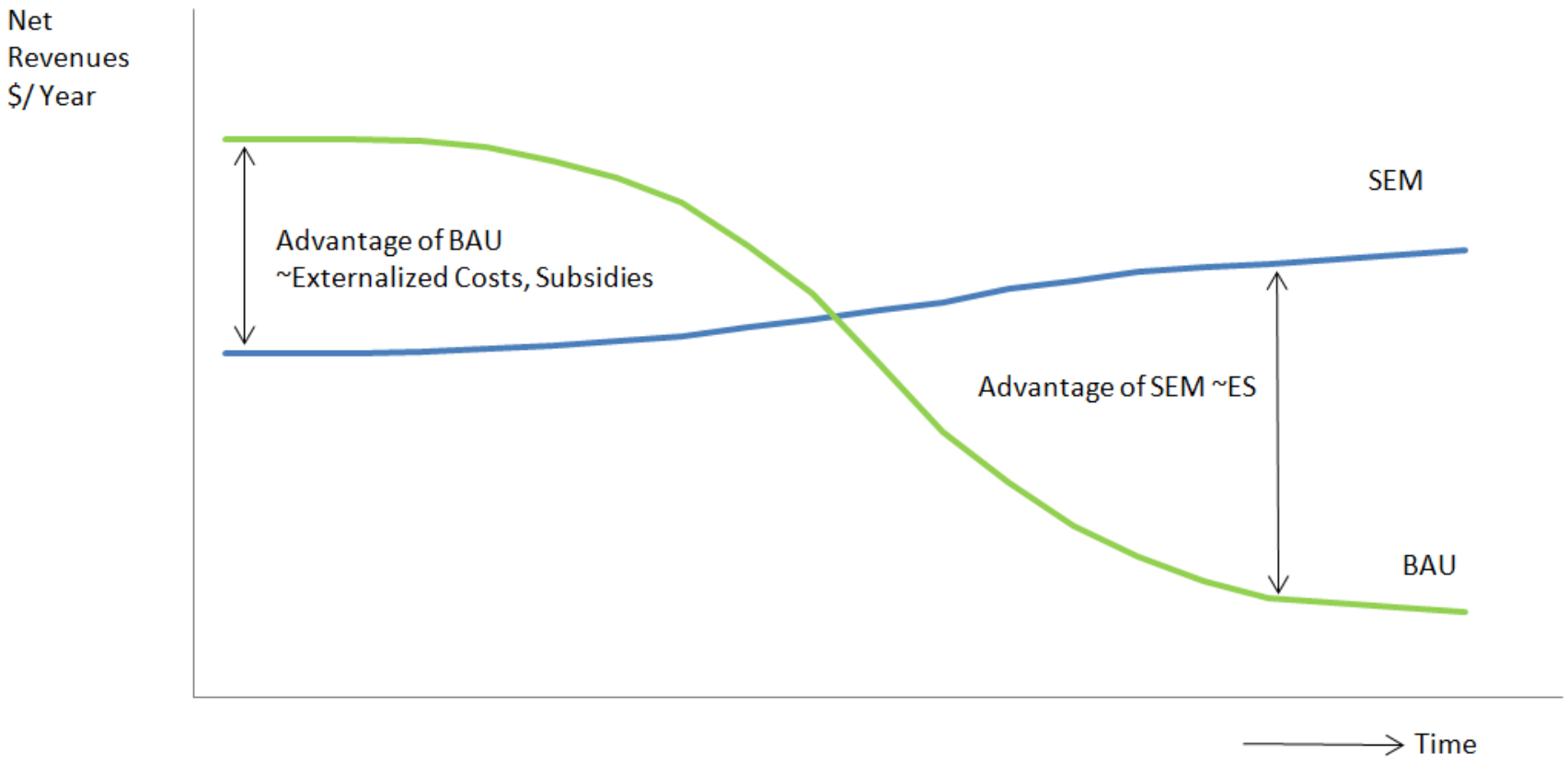
Typology of Ecosystem Services provided by Agricultural Ecosystems

Ecosystem Service category	Service	Benefit / outcome
Provisioning Services	Food	Food
	Fodder	Fodder (Including grass from pastures)
	Biochemical and medicinal resources	Biochemical and medicinal resources
	Genetic resources	Genetic resources
	Amenity service	Provision of attractive housing and living conditions
Regulating Services	Sink for atmospheric carbon dioxide	Carbon capture
	Hydrological services / flood risk regulation	Protection of property, agricultural land, human lives
	Protection against storms	Protection of property, agricultural land, human lives
	Control of erosion and sediments	Maintenance of soil fertility
	Regulation of pest and pathogens	Natural pest control service
Cultural Services	Cultural, spiritual, religious,	Cultural, spiritual, religious, l
	Scientific and educational information	Education
	Tourism and recreation	Tourism and recreation

Interactions between on-site and off-site management practices, the provision of ES and agricultural productivity and land degradation



The importance of time



Step 1: Characterize the land area and determine the context for the assessment	1a. Develop a conceptual understanding of the physical characteristics of the area
	1b. Define the issues.
	1c. Define the BAU and SLM option to be analyzed.
Step 2: Define the scope of the economic assessment	2a. Select ecosystem services for valuation . (qualitative assessment)
Step 3: Quantification of impacts	3 Quantify (in bio physical terms) the impacts of BAU and SLM, taking into consideration both on-site and off-site impacts
Step 4: Undertake valuation of ecosystem services	Derive monetary estimates of the ecosystem services under BAU and SLM using an appropriate valuation approach
Step 5: Analysis of valuation evidence	Aggregation, discounting, sensitivity analysis and distributional analysis
Step 6: Understanding the institutional requirements	Specify the institutional barriers to achieving the optional economic land use

Overgrazing

High level physical impact	Specific impacts	Possible monetary approaches
Loss of soil cover Soil loss	**On site**: • Reduced fodder available leading to lower milk / livestock productivity • Loss of land available for grazing • Reduced carbon sequestration	• Cost of substitute fodder • Δ in milk production × market price • Δ in meat production × market price • Δ in carbon sequestration function × market price of carbon
	Off site: • Siltation of reservoirs resulting in loss energy output or water supply • Changes in runoff leading to flooding / landslides	• Loss of energy output as a result of the reduce life time of reservoir × market price of energy • Impact of flooding on property damage / loss of agricultural land / human life estimated based on replacement cost/ market prices/ Value of life assessments

Poor water management / inadequate drainage infrastructure

High level physical impact	Specific impacts	Possible monetary approaches
Salinization and water logging which affect soil fertility & land available for agriculture	**On site**: • Reduced productivity due to reduce soil fertility • Reduced productivity due to loss of area available for agricultural production	• Δ in productivity × market price of affected crop • Cost of replacing loss nutrients to maintain soil fertility
	Off site: • Siltation of reservoirs resulting in loss energy output and water supply • Low flow rivers resulting in impacts on biodiversity	• Loss of energy output as a result of the reduce life time of reservoir × market price of energy • Loss of water supply × Δ in productivity × market price of affected crop

Intensive agriculture on steep slopes / marginal lands

High level physical impact	Specific impacts	Possible monetary approaches
Soil erosion	**On site**: • Reduced productivity due to reduce soil fertility • Loss of area available for agricultural production	• Δ in productivity × market price of affected crop • Cost of replacing loss nutrients to maintain soil fertility
	Off-site: • Siltation of reservoirs resulting in lost energy output and water supply	• Loss of energy output as a result of the reduce life time of reservoir × market price of energy • Loss of water supply × Δ in productivity × market price of affected crop

Pilot Study

- BAU Scenario
- Focussed on the costs of land degradation as a result of poor water management practices
- Selected districts
  - South – Qubodiyon, Quamangiz, Jilikul
  - North – Zafarabad, Ganchi, Istaravshan

Donors

Belgian Development Cooperation	Danish Ministry of Foreign Affairs (DANIDA)
European Commission	Irish Aid
Norwegian Ministry of Foreign Affairs (MFA Norway)	Swedish Environmental Protection Agency (Swedish EPA)
Swedish International Development Cooperation Agency (SIDA)	UK Department for International Development (DFID)
Spanish Ministry of Foreign Affairs and Cooperation	Department of State United States of America