

Valuation of ecosystems and their services in Central Asia



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Summarizing the experience of promoting the ES concept in CA – Regional publication on the implementation of ecosystem based management and instruments to support ecosystem services in CA

Content:

- Rationale
- Short problem context
- Some highlights
- Recommendations

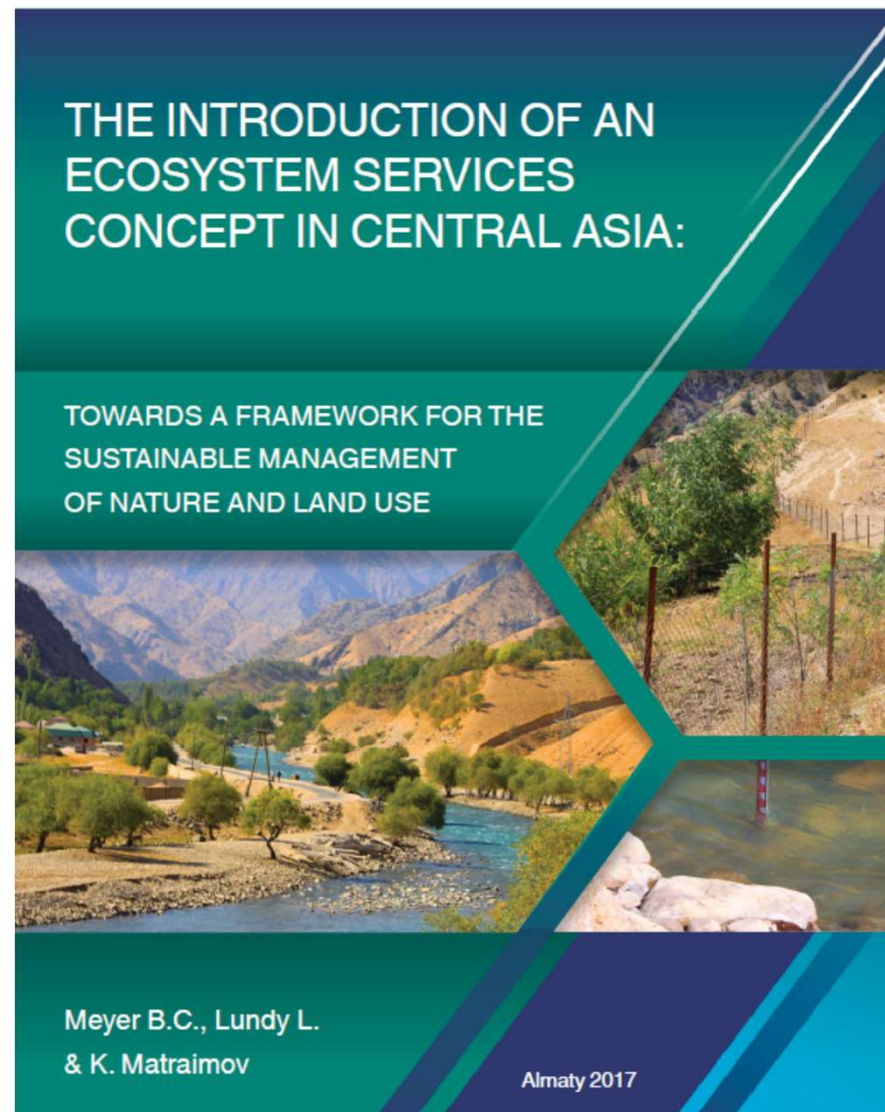


FIGURE 1.3 OVERVIEW OF THE LOCATION AND TYPOLOGY OF MOUNTAIN ECOSYSTEMS IN CENTRAL ASIA (THE STATE OF THE ENVIRONMENT IN CENTRAL ASIA, 2015)

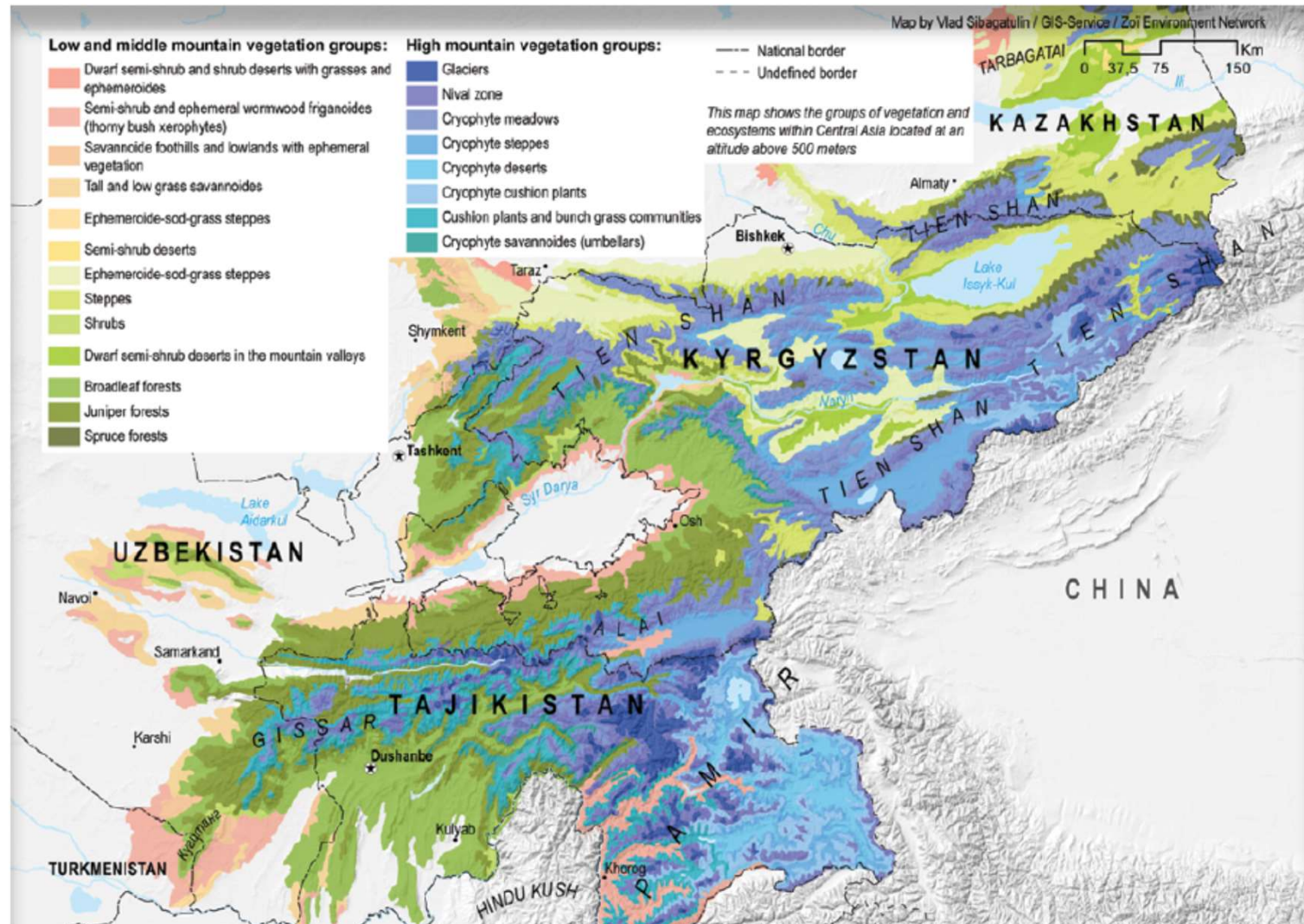


TABLE 3.1 OVERVIEW OF THE GEOGRAPHY, SOURCES OF INCOME AND ECOSYSTEM TYPES WITHIN THE FIVE CASE STUDIES

CASE STUDY INDICATOR	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Country Region	Kyrgyzstan South of Kyrgyzstan	Kyrgyzstan Issyk-Kul region	Tajikistan West of Tajikistan	Kazakhstan Turkestan district	Kazakhstan Turkestan district
River catchment	Syr Darya - Aral	Issyk - Kul	Amu Darya - Aral	Syr Darya- Aral	Syr Darya- Aral
Catchment type	High\medium mountain	High mountain	High mountain	Low mountain; desert	Low land; desert
Catchment (ha)	45,528	45,222	31,000	145, 772	237,000
Altitude (m)	800 – 2500	1605 – 4700	1000 – 4500	300 - 800	220 - 230
Population	11, 430	11, 500	0*	6, 778	25, 000

TABLE 3.1 OVERVIEW OF THE GEOGRAPHY, SOURCES OF INCOME AND ECOSYSTEM TYPES WITHIN THE FIVE CASE STUDIES

CASE STUDY INDICATOR	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Main sources of income(s)	Agriculture; Home animals; Forest products; Honey	Agriculture; Home animals; Mushrooms; Ecotourism	Agriculture; Home animals; Forest products	Agriculture; Home animals; Government subsidies	Agriculture; Home animals; Government subsidies**
Main ecosystems	Alpine pasture; Mountain pasture; Walnut Forest Hay field Irrigated lands	Spruce forest; Broad leaf forest; Alpine pasture; Mountain pasture; Irrigated land	Alpine pasture; Mountain pasture; Irrigated land	Mountain pastures; steppe grasslands Irrigated lands	Irrigated lands; steppe grasslands

Key: * = No population within the park but park accessed by four near-by villages; ** e.g. government subsidies to support change to drip irrigation and drought tolerant crops

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TABLE 3.3 OVERVIEW OF THE MAJOR PRESSURES IMPACTING AT A REGIONAL SCALE

CASE STUDY PRESSURE	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Food production			☒	☒	☒
Water supply and quality	☒	☒	☒ ☒	☒ ☒	☒ ☒
Income generation	☒	☒	☒	☒	☒
Resource management	☒	☒	☒ ☒	☒	☒
Biodiversity				☒	☒
Land degradation	☒	☒	☒	☒	
Glacier melting		☒	☒		
Climate change	☒	☒	☒	☒	☒
Carbon sequestration				☒	☒
Endorheic lakes	☒ ☒	☒	☒ ☒	☒ ☒	☒ ☒
Low environmental flows in rivers				☒	☒

TABLE 2.1 METHODOLOGIES USED TO EVALUATE ECOSYSTEM SERVICES IN EACH OF THE FIVE CASE STUDIES (BASED ON DATA PROVIDED BY INTERNAL PROJECT REPORTS OF CAREC)

CASE STUDY METHODOLOGIES	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Ecosystem and land use mapping	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ecosystem service mapping	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Economic valuation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Local community engagement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Payment for ecosystem services		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Monitoring of ecosystem services and construction of water distribution facilities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *		
Raise awareness of ecosystem services		<input checked="" type="checkbox"/>			
Modelling for policy advice					<input checked="" type="checkbox"/>
Focus groups, questionnaires, and interviews					<input checked="" type="checkbox"/>

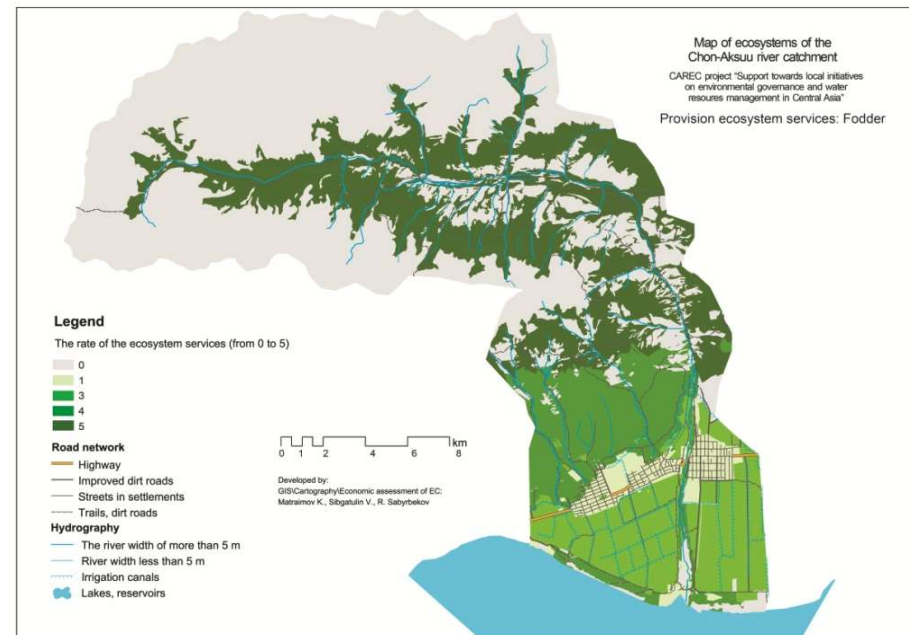
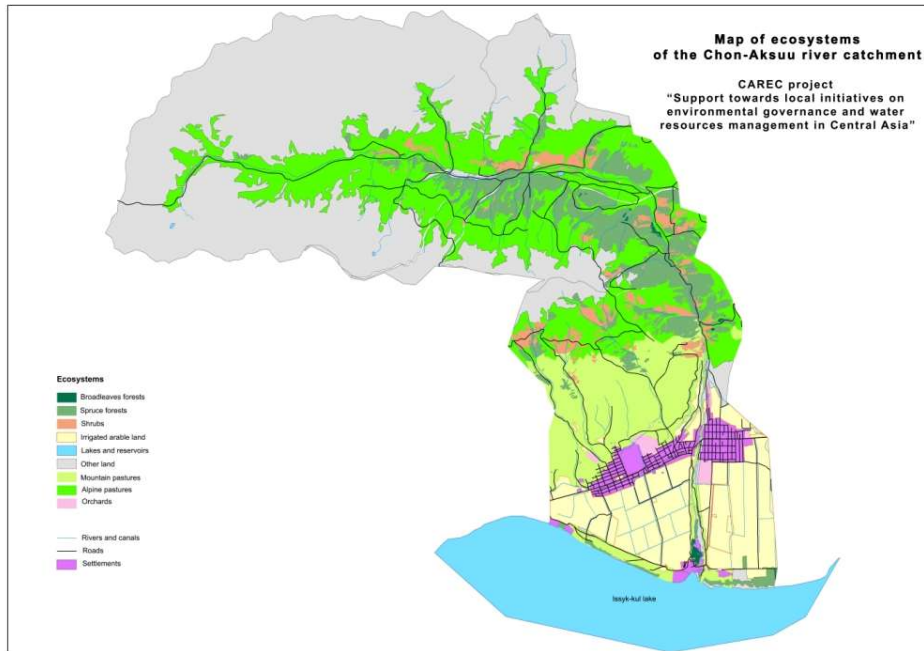
Key: * construction of water distribution facilities in Nazirak village, Tajikistan, only

TABLE 3.5 ECOSYSTEM SERVICES EVALUATED IN THE FIVE CASE STUDIES BY ECOSYSTEM SERVICE CATEGORY

CASE STUDY ES CATEGORY	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Supporting services	Biodiversity	Biodiversity Grazing Agriculture Mushrooms	Biodiversity Grazing; Agriculture Non forest products	Biodiversity	Grazing; Agriculture
Provisioning services	Grazing; Agriculture Forest products			Grazing; Agriculture	
Regulating services	Carbon sequestration	Carbon sequestration	Carbon sequestration	Carbon sequestration	
Cultural services		Ecotourism			

Key: * too much ecotourism; ** no ecotourism

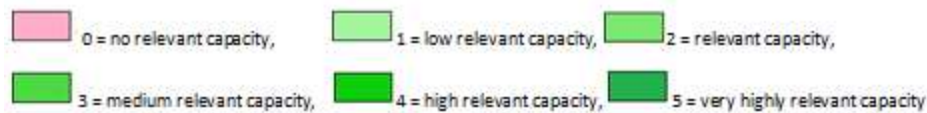
Important Results: Ecosystem services map series for CA



Example: Ecosystem map of the Chon Ak-Suu river basin (CAREC 2017a)

Important Results: Assessment Methodologies Developments

Ecosystems	Provisioning services	Crops	Livestock	Fodder	Capture Fisheries	Wild Foods	Timber	Wood Fuel	Energy (Biomass)	Biochemicals / Medicine	Freshwater	Regulating services	Local climate regulation	Global climate regulation	Flood protection	Groundwater recharge	Air Quality Regulation	Erosion Regulation	Nutrient regulation	Water purification	Pollination	Cultural services	Recreation & Aesthetic Values	Recreation and ecotourism	Intrinsic Value of Biodiversity	Ecological Integrity	Abiotic heterogeneity	Biodiversity	Biotic waterflows	Metabolic efficiency	Energy Capture (Radiation)	Reduction of Nutrient loss	Storage capacity (SOM)
Antropogenic	2,57	4	4	4	2	2	2	3	2	2	2	2,11	2	2	2	2	3	3	2	2	3	2,72	3	3	2	1,29	2	3	2	0	0	0	3
Rivers and wetlands	1,24	0	2	1	2	1	0	1	1	1	3	2,84	3	2	1	4	3	2	3	4	2	3,51	3	4	4	4,29	4	5	4	3	4	5	5
Fir (silver fir) forests	1,72	0	2	1	0	3	4	3	1	2	2	3,53	4	3	3	4	4	4	3	4	3	4,08	3	4	4	4,07	4	4	4	3	4	5	5
Criophyte (alpine) meadows	1,06	0	3	1	0	2	0	0	0	2	1	2,62	3	2	1	3	3	3	3	2	3	3,63	3	4	4	3,05	4	4	3	2	4	3	2
Glaciers and snowfields	0,51	0	0	0	0	0	0	0	0	0	4	1,94	4	3	1	4	2	1	1	2	0	2,93	2	4	3	0,81	2	1	0	0	0	0	2
Small-leaved forests	1,41	0	2	1	0	3	2	2	1	2	2	3,08	3	2	3	3	3	3	3	3	3	3,55	3	4	4	2,83	4	3	3	2	3	3	2
Vegetation of nival-subnival zone	0,34	0	0	0	0	0	0	0	0	0	2	1,43	2	2	1	2	2	1	1	1	1	2,56	2	3	3	0,44	2	1	0	0	0	0	0
Rock, primary rock abruption, slide rock	0,17	0	0	0	0	0	0	0	0	0	0	0,78	1	0	1	1	1	1	0	1	0	2,34	2	3	2	0,86	2	1	0	0	1	0	2
Middle-mountane deciduous shrub	1,18	0	2	1	0	2	1	2	0	2	1	2,88	3	2	3	3	3	3	3	3	3	3,23	2	3	4	2,98	3	4	3	2	3	3	3
Middle-mountane meadows	1,36	1	4	2	0	2	0	0	1	2	1	2,62	2	2	2	3	3	3	3	2	4	3,41	3	4	4	2,74	3	4	3	2	2	2	3
Middle-mountane steppes	1,22	1	4	2	0	2	0	0	0	2	1	2,51	2	2	2	3	3	3	3	2	3	3,30	3	4	4	2,81	3	4	2	3	3	2	3
Subalpine meadows	1,08	1	4	1	0	2	0	0	1	2	1	2,57	2	2	2	3	3	3	3	2	3	3,57	3	4	4	2,67	3	4	2	2	2	2	3



ES Assessment matrix for Chon-Ak-Suu river basin (Kaptagaeva 2013)

TABLE 3.10 OVERVIEW OF STAKEHOLDER ORGANISATIONS ENGAGED WITHIN THE FIVE CASE STUDIES

CASE STUDY STAKEHOLDERS	ZERGER RIVER BASIN	CHON AK-SUU RIVER BASIN	SHIRKENT NATURAL PARK	IKANSU RIVER BASIN	TURKESTAN IRRIGATION SYSTEM
Water Users Association	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Federation of Water Users Associations		<input checked="" type="checkbox"/> *		<input checked="" type="checkbox"/>	
Pastures Committee	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Forestry Department**	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Association of Mushroom Pickers		<input checked="" type="checkbox"/>			
Local community / farmers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Policy-makers / local authorities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
National park			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Basin Council		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Research scientists		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Key: x = stakeholder organisation active partner in case study; * 4 Water Users Associations (1 per village);

** = governmental department

Recommendations for further practice

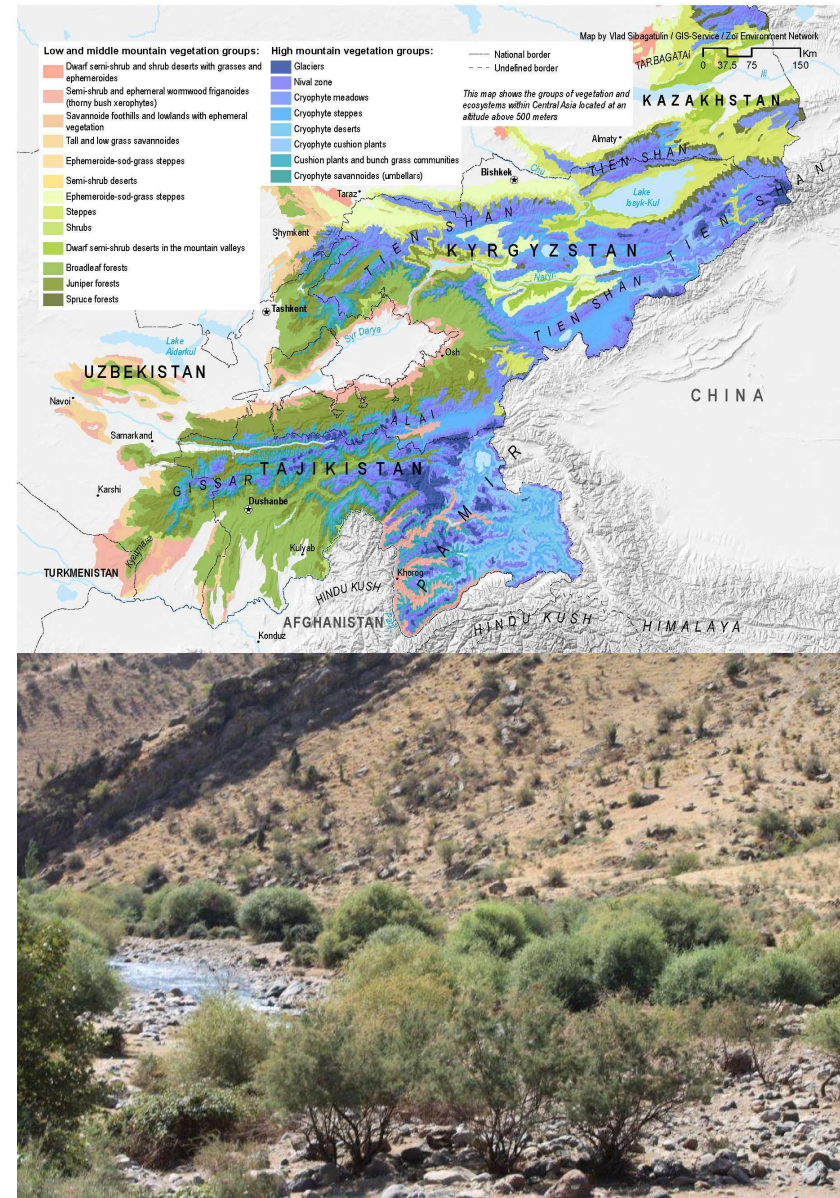
Based on the synthesised evaluation of the activities undertaken within the five case studies, the following outlines a series of recommendations to enhance the delivery and sustainability of an EA within a Central Asia context. Proposals for a series of projects to consolidate EA experiences to-date and further embed the approach within local to regional level policy and practice are also put forward.



Recommendation 1. Development of a common typology of Central Asian ecosystem types

Project recommendation: Central Asian ecosystem typologies

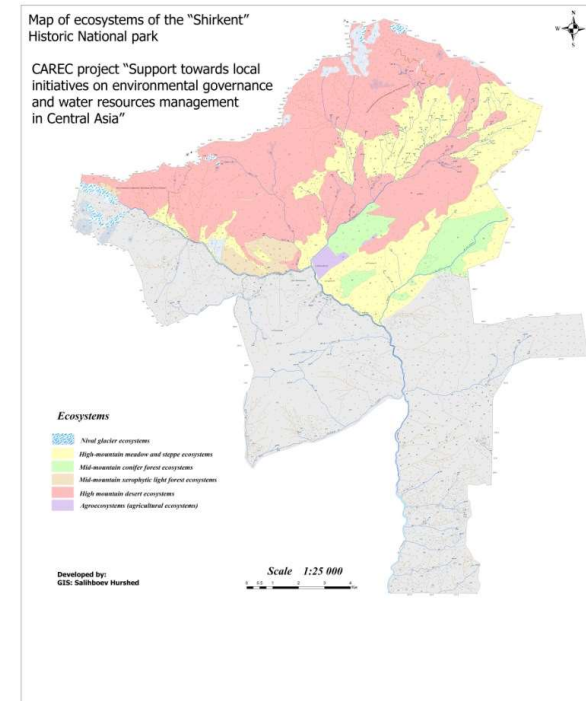
1. Common typology of Central Asian ecosystem types
2. Integrated water and land-use management strategies
3. Propose and test a methodology to identify multiple ES delivery areas
4. Develop sub-ecosystem level mapping guidance
5. Develop and disseminate outputs in different management formats



Recommendation 2. Development of a common ecosystem service classification framework for CA

Project recommendation: ES typologies and their valuation

1. ES typology pertinent to ecosystem types
2. Map spatial and temporal delivery of ES and goods
3. expand current ES valuation work on economic assessment by
 - further provisioning services assessments
 - assessments of the value of selected regulation, supporting and cultural services to support poverty alleviation
4. develop new knowledge of ecosystems / ES in mitigating to natural hazards and explore how this information may be utilised within land-use decision making
5. Further develop guidelines on undertaking economic valuation of ES
6. develop a better understanding of how EA/ES-delivery within supports implementation of the UN CBD (2000)



Management of Extreme Events

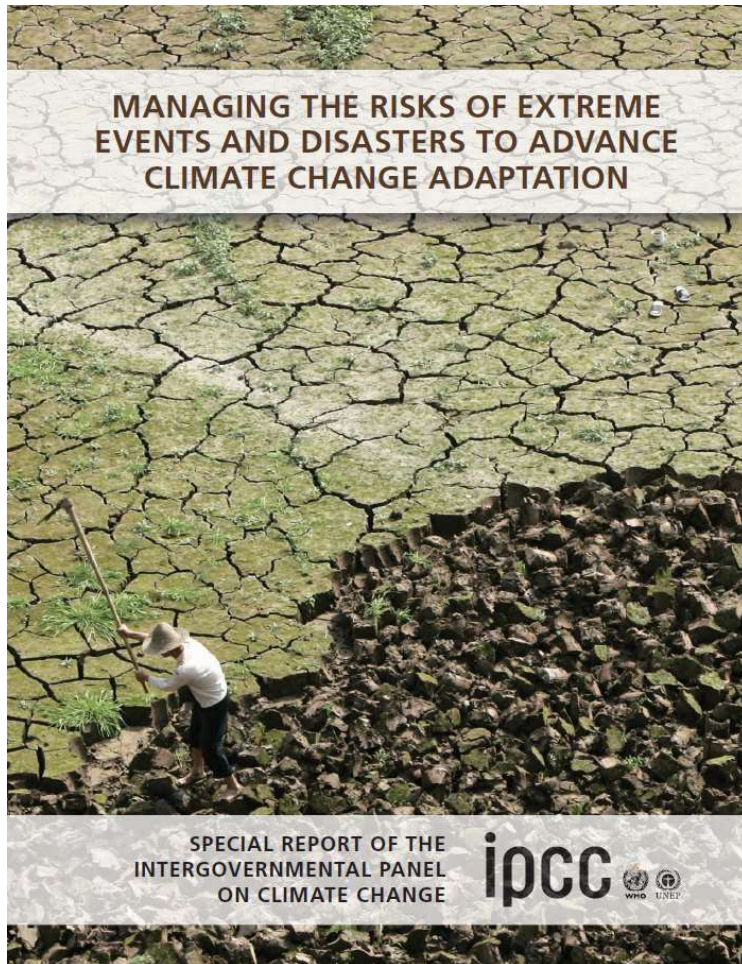


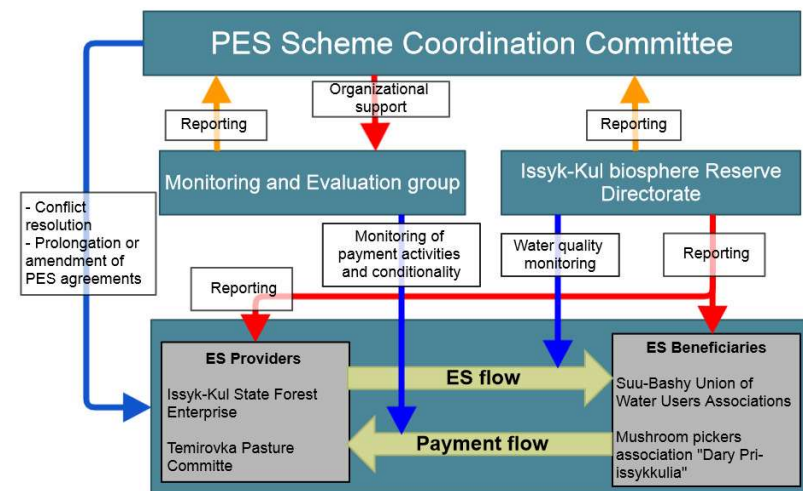
TABLE 3.6 ECOSYSTEMS IDENTIFIED IN THE CHON AK-SUU RIVER BASIN AND THE POTENTIAL ECOSYSTEM SERVICES GENERATED (CAREC 2016, CAREC 2016E)

ECOSYSTEMS		Provisioning services	Wild wood	Fire wood	Medical plants	Water supply	Meadows and pastures	Constructing material	Agriculture	Regulation services	Carbon Sequestration	Cultural services	Ecotourism	Supporting Services	Biodiversity
1	Coniferous forests		✓	✓				✓			✓		✓		✓
2	Deciduous forests		✓	✓				✓			✓		✓		✓
3	Medium-leaved deciduous shrubs		✓	✓				✓			✓		✓		✓
4	Glacier and subnival zone higher than 3200 m												✓		✓
5	Meadows of medium altitude				✓		✓				✓		✓		✓
6	Alpine meadows				✓		✓				✓		✓		✓
7	Lakes and swamp												✓		✓
8	Rivers and streams						✓						✓		✓
9	Agricultural land							✓	✓						
10	Archards			✓			✓		✓						

Recommendation 3. Development of a common scoring system to support the consistent qualitative assessment of ES throughout Central Asia

Project recommendation: Benchmarking ES delivery

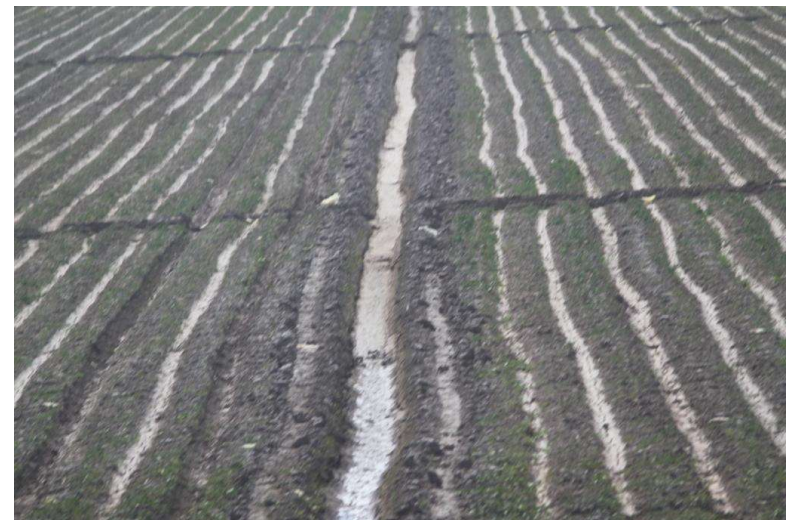
1. explore alternative approaches to assessing / benchmarking ES delivery and how this information can be used within policy development and practice
2. facilitate discussions on qualitative and quantitative ES assessments
 - at a local level with key stakeholders / community representatives
 - at a regional/national/Central Asian level with competent authorities, policy-makers and scientists
3. explore alternative approaches to communicating levels of uncertainty associated with data sets and scoring systems to policy-makers and practitioners



Recommendation 4. Invest in approaches to raise awareness of soft and hard infrastructure to support implementation of PES schemes

Project recommendation: Building capacity and capability in local communities

1. identify and evaluate alternative approaches to supporting partnership working within existing ES projects
2. support local communities' to identify and address negative ecosystem impacts e.g. water supply and sanitation, pasture degradation and animal husbandry practices
3. enhance the capacity of local organisations to adopt an EA approach to address overuse/degradation of common lands
4. expand initial successful PES activities to new projects
5. encourage local community interest in an EA by providing access to information about subsidies and supporting organisations



Recommendation 5. Evaluate the Sustainable Development Goals (SDGs) within an Ecosystem Approach

Project recommendation: Policy and practice

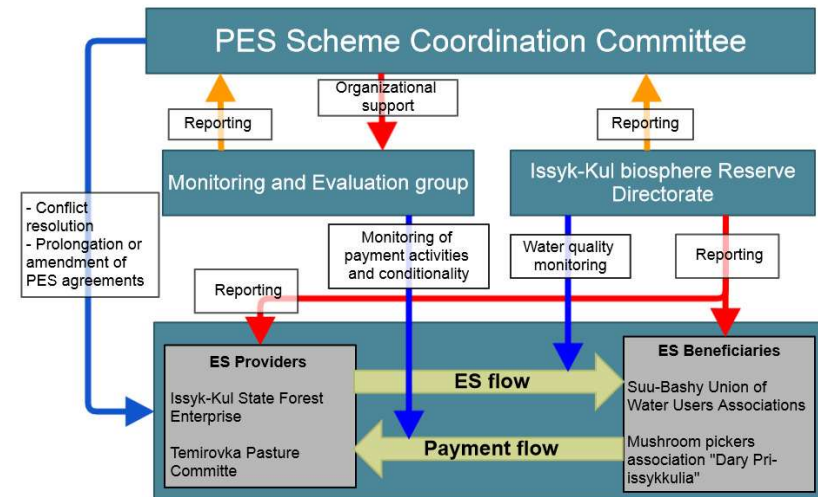
1. map the ecosystem services terminology to the Central Asian policy sphere.
2. develop policy briefings
3. identify legislative texts where an EA can be included within policy documents (e.g. Water Codes, ecosystem monitoring programmes, biodiversity strategies, land use planning frameworks)
4. explore the use of an EA within transboundary catchment management activities for a better linking upstream, midstream and downstream ES delivery
5. identify and analyse cross-linkages and/or interdependencies between the UN SDGs and ES in relation to major Central Asian ecosystem challenges e.g. overgrazing, soil salination, the drying out of endorheic lakes etc: NEXUS
6. explore linkages between UN SDGs, international financial/compensation schemes and ES delivery in Central Asia e.g. carbon sequestration and biodiversity protection.



Recommendation 6. Develop an on-line, open-access Central Asian ES portal

Project recommendation: Data sharing

1. develop an internationally-facing “Centre of Ecosystem Services Evaluation for Central Asia” which co-ordinates, synthesises and promotes EA activities within Central Asia, and represents Central Asian EA activities on an international stage
2. develop a portal to provide open access to:
 1. Central Asian data sets and their valuation
 2. ES handbooks, guidelines and assessment procedures
 3. bespoke educational materials for schools, universities and lifelong training institutes



**Summarizing the experience of promoting the ES concept in CA –
Regional publication on the implementation of ecosystem based
management and instruments to support ecosystem services in CA**

Special thanks to the multiple involved partners



Tajikistan, September 2017



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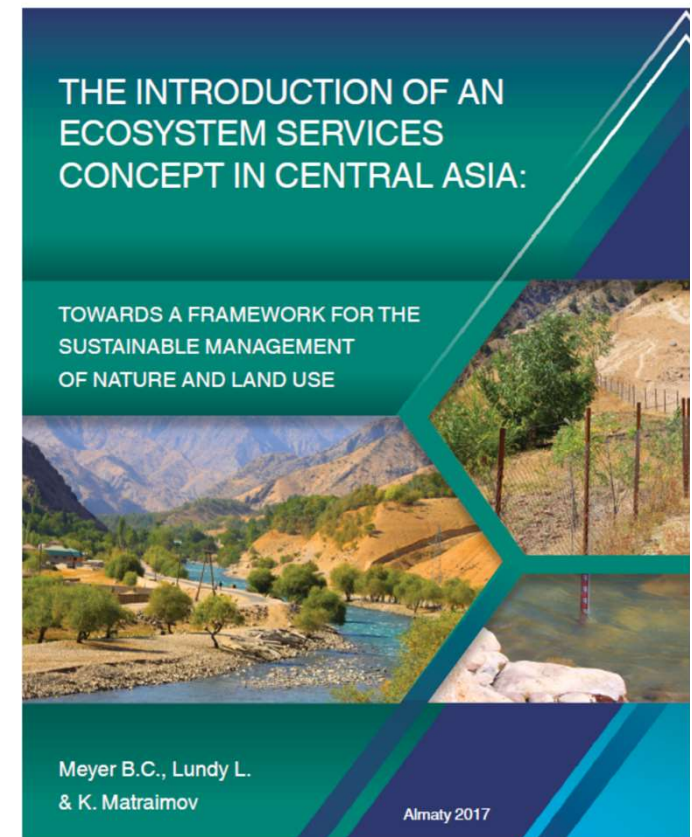
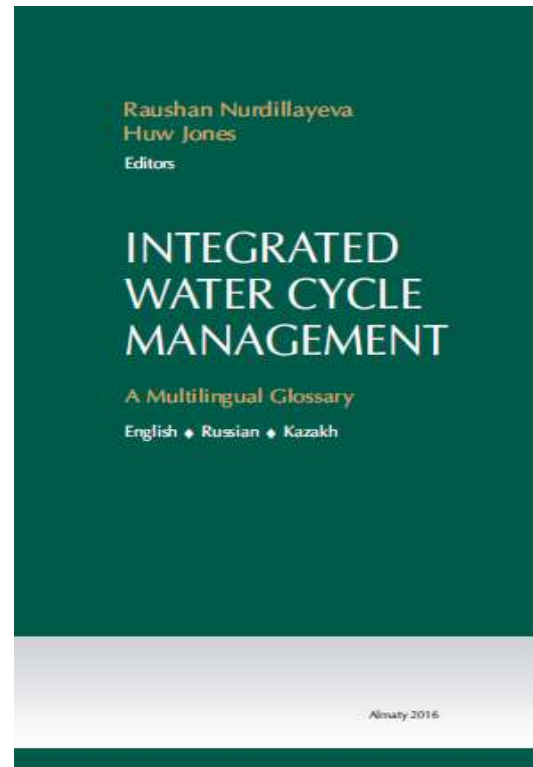
Integrated Water Cycle
Management in
Kazakhstan



Tempus



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