

# Assessment of the Water-Food-Energy- Ecosystems Nexus in the Syr Darya Basin

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Convention of the Protection and Use of Transboundary Watercourses and International Lakes

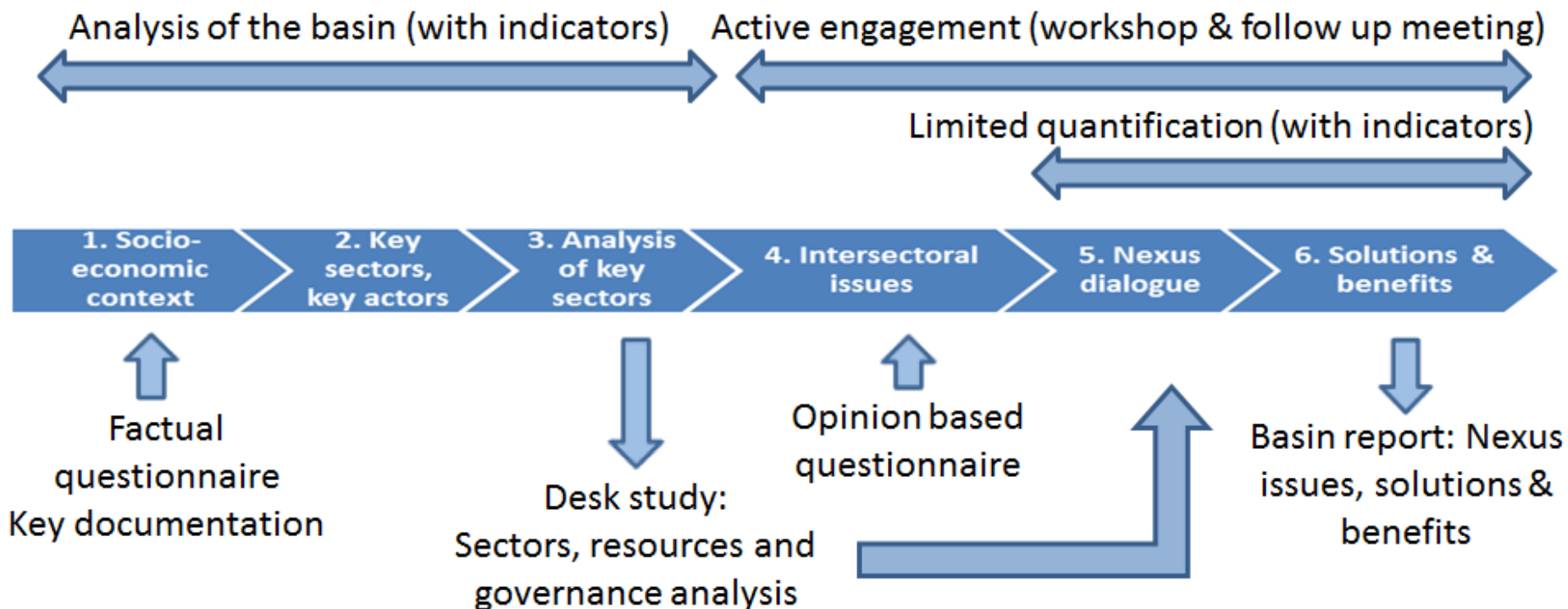


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# Nexus assessments methodology

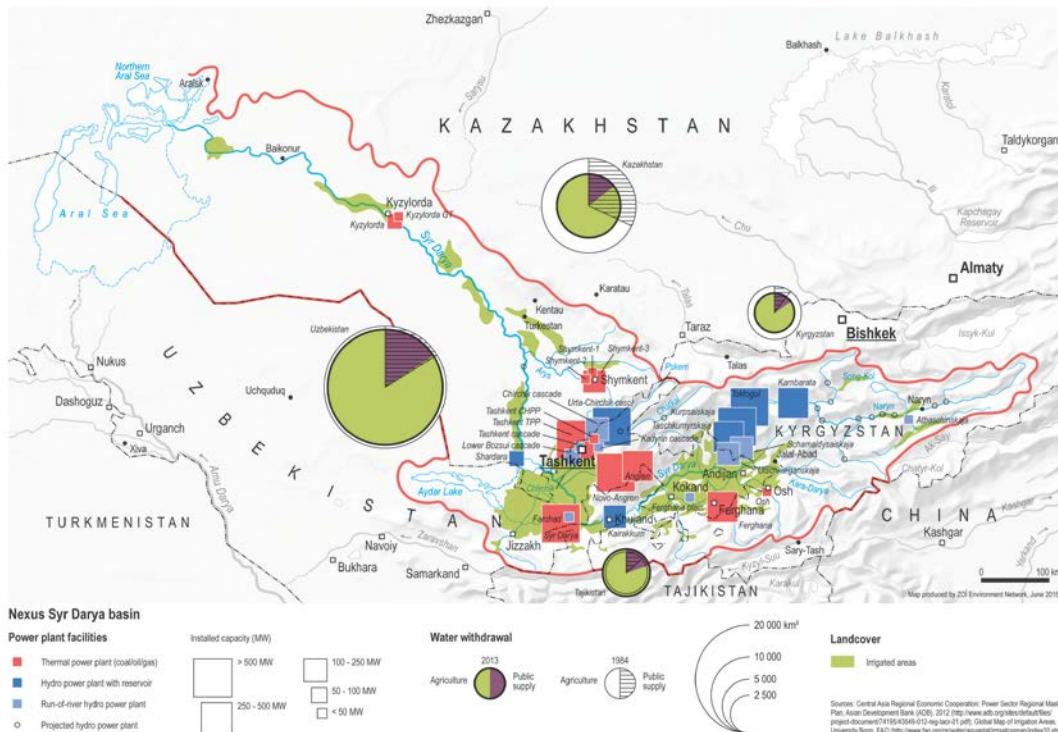


- Developed under the UNECE Water Convention's Programme of Work 2013-2015 (Task Force on the Water-Food-Energy-Ecosystems Nexus)
- Aims: Foster transboundary cooperation (intersectoral synergies & measures to reduce tensions); assist countries (resource use optimization, capacity building);
- Adapts to the context and the specific issues; application to 5 basins demonstrates value for engaging different sectors into a dialogue
- Provides for identification of cooperative ways to tackle nexus challenges in a non-prescriptive, inclusive and indicative manner highlighting a broad range of potential opportunities.

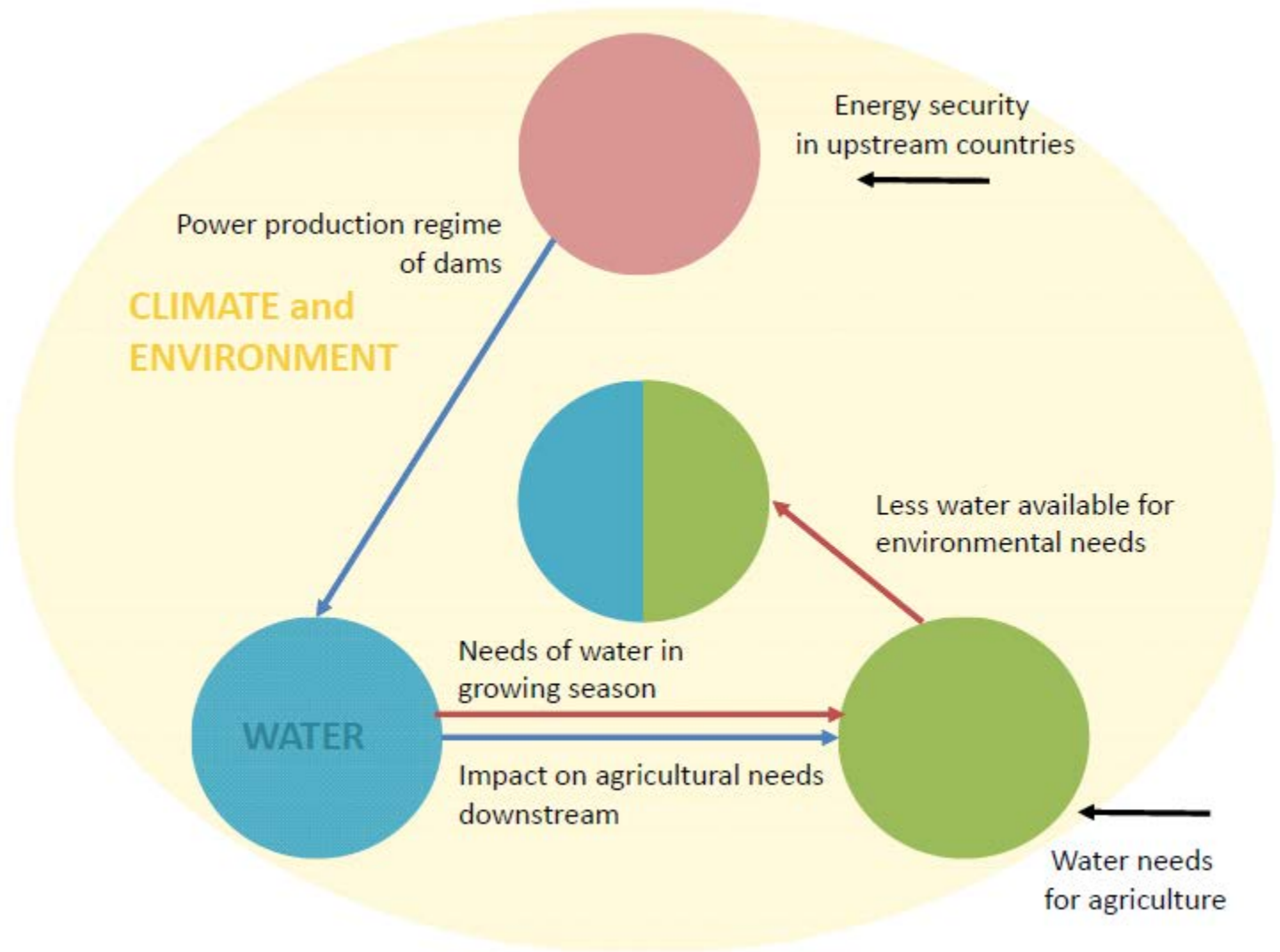


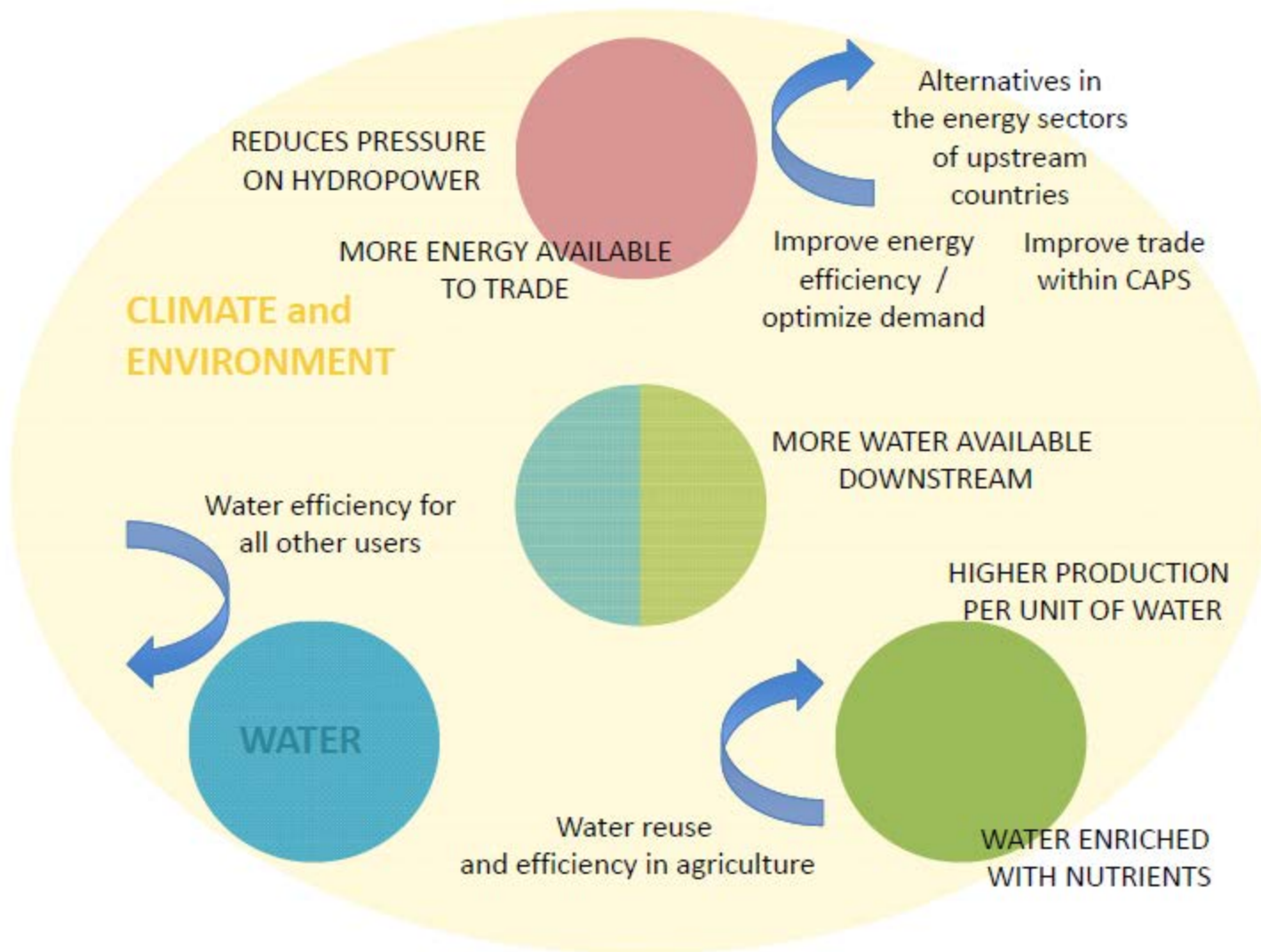


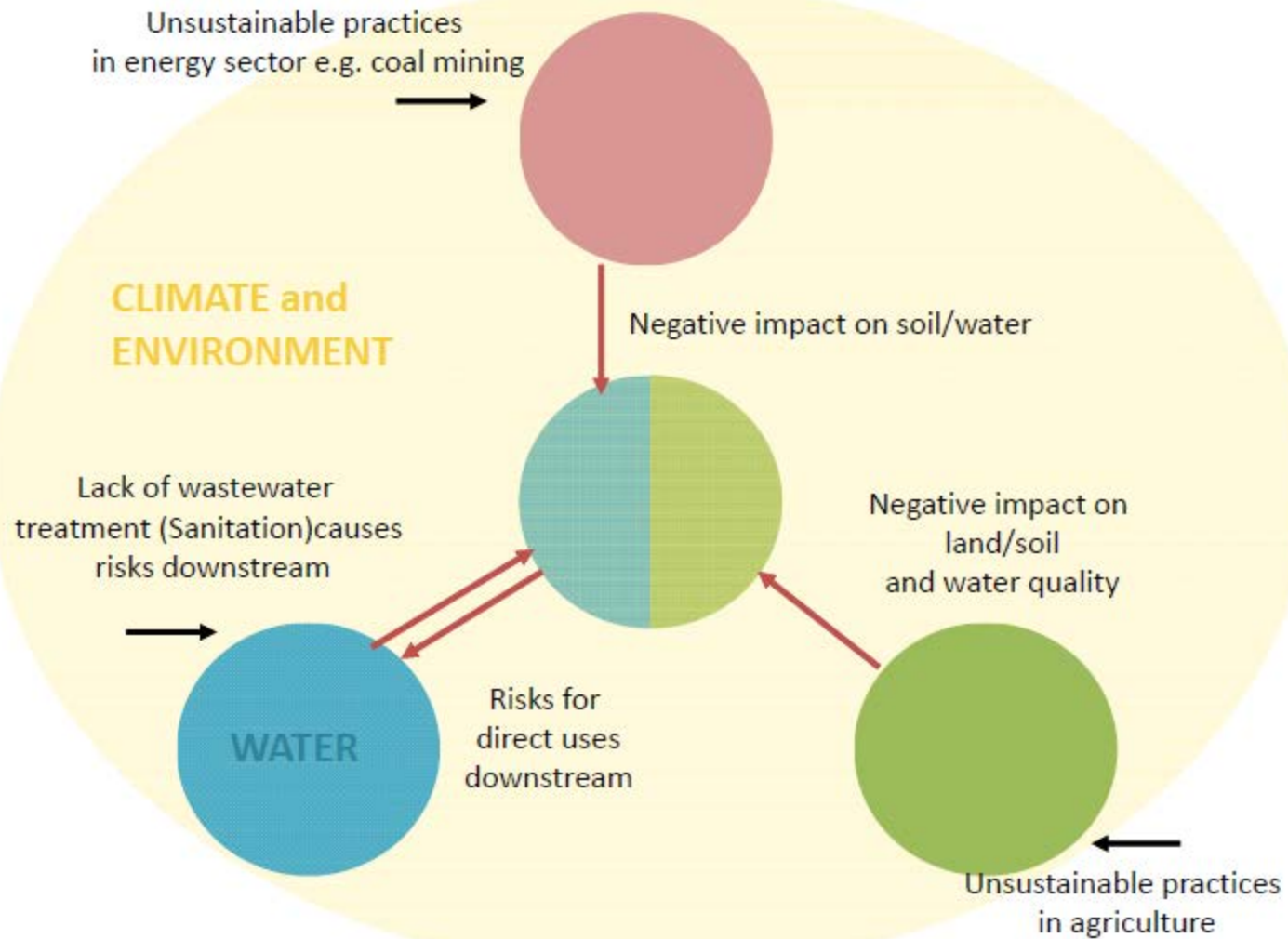
# Nexus assessment process in the Syr Darya Basin

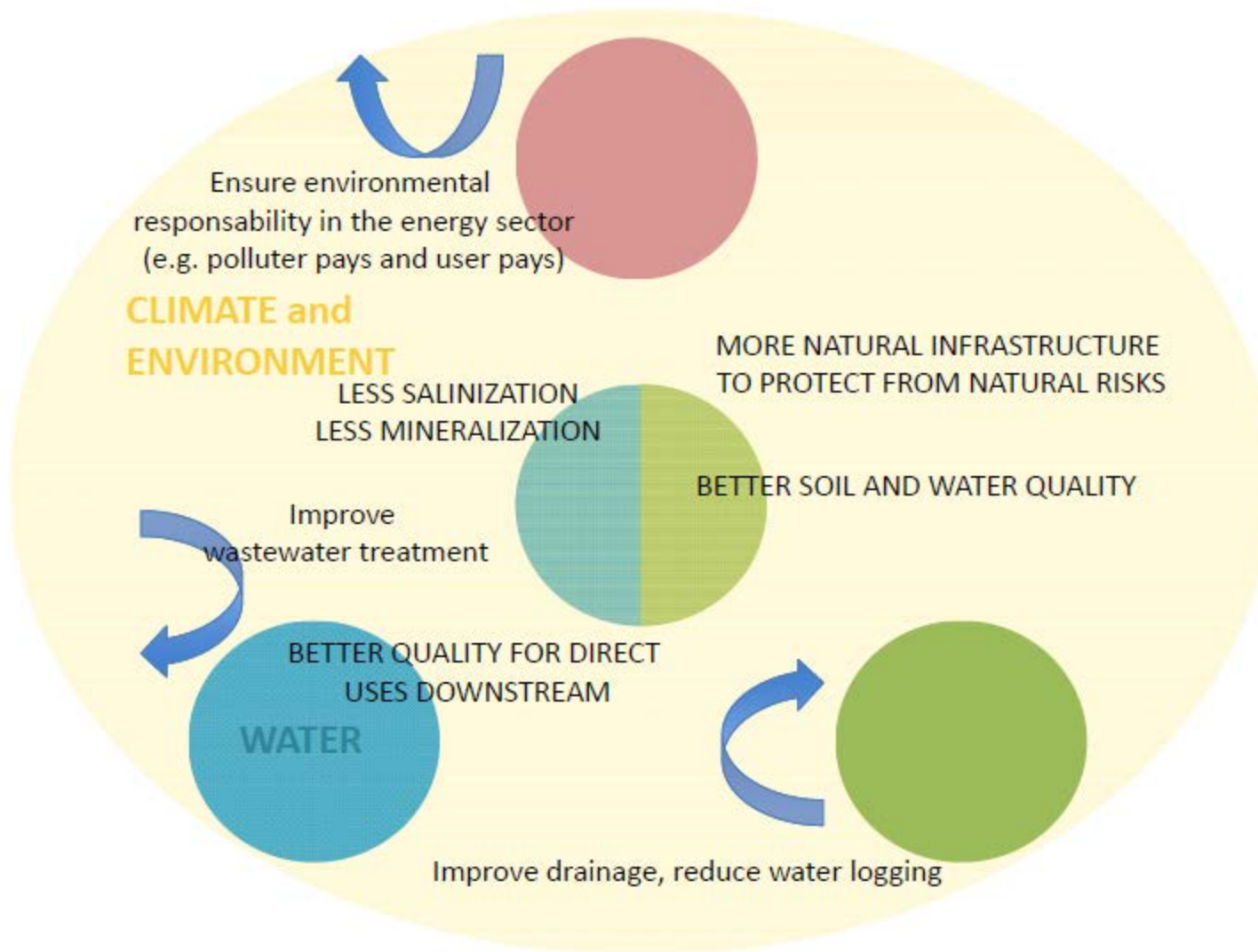


- Desk study
- Multisectoral workshop (Almaty, 2-4 December 2014) for the countries organized with GWP in cooperation with FAO
- Main intersectoral issues, some future scenarios, possible solutions jointly identified
- Scoping level analysis
- Participatory process: Consultations
- Funded by Finnish Ministry of Foreign Affairs











# Syr Darya Basin: indicators

## SYR DARYA BASIN

River length 3,019 km  
River basin area 410,000 km<sup>2</sup>



KYRGYZSTAN	TAJIKISTAN	UZBEKISTAN	KAZAKHSTAN
INTERNAL RENEWABLE WATER RESOURCES			
National: 48,930 million m <sup>3</sup> /year	21,910	48,870	108,400
Syr Darya Basin: 28,500 Surface, groundwater and return flow, 1988	2,000	12,000	5,400
WATER WITHDRAWAL			
8,000 million m <sup>3</sup> (2006) Agriculture 98% Industry 4% Municipal 3%	11,500 (2006) Agriculture 91% Industry 3% Municipal 6%	56,000 (2006) Agriculture 90% Industry 3% Municipal 7%	21,100 (2010) Agriculture 96% Industry 3% Municipal 4%
Syr Darya Basin: 2,700 (2013)	3,900	22,700	6,900
INSTALLED ELECTRICITY GENERATING CAPACITY			
3.8 million kW Hydropower 3.0 (79%) Fossil fuels 0.8 (21%)	5.1 million kW Hydropower 4.7 (92%) Fossil fuels 0.4 (8%)	12.6 million kW Hydropower 1.7 (14%) Fossil fuels 10.8 (86%)	17.8 million kW Hydropower 2.3 (13%) Fossil fuels 15.6 (87%)
AGRICULTURAL LAND			
105,900 km <sup>2</sup> (2012) of which 21 % is potentially irrigable	48,750 km <sup>2</sup> of which 32% is potentially irrigable	266,900 km <sup>2</sup> of which 18 % is potentially irrigable	2,079,800 km <sup>2</sup> of which 2% is potentially irrigable



# Nexus – future, trends

## BASIN TRENDS

TEMPERATURE	↗↗
PRECIPITATION	↗↘
ECOSYSTEM SERVICES	→
WATER RESOURCE AVAILABILITY	↘
POPULATION	↗
ECONOMY (medium term)	↗

## NEXUS FUTURE IN THE SYR DARYA BASIN

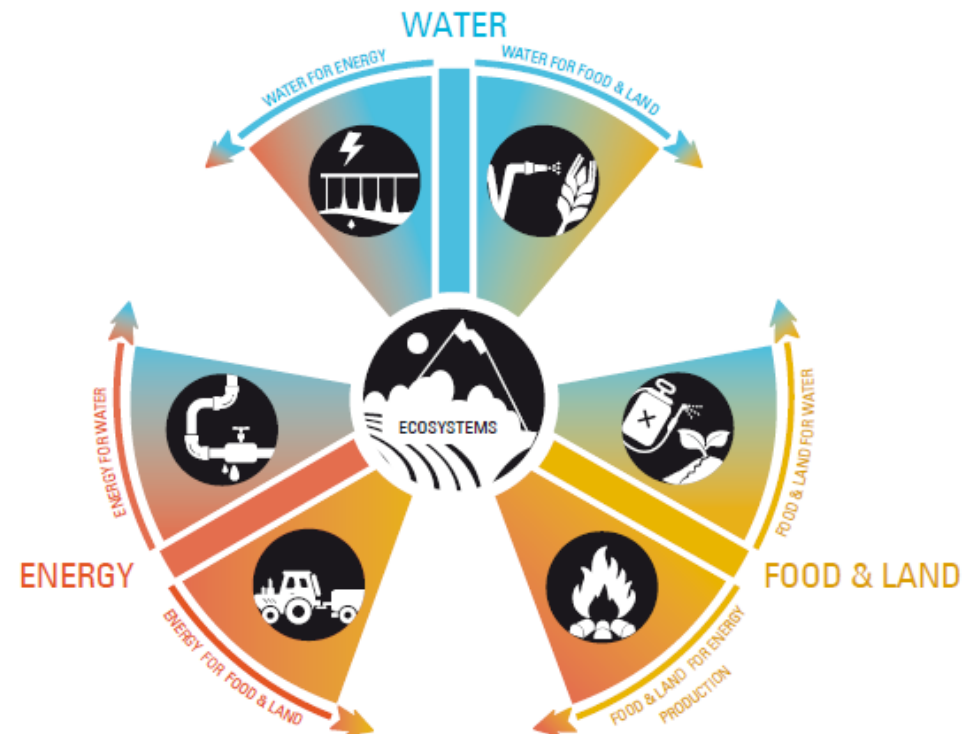


## NATIONAL TRENDS

	Kyrgyzstan	Tajikistan	Uzbekistan	Kazakhstan
WATER FOR FOOD & LAND Irrigation needs	↗	↗	↘	↘
WATER FOR ENERGY Electricity generation needs, cooling	↗↗	↗	→	↘
ENERGY FOR WATER Treat, move and store water	↗	↗↗	↗↗	↗
ENERGY FOR FOOD & LAND Grow, store, process and move food	↗↗	↗↗	↗	↗
FOOD & LAND FOR ENERGY Food-energy competition for water, biofuel production	↗	↘	→	→
IMPACT OF FOOD & LAND ON WATER RESOURCE Water pollution, agricultural use	↗	↗	↗	↗

# Main categories of solutions

- **Institutions** (intersectoral, multiple level governance, engaging resource users, responsibilities etc.)
- **Information** (multi-sector information to support policy, assessing impacts across sectors, guidelines etc.)
- **Instruments** (economic instruments, SEA etc.)
- **Infrastructure** (built and natural – investments, operation, multiple use designs etc.)
- **International coordination and cooperation** (sharing information, plans, good practices etc.)



# Possible solutions/synergic actions identified in the Syr Darya Basin (a selection)

## 1. National development with co-benefits

- Improving energy efficiency, reducing dependency on water for energy (diversification of sources)
- Rationalizing water use (esp. in agriculture)

## 2. Broader sustainable development and national policy coherence

- Developing mechanisms to identify and incorporate the wider nexus impacts in sector-based policy development leading to more integrated planning processes
- Improving basin-wide monitoring, data verification and exchange, and knowledge-sharing, including joint monitoring (e.g. water flows and quality), joint forecasting

## 3. Accelerate national development by furthering cooperation

- Improving intersectoral coordination at the basin level by increasing representation of and consultation with the relevant ministries
- Developing a regional energy market and exploring opportunities for energy-water exchanges



# Example on infrastructure solutions from the Syr Darya: hydropower



- Solving energy security challenges upstream would significantly benefit from diversification of sources — alternatives might include some fossil fuels, energy trading, integrating more of other renewable energy sources, for example
- Water- and energy-efficiency programmes would slow the burden of investment in new capacity, help make the most of existing infrastructure in all countries and be more cost efficient
- Without restoration of the regional electricity grid and further development of connections, major capacity expansions might have limited utility. Any such expansions would best allow for multiple uses of the overall flow regulation system

# Some concluding remarks

- Recognition of the value of a nexus approach for sustainable development expanding to economic sectors, illustrated by the cooperation with the UNECE Group of Experts of Renewable Energy. Benefits related synergies.
- The nexus assessment methodology is widely applicable – use and further development encouraged to promote dialogue.
- A “menu” of possible synergic actions identified for the countries’ consideration.
- A 4-country energy system modeled, that interfaces with other resource models: Subject to interest of the countries, with additional data, specific questions and opportunities could be explored (e.g. effect of investments)
- Opportunities to work further: SPECA TWG, EUWI National Policy Dialogues, new project on Nexus Dialogue in Central Asia led by CAREC and to be financed by the European Commission.
- Welcome to the global workshop and Task Force meeting (Geneva, 6-8 December 2016): Assessment approaches and good practices discussed.
  - <http://www.unece.org/env/water/nexus.html>
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