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TECHNISCHE  
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DRESDEN

ADVANCING A **NEXUS APPROACH**  
TO THE SUSTAINABLE MANAGEMENT  
OF **WATER, SOIL AND WASTE**



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INTERNATIONAL  
KICK-OFF WORKSHOP

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AN INITIATIVE OF THE

Federal Ministry  
of Education  
and Research

# Towards Nexus Approach: Selected Case Studies around the World

Case studies: Ethiopia, China, Uzbekistan,  
and Serbia

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**IPSWaT (International Postgraduate Studies in Water Technologies)** is a scholarship programme promoted by the German Federal Ministry of Education and Research (BMBF)

- aims to support outstandingly qualified young scientists
- Master's degrees or PhDs in the water sector
- 24 selected German universities / courses

Today:

- 400 scholarship holders and alumni
- from 64 countries worldwide

The programme runs from 2001 until 2014

**Aim:** promoting capacity building and networking in the water sector for taking on international responsibility and meeting global challenges.





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# Towards Nexus Approach

## Case study: Ethiopia

*Land degradation in Ethiopia and its  
connection with utilization of water and  
waste*

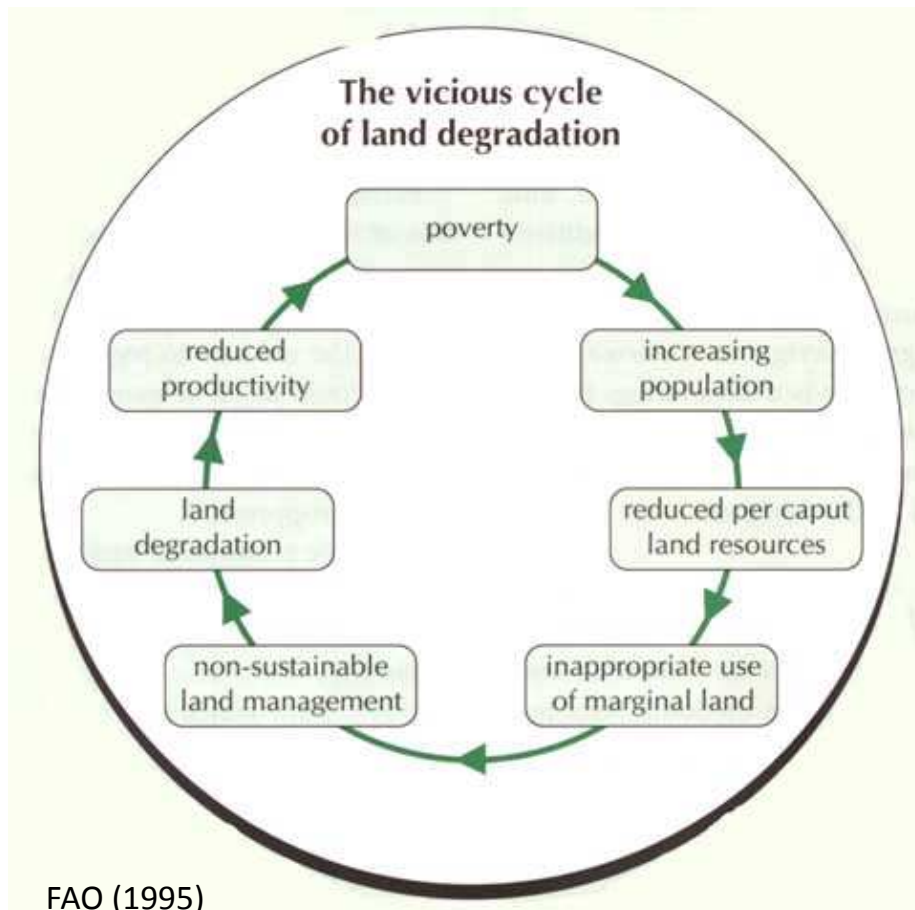


## Land degradation in Ethiopia

- Severe land degradation in the form of **deforestation, soil erosion, soil nutrient depletion**
- **Causes -**



Source: IFAD (2007)



- Reliance on agriculture (> 85% of employment)
- Rapid population increase
- Dynamic Land policy
- Poor infrastructure (energy, irrigation)

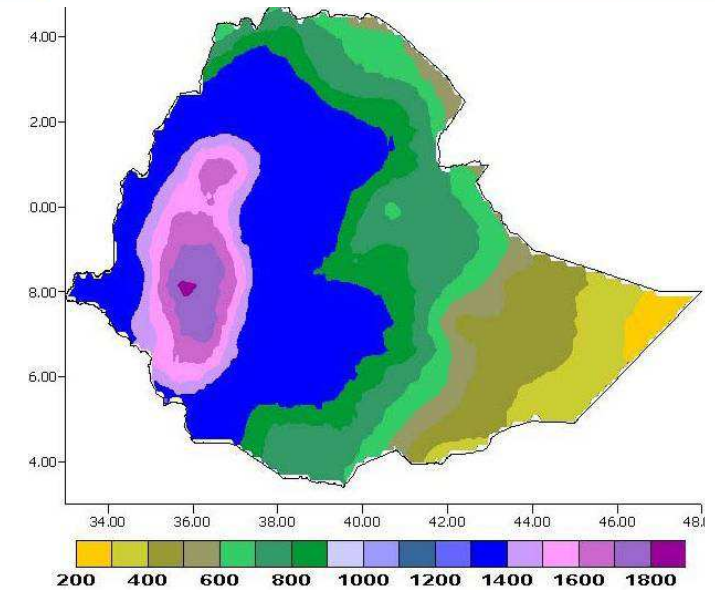


## Water resources utilization

- abundant water resources and vast hydropower potential (about 45 GW)
- Change rain-fed agriculture to irrigation agriculture
- Accelerate hydropower exploitation (currently < 5%)

## Waste resource utilization

- Increasing urbanisation -> increasing solid and liquid waste management problems
- Much of the solid waste is **organic**
- Should be used to produce **bio-gas** and **compost**
- Liquid waste – focus should be on decentralized system - source separation – to produce compost and bio-gas



Source: Alemayehu Mengistu (2006, p.9)



Source : Waste Management World (2013)



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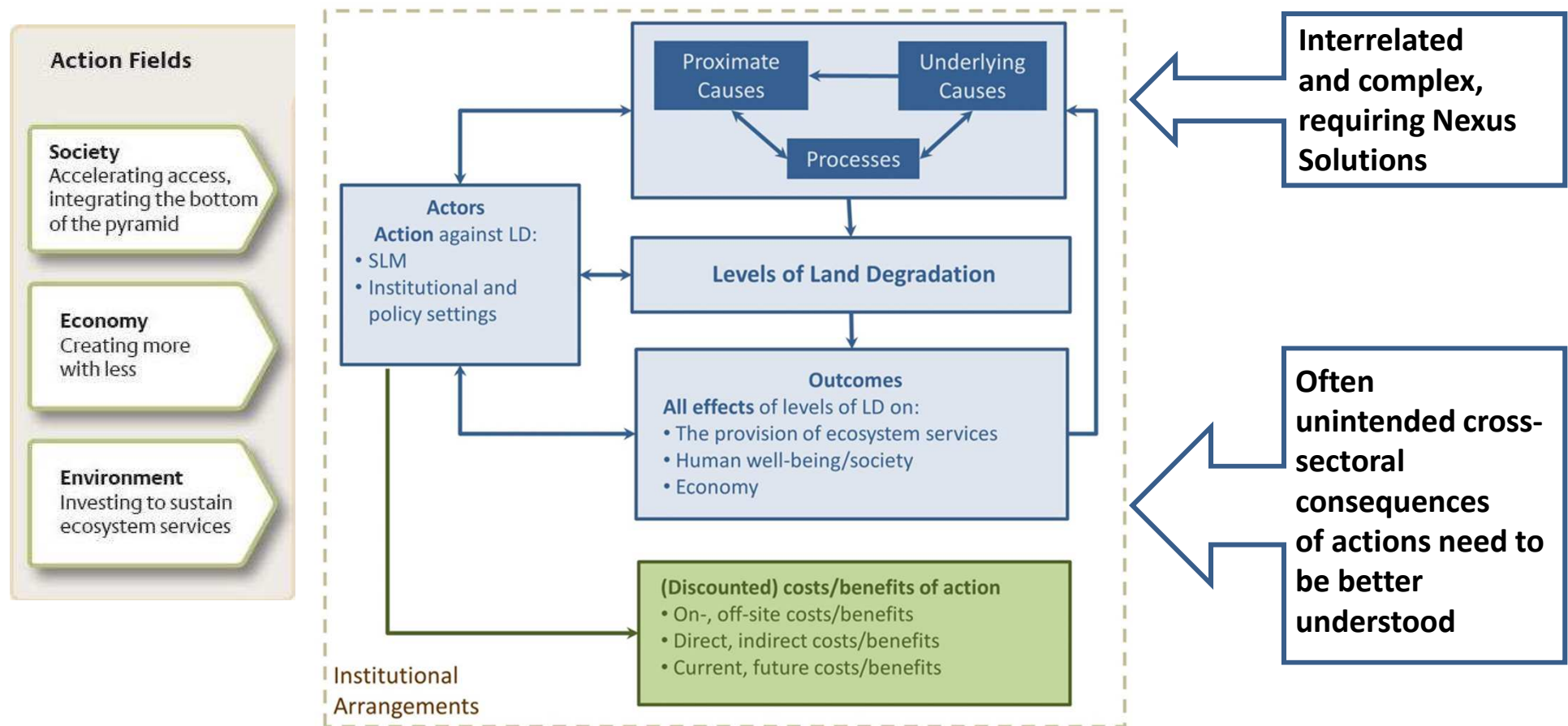
# Towards Nexus Approach

## Case studies: Uzbekistan

The Role of Nexus Thinking in Addressing  
Land Degradation



# The Role of Nexus Thinking in Addressing Land Degradation

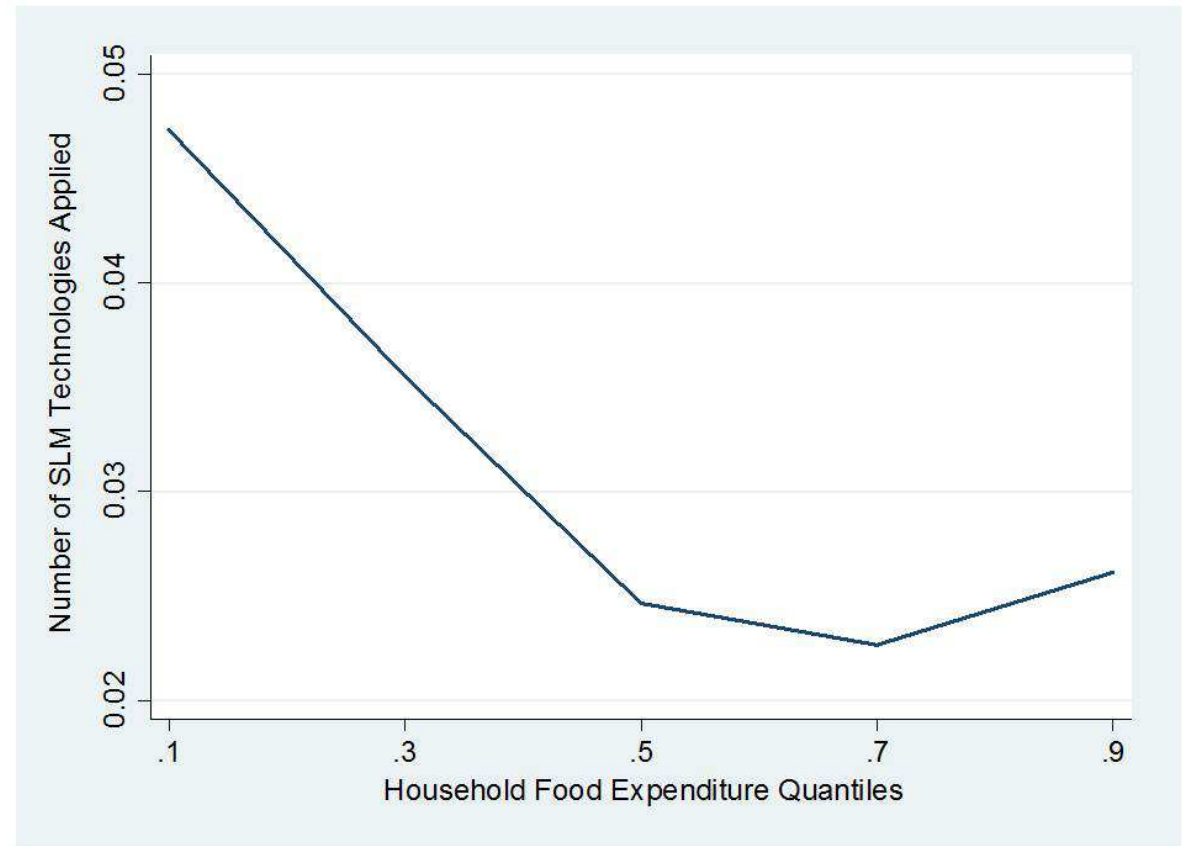






## SLM, Water and Food Security Linkages in Uzbekistan

- Linkages and tradeoffs between water use, land and environmental degradation, food security, improving livelihoods and also energy production
- SLM Packages as Nexus-plaforms





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# Towards Nexus Approach

## Case studies: China

*Soil erosion control and water availability  
in dryland area, NW China*



## Soil erosion on the Loess Plateau, NW China

20,000 – 30,000 t/km<sup>2</sup>.a

### Soil conservation measures:

Planting trees and grass (biological)

Construction of terrace and check-dams (engineering)

### Benefits:

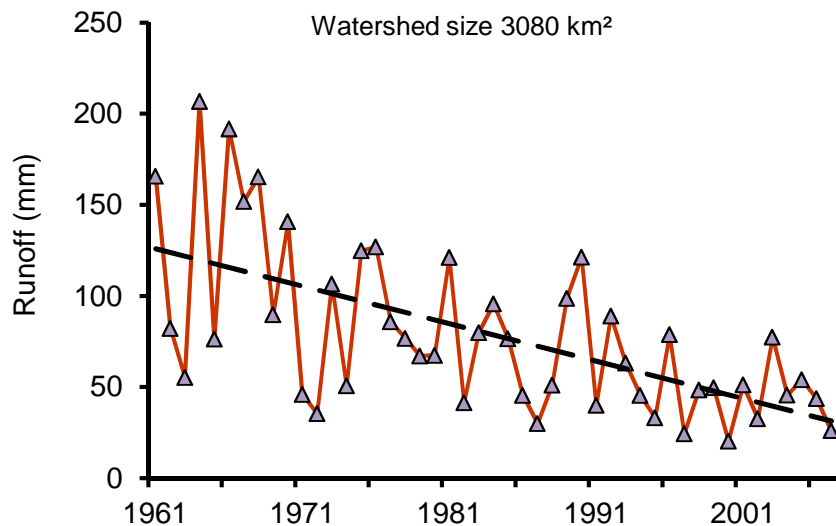
reduce sediment and soil losses,

alleviate flash floods, enlarge carbon sequestration,

improve agricultural productivity and supply timber

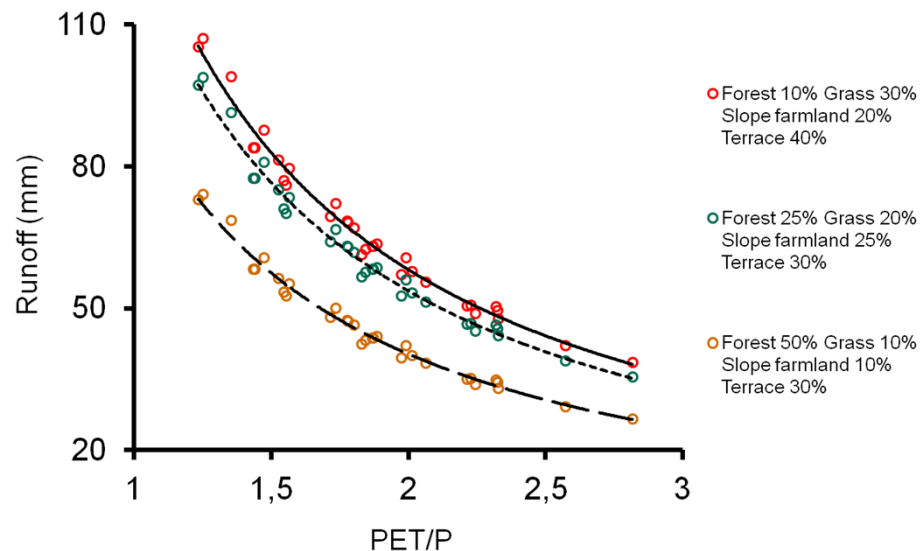
### Negative side effect:

water yield / availability has significantly declined,  
which increases water shortage and intensifies water  
use conflicts threatening sustainable development.





## Is it a result of land use or/and climate change?



### Results:

- The runoff reduction is a combined effect of land use and climate change
- Land use and climate have different roles in varying scale
- Implementation of conservation plans has to consider on-site and off-site impact: e.g. soil protection versus water security
- **Adaptive management strategies for balancing soil erosion control and water resource demand are urgent!**

### Nexus approach:

Important in developing adaptive management strategies for harmonizing soil management and water supply security in the dry land area of China



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# Towards Nexus Approach

## Case studies: Serbia

*Idea of Nexus practical implementation in  
Serbia*



## **Wastewater management practice in Serbia**

- 240 Mil m<sup>3</sup>/a municipal ww → 10% treated (mainly 1<sup>o</sup> treatment)
- 62% population has access to the sewer system
- Only 19 municipalities have WWTP, 5 operating

## **Waste management in Serbia**

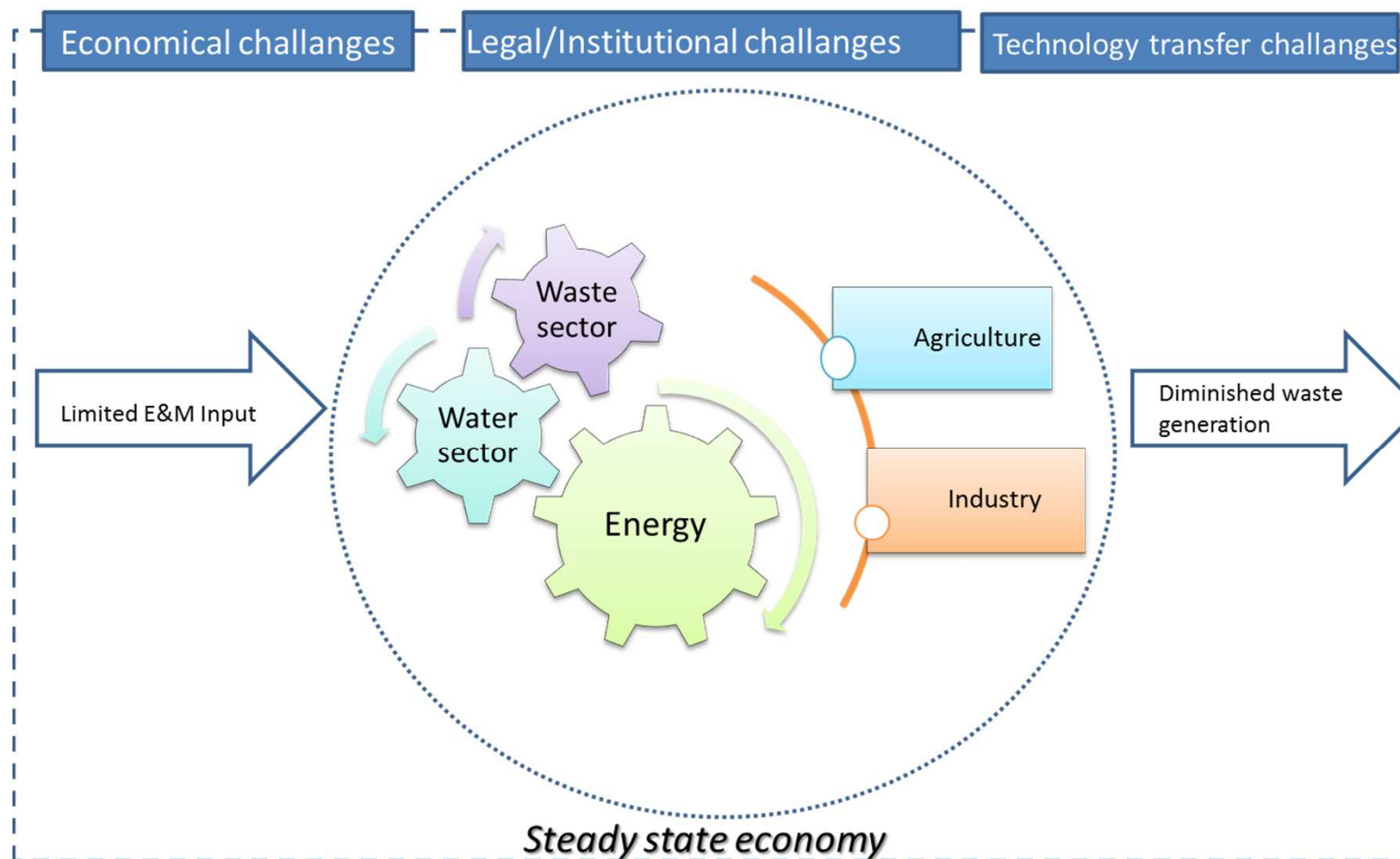
- 2,3 Mil T/a MSW (ca. 60% organic part)
- Collection organised for the 60% of the population → 15% disposed of in sanitary landfills (EU 99%) and 4% recycled (EU 40%)
- 90% of the landfills/dumping sites are causing severe affect to the groundwater sources → 80% of drinking water sources originates from ground water

## **High dependency on import of energy carriers > 40%**

**The economic challenge of environmental approximation is enormous: 5,6 billion EUR for water sector and 3,8 Billion EUR for waste sector (83% of the total projected costs)**



## Idea of Nexus practical implementation in Serbia





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## Thank you for your attention!

If you have any query, please feel free to find us for the answers:



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