Ecosystems, land use, agriculture, forestry, water, salinization and biodiversity. Case of Uzbekistan

Farhod Ahrorov.

Samarkand branch of TSUE, Uzbekistan

Uzbekistan: General Info

- Area: 447,400 km^2
- Population: 37.4 million (as of March 2025)
- Population density: 83.6 inhabitants / km2
- Capital: Tashkent (3.7 million inhabitants)
- Currency: Sum (about 13600 UZS = 1 €)
- Official language Uzbek (since 1989)

Major industries

Agriculture – Cotton, cereals, fruits, vegetables, livestock, silk production
Food Processing – Dairy products, meat processing, beverages, flour milling
Textile Industry – Cotton processing, garment production, silk textiles
Chemical Industry – Fertilizers, pharmaceuticals, plastics, petrochemicals
Oil and Gas Processing – Refining, petrochemical production, fuel processing
Mining and Metallurgy – Gold, uranium, copper, tungsten, rare earth metals
Machinery and Equipment – Industrial machinery, agricultural equipment, electronics
Automotive Industry – Cars, trucks, buses (UzAuto Motors, GM Uzbekistan)
Construction – Cement production, infrastructure development, real estate
Renewable Energy – Solar and wind power development, green hydrogen production

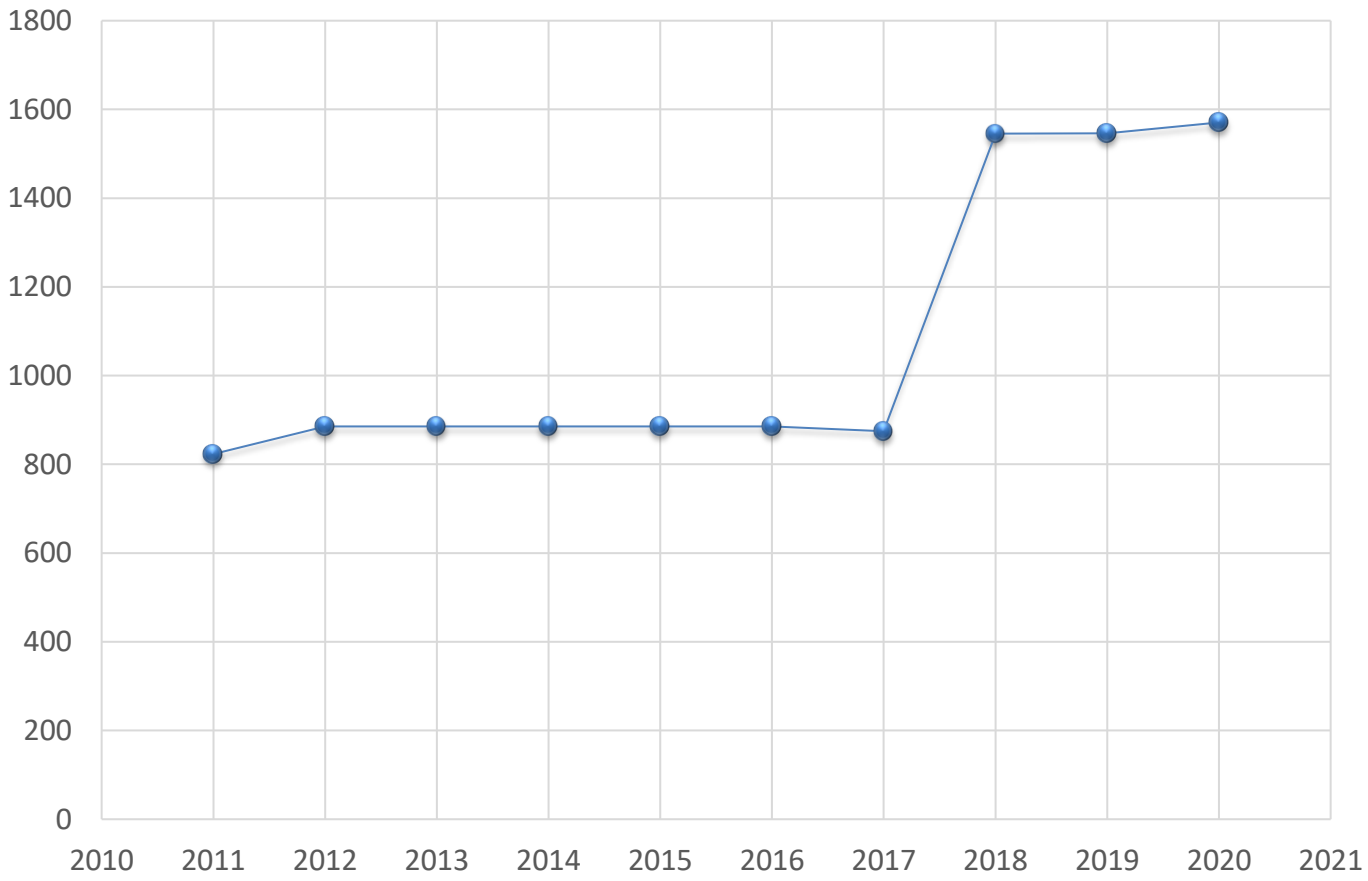
Agriculture in Uzbekistan

- agr. used area 24,057 million hectares = 65.95% of TA
- 13.9% of arable land, 71.17% pasture, 10.68% forests
- Share of GDP: 2024- 23,4%
- about 49% of the population lives in rural areas

Source: stat.uz (2024)

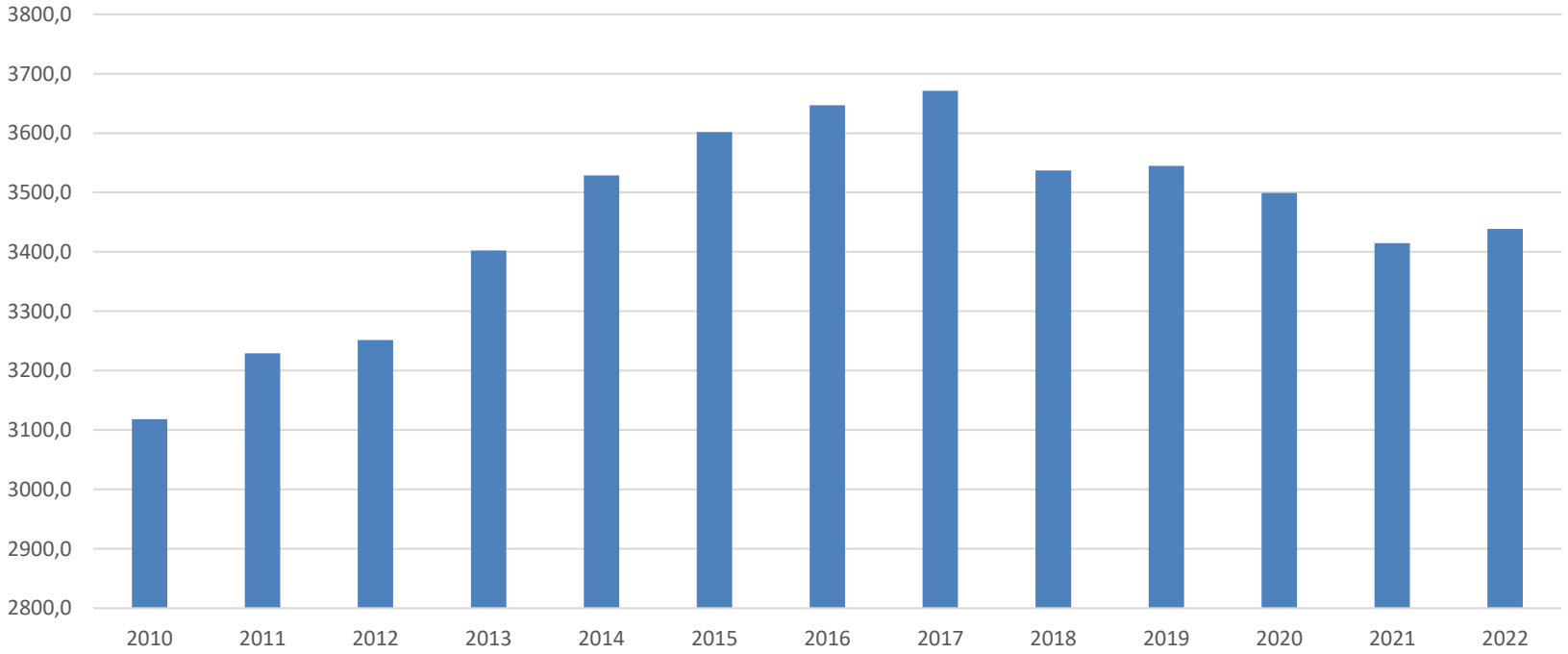
Protected natural areas

(thousand hectares)



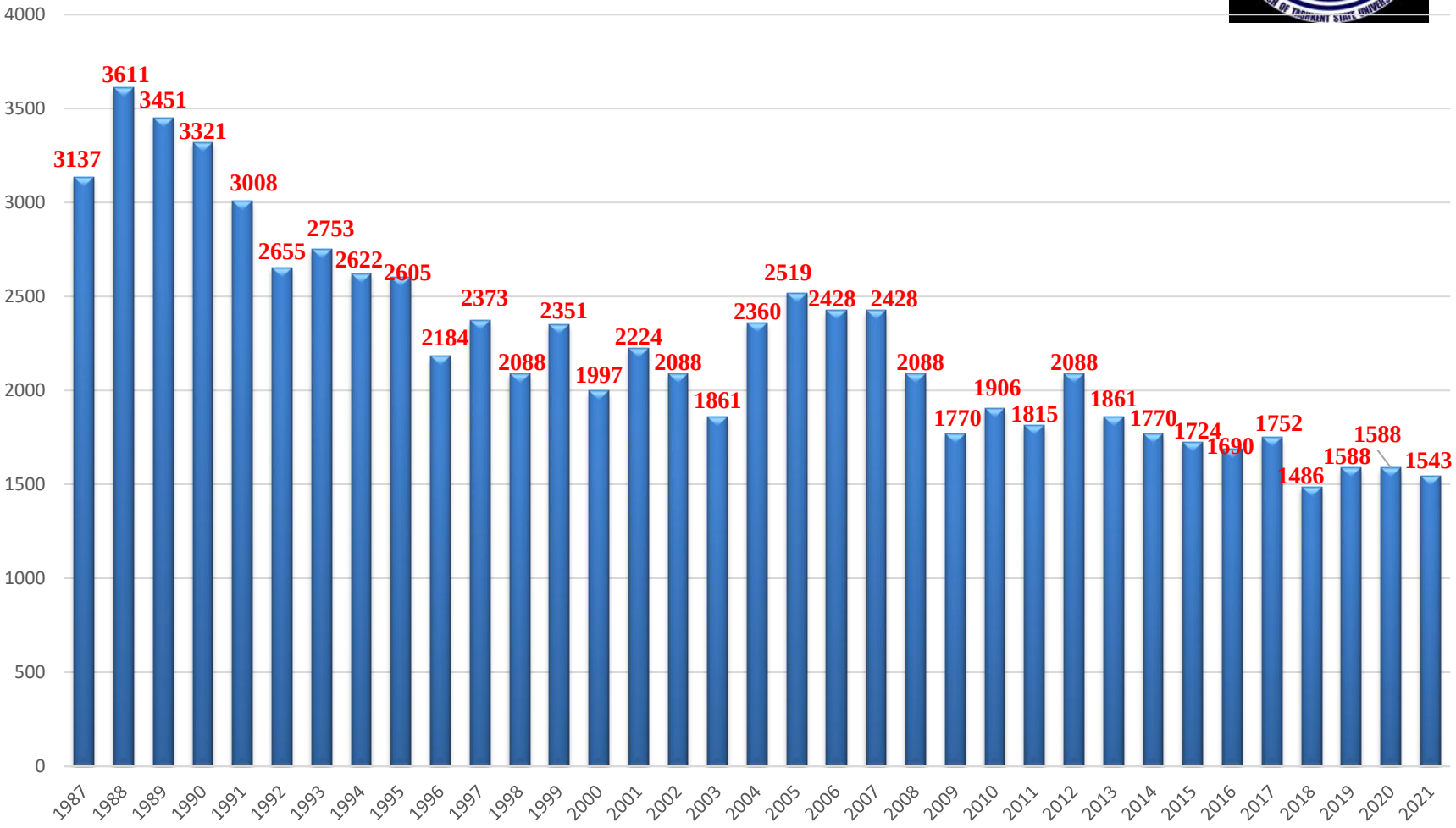
Sourse: stat.uz

Employed in agriculture, in thousands



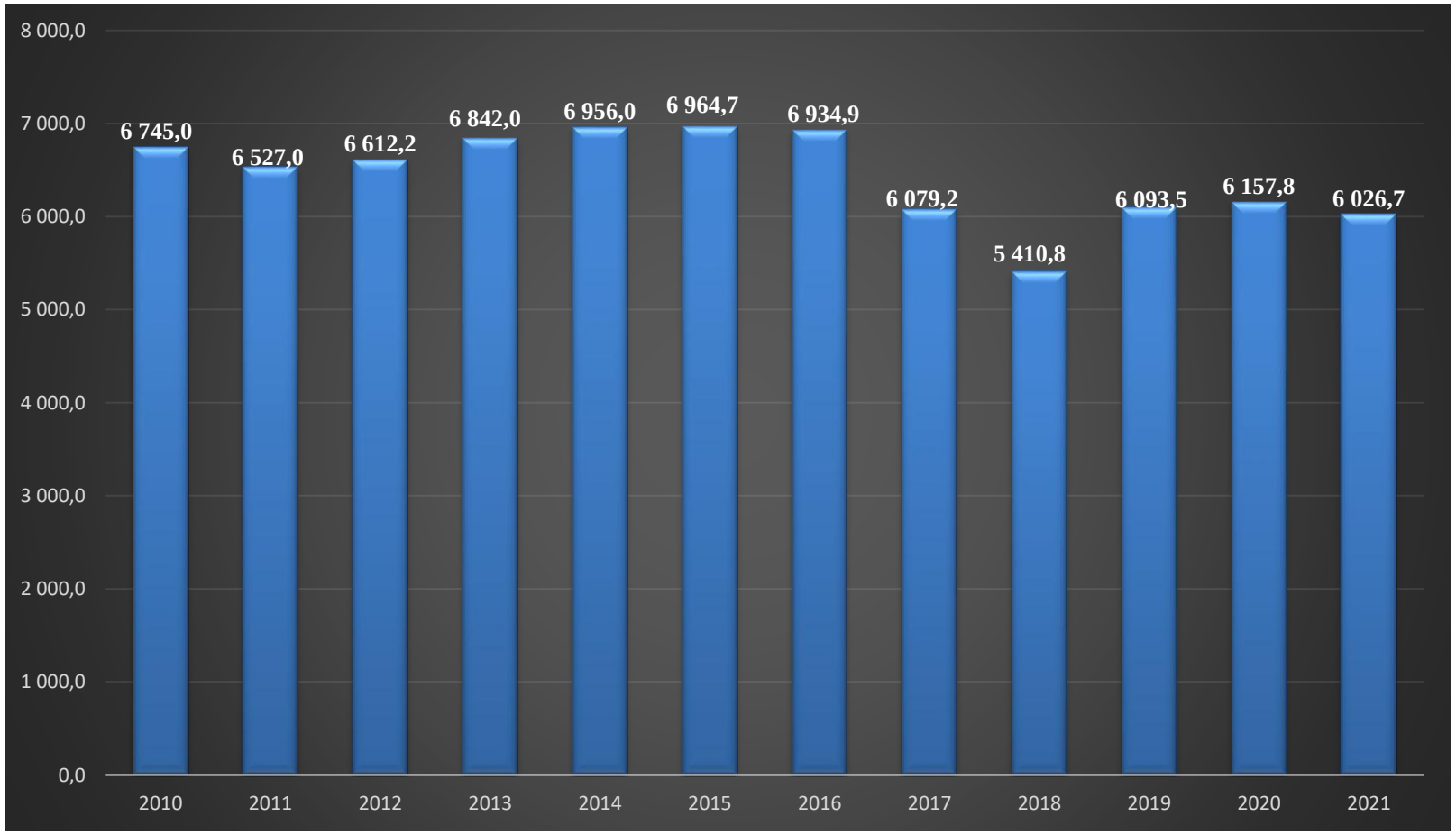
Source: stat.uz 2024

Cotton production in Uzbekistan, th.ton



Source: https://www.indexmundi.com/agriculture/?country=uz

Wheat production in Uzbekistan, th.tonnes



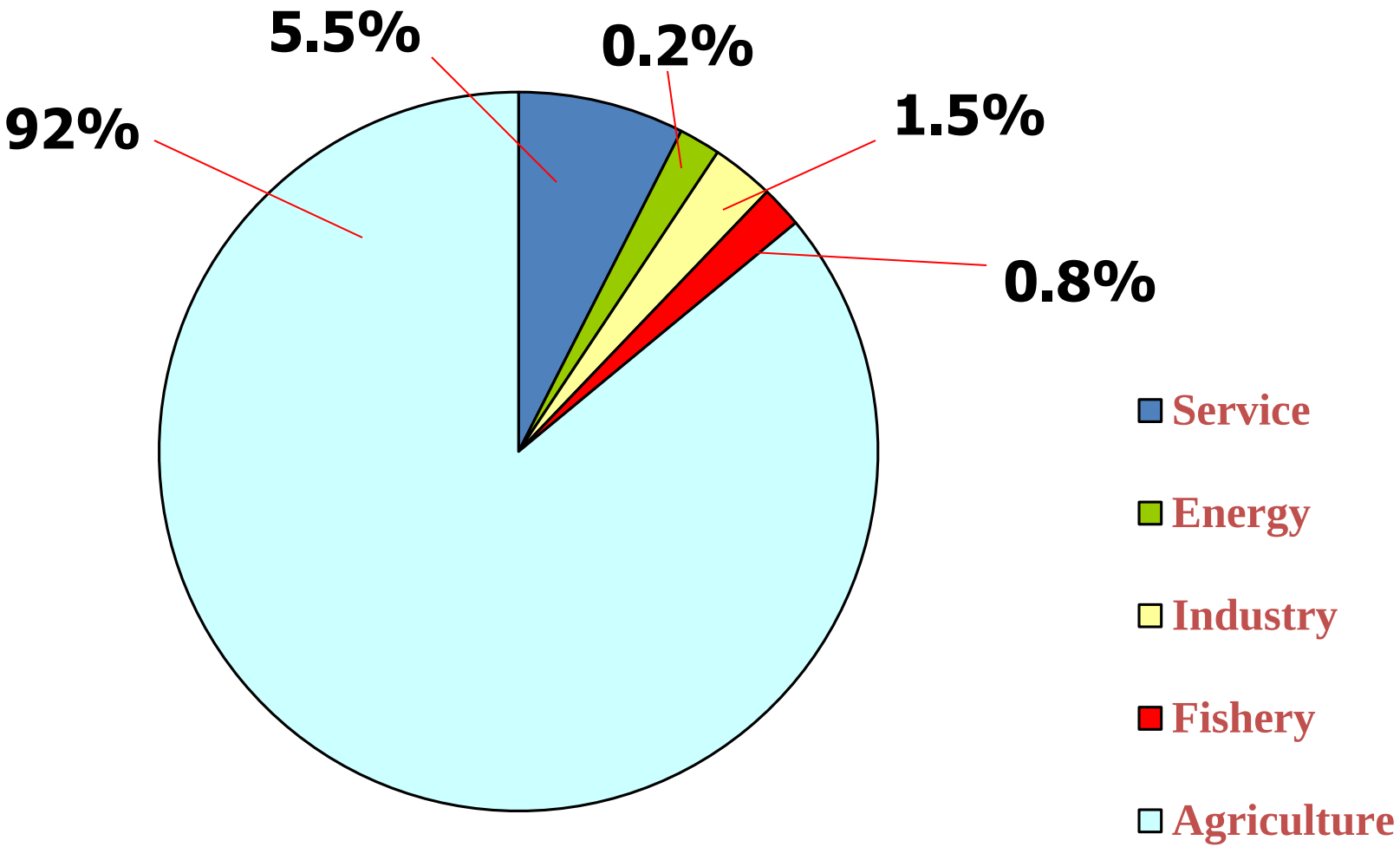
Source: stat.uz

Problems of agriculture of Uzbekistan

Water Scarcity and Irrigation Challenges

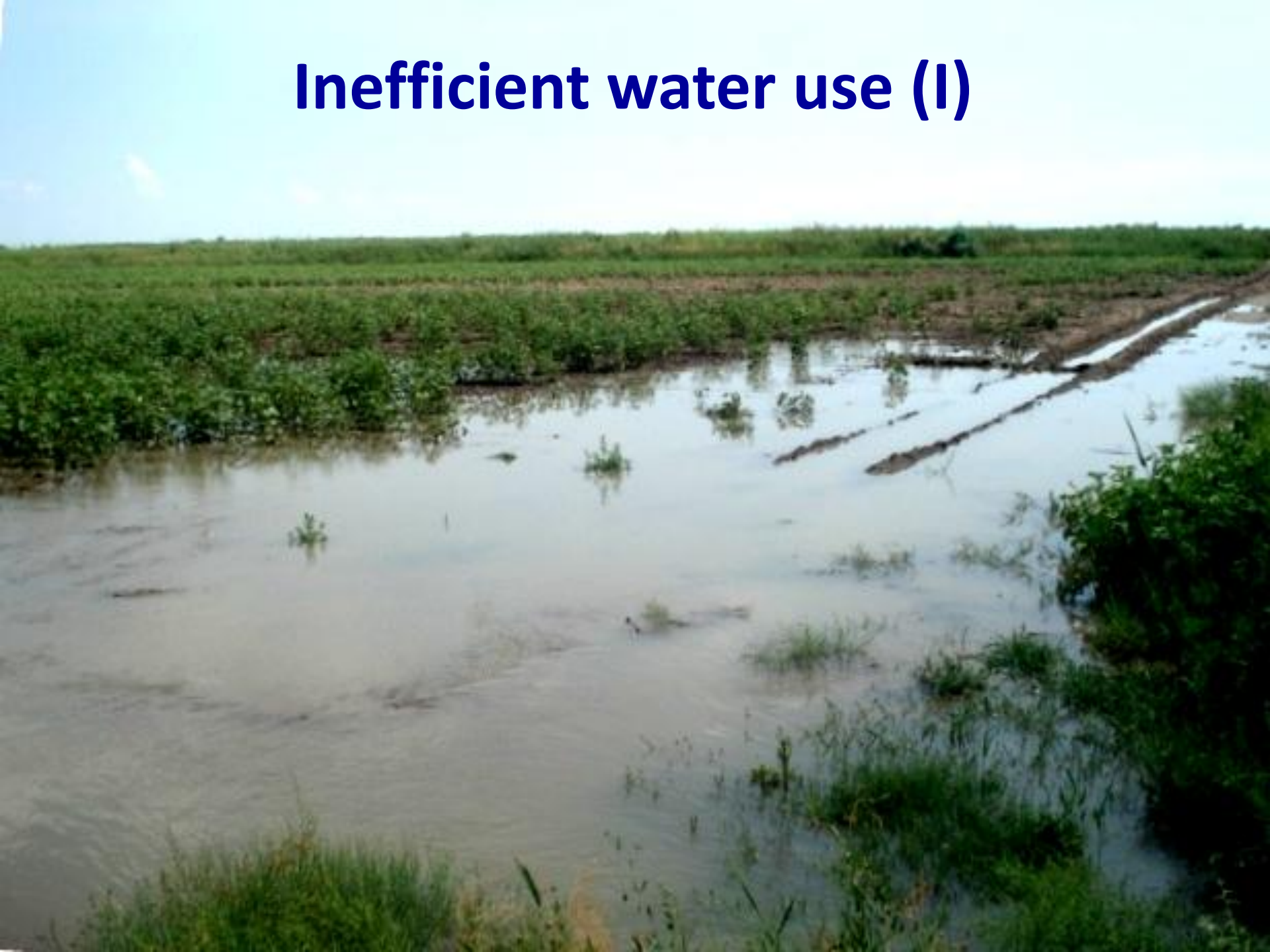
- Over 85% of Uzbekistan’s agriculture relies on irrigation, but inefficient water management leads to wastage and salinization of soils.
- Climate change is causing droughts and water shortages, reducing water availability from the Amu Darya and Syr Darya rivers.
- Outdated Soviet-era irrigation infrastructure is still in use, leading to high water losses.

Water use by branches of economy



Irrigation system and channels

Inefficient water use (I)



Soil Degradation and Desertification

- Excessive use of chemical fertilizers and monoculture farming (especially cotton) has led to soil depletion and degradation.
- About 50% of arable land suffers from salinization, affecting crop yields.
- Desertification is expanding, particularly in Karakalpakstan and Khorezm regions, reducing available farmland.

Land degradation in the Uzbek agriculture

- Irrigation erosion - 722 thousand ha
- Wind erosion - 1,812 thousand ha
- Due to the erosion yield losses in cotton 450-500 thousand tons per year

Source: Soil and cadastre committee Uzbekistan, 2012

Irrigation ditch

Limited Land for Cultivation and Land Degradation

- Only 13.9% of the total land area is arable, and expansion is limited due to natural constraints.
- Urbanization and industrialization are reducing the availability of agricultural land.

Outdated Farming Practices and Low Productivity

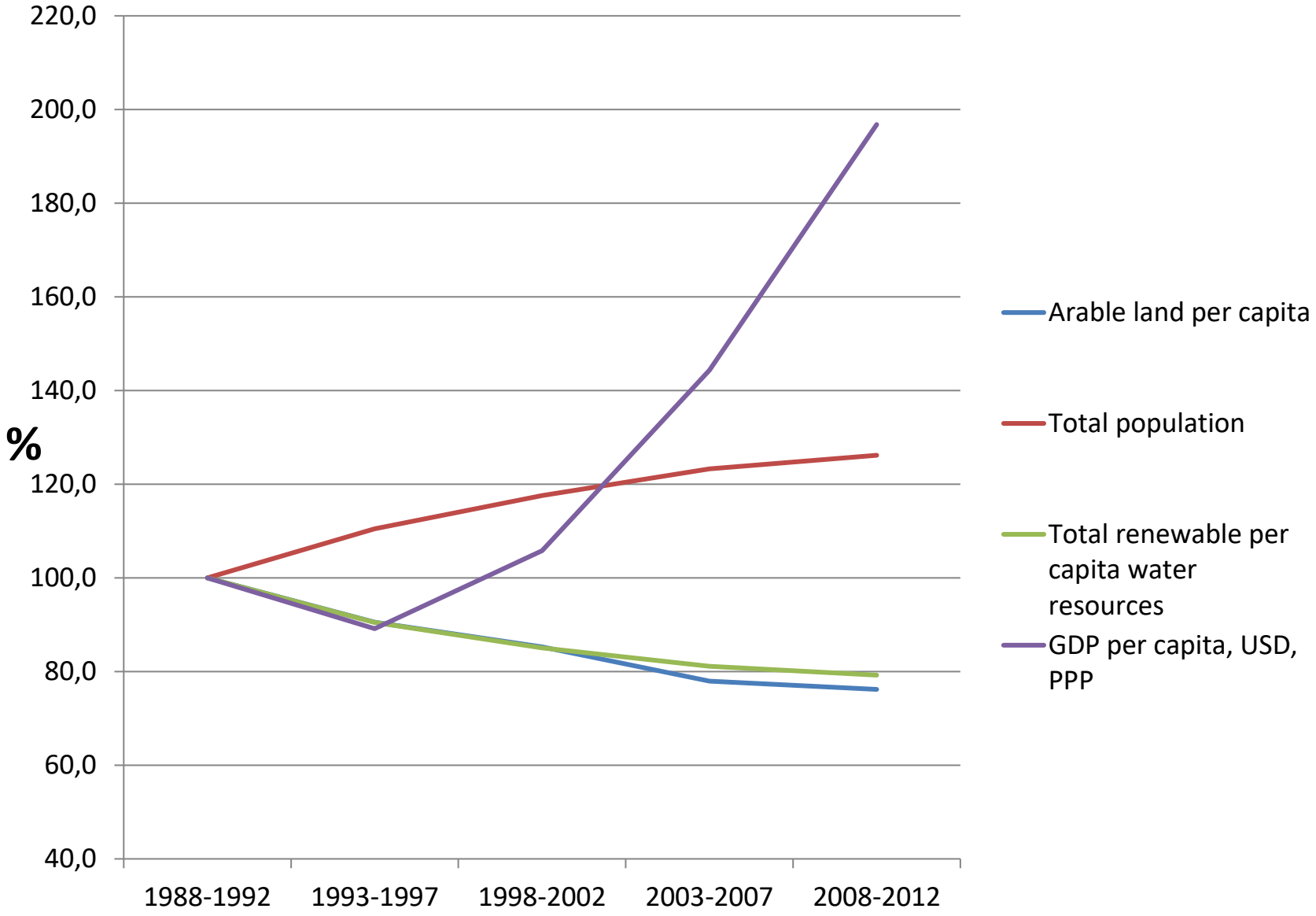
- Many farms still rely on traditional farming methods, leading to low crop yields compared to global standards.
- Limited mechanization and inefficient use of modern agricultural technology hinder productivity.

Burned straw

Inequal distribution of straw

Soil structure

Pressure to natural resource in agriculture of Uzbekistan



Possible recommendations for a Sustainable use of resources (I)

- Charges on irrigation water would undoubtedly contribute to improved water management;
- Therefore is a prerequisite for the introduction of water pricing and land pricing, the liberalization of markets;
- Reallocation of taxes from land tax to water tax(payment).
- As consequence, investments on newer methods and technologies such as drip or sprinkler irrigation will be profitable.

Possible recommendations for a Sustainable use of resources (II)

- Efficient water management
- Soil conservation techniques
- Climate adaptation strategies
- Financial support
- Diversification
- Infrastructure improvements
- Training and education.

Thank you!