Agricultural Irrigation: Uzbekistan Country Profile

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Successful in international cooperation for over 20 years

Institute for Resource Management – inter 3 and Contact Persons

1999

Founding

> 20 years

National and International experience (e.g. in Iran, Turkey, Egypt, ...)

> 25

Interdisciplinary project fields

+ 10

Project staff

> 100

Successful projects

> 500

Conducted workshops in the context of international cooperation

Proven methods and tools for successful project implementation and international cooperation

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inter 3 Competencies: inter- and transdisciplinary work, intercultural thinking and cooperating internationally

WATER AND ENERGY INFRASTRUCTURE

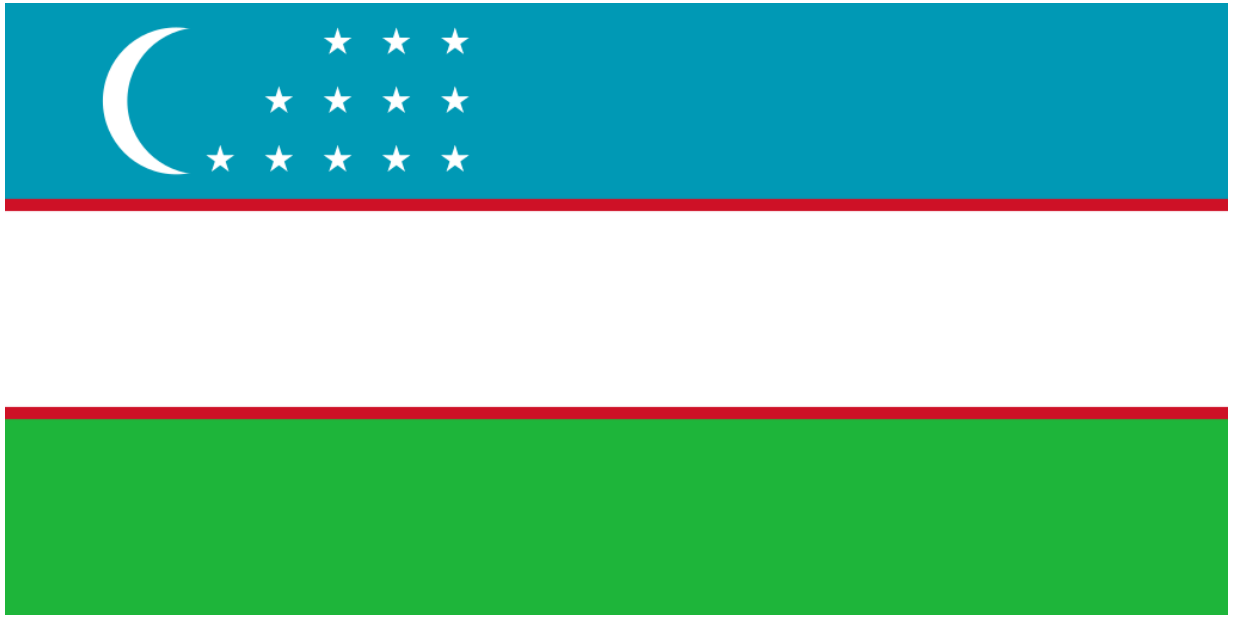
LAND MANAGEMENT AND REGIONAL DEVELOPMENT

URBAN SPACES AND DEVELOPMENT

Context-oriented Project Management	**Decision Support**	inter3	
	**Future and Strategy Definition**		**Dealing with Vulnerability and Resilience**
Blended Learning and Capacity Development		**Communication and Dissemination of Results**	

Outline

- Introduction to Republic of Uzbekistan
  - Politics and Economy
  - Water ressources and challenges
- Agriculture and Irrigation in Uzbekistan
- Current opportunities and fields of action



Republic of Uzbekistan

Key Facts and Figures

- Most densely populated country in Central Asia
- Double-landlocked regional hub
- Diverse cultural heritage
- Uzbek is official language with widespread use of Russian
- 33 mio. inhabitants with half living in urban areas
- 0,5 Mio km² surface with 80% desert and steppe

- Main challenges: climate change, population growth, urbanization, economic development & resource need

Young country with big opportunities

- President Schawka Mirsijojew since 2016, gradual transition to market economy
- Reform efforts to attract international investors
- GDP 2019: 58 Billion $US with 5-6% expected growth
  - 48% Services
  - 34% Industry
  - 18% Agriculture
- Young workforce with cheap labour costs
- High priority on education 10-12% of GDP
- Demand for technological catch-up in all sectors

World Bank Doing Business Index (1-190) (2020)

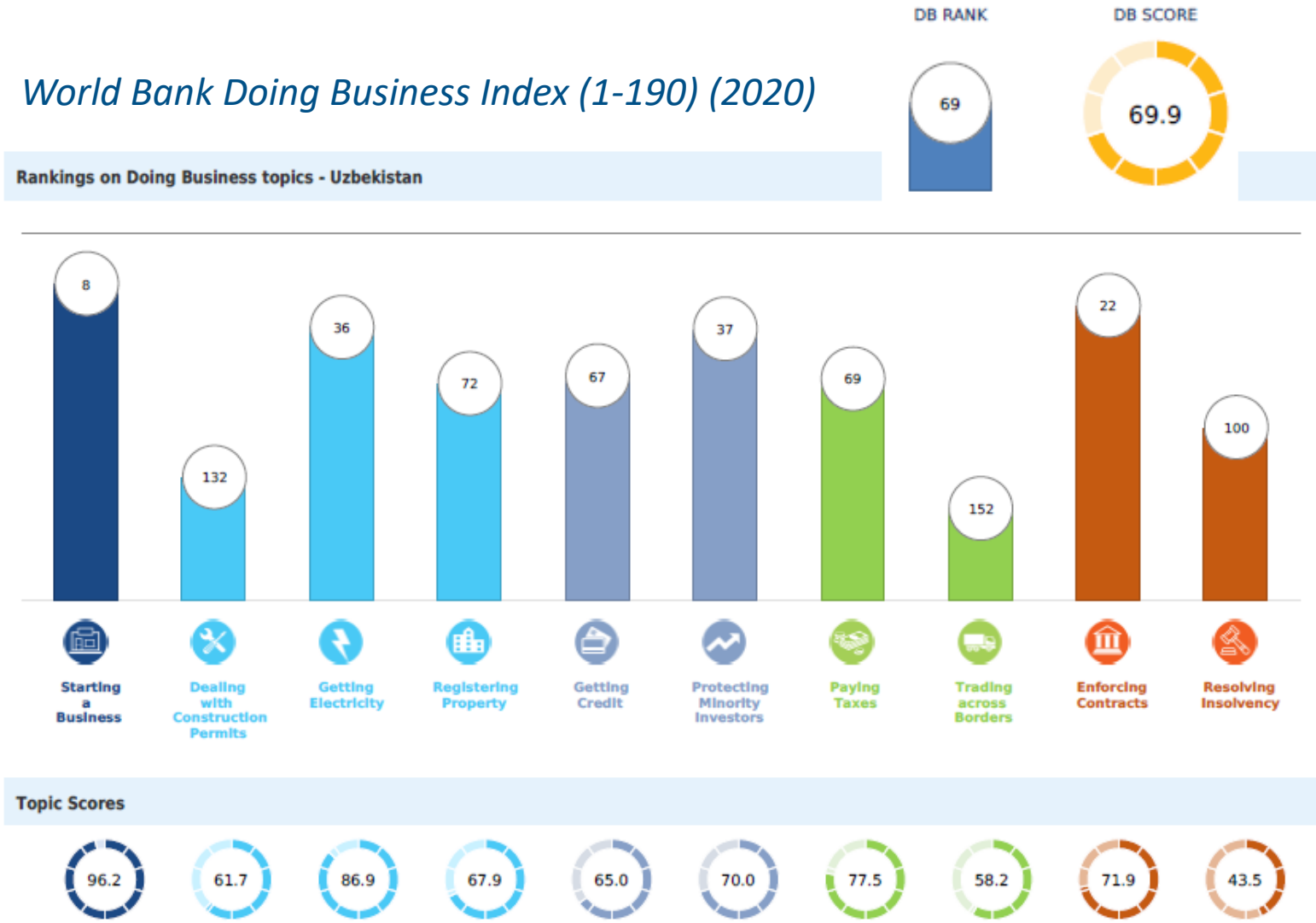
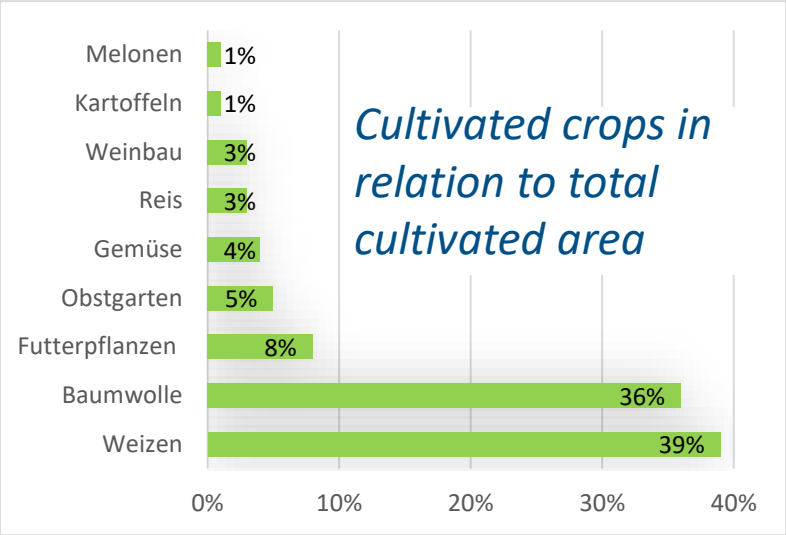


Fig: World Bank

Agriculture is of high relevance

- 4 Mio ha arable land
- Agriculture empolying 27% of the work force, 50% income dependency of population
- Traditional importance of cotton production
- Expected production expansion for fruit and vegetables
- National and international investment in production and value chain
- Governmental planning and economic control



Average annual agricultural production

Produktion, 1000 Tonne	1971-1975	1976-1980	1981-1985	1986-1990
Baumwolle	4.894	5.359	5.159	5.112
Obst, Gemüse, Kartoffeln	2.777	4.319	5.138	5.021
Bruttoproduk-tion / ha, Rubel	2.635 (30€)	2.847	2.800	2.400 (27€)

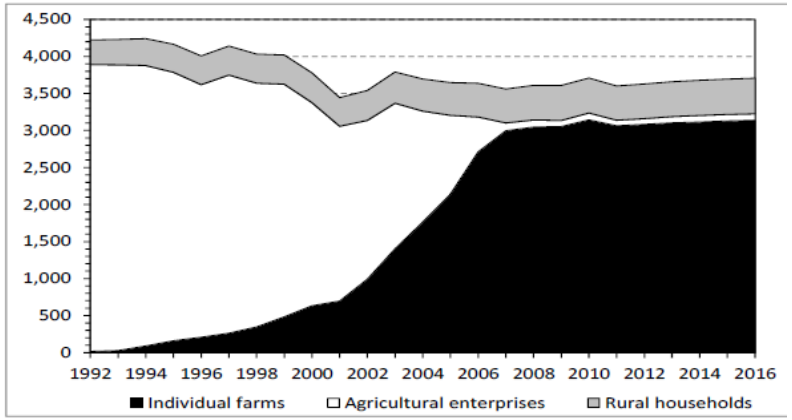


Fig: World Bank

Figure 7: Average size of individual farms according to production specialization, ha

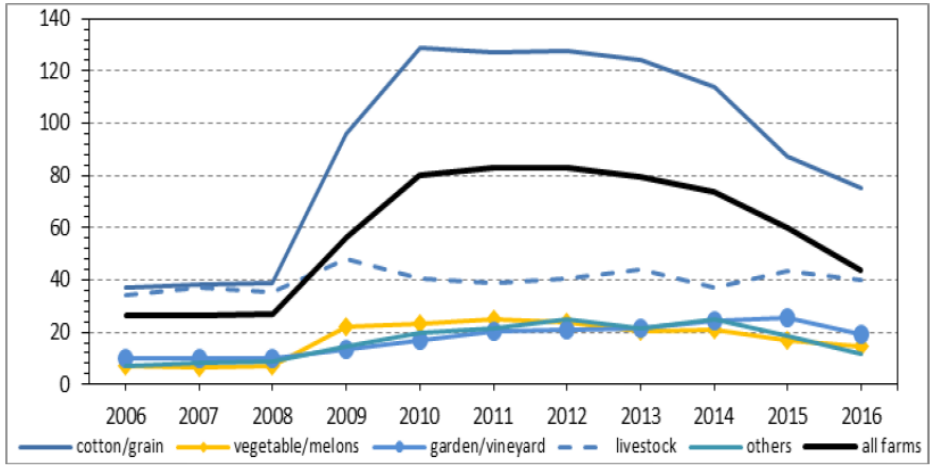


Fig: World Bank

Great vulnerability of the region

- High emissions relative to GDP
- 20% of energy in agriculture
- Vulnerable water resources and agriculture to climate change (top 25 country exposed to water stress)
- Threats: glaciers, discharge, productive precipitation, salinization, droughts
- Demand for action in water and agriculture politically recognized
- Increase: water use efficiency, monitoring, adapted varieties, diversification, mechanization, desalination and reuse

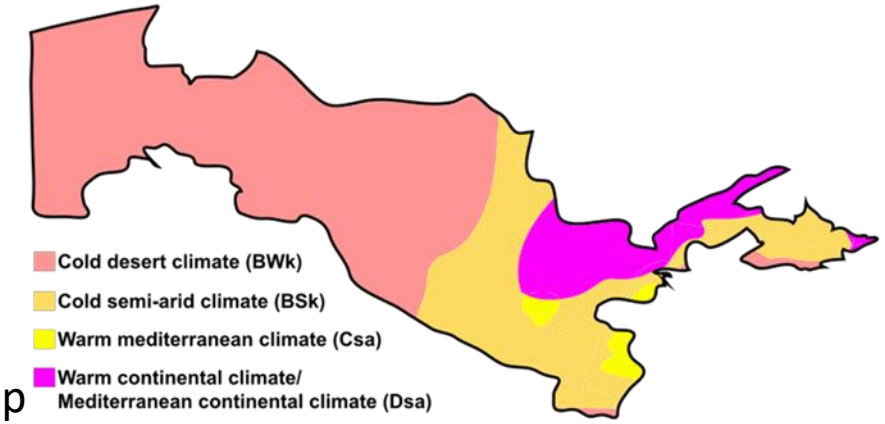
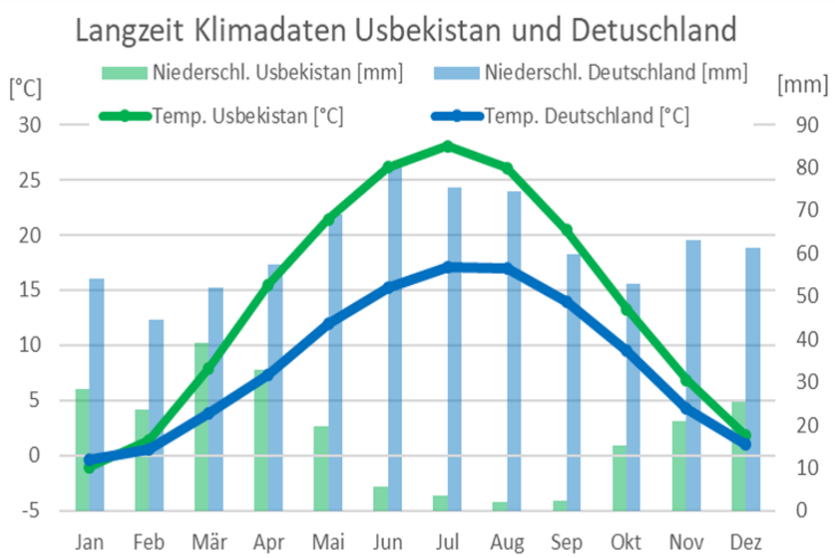


Fig: BECK,2018



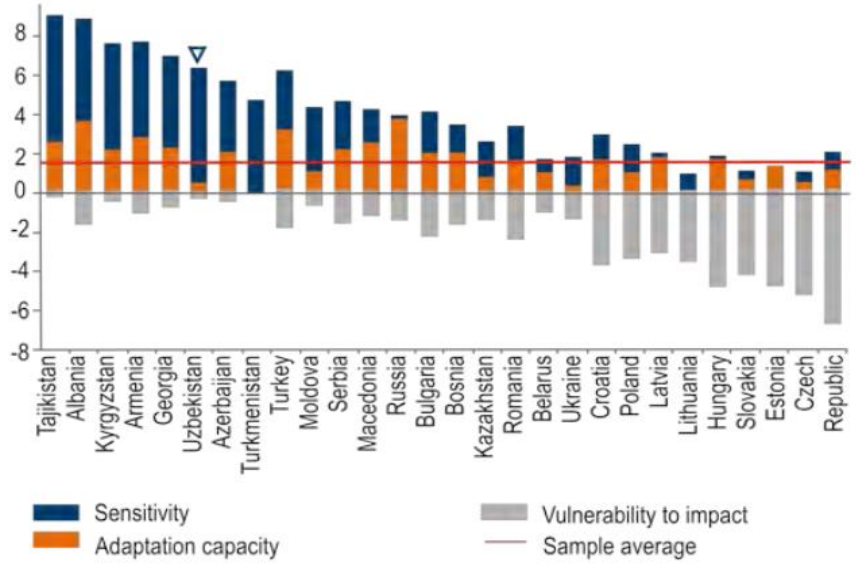


Fig: REC-CA, 2020

CO2 Emissions of Uzbekistan

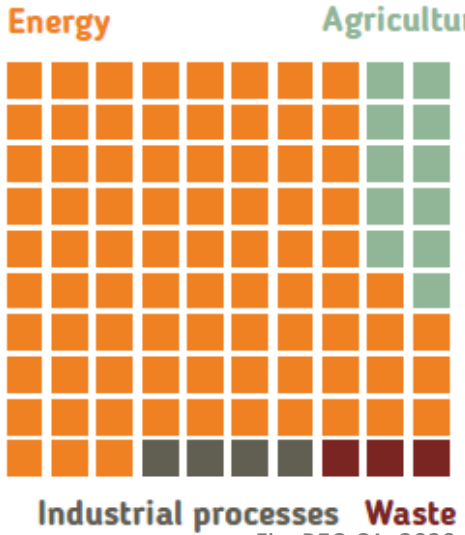


Fig: REC-CA, 2020

Complex hydraulic interdependencies

- Lower reaches of Amudaray and Syrdarya river
- 60 dams with 15 km³ capacity
- Only small fraction of 56 Bill m³/a water extracted generated in country
- Salinization problems

102 Mrd. m³/a aus Nachbarstaaten (64% durch Abkommen gesichert)

16 Mrd. m³/a intern Erneuerbare Wasserressourcen

99 Mrd. m³/a nach Nachbarstaaten (Aralsee) (33% durch Abkommen gesichert)

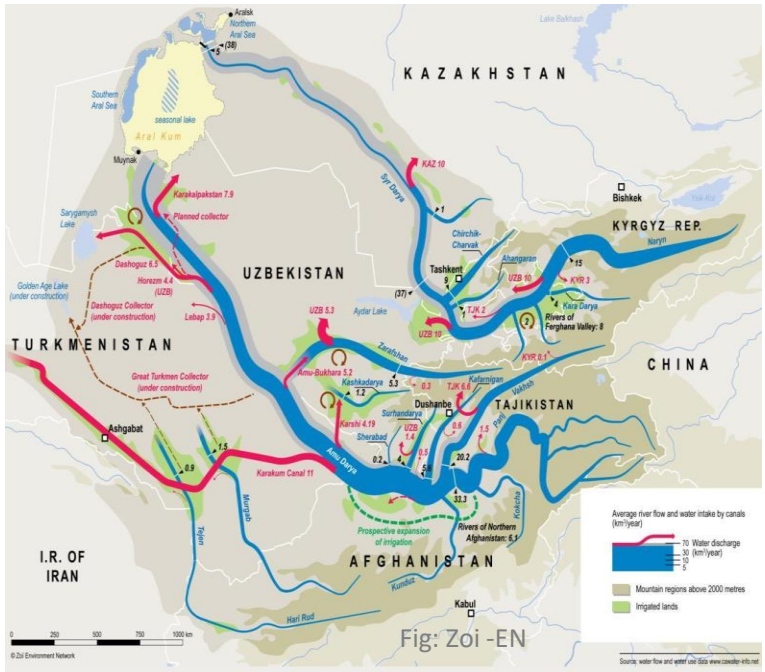


Fig: Zoi -EN

Fig: FAO

Demand for action

- Ecological and political crisis
- International efforts for transboundary water resources management

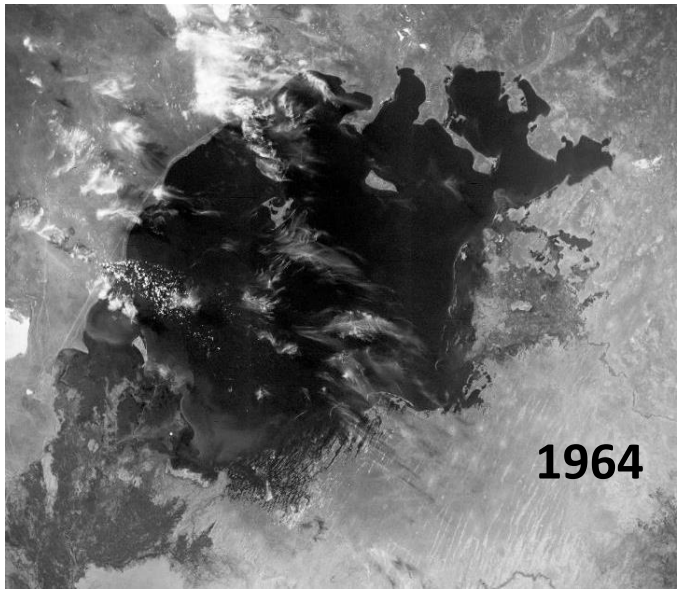
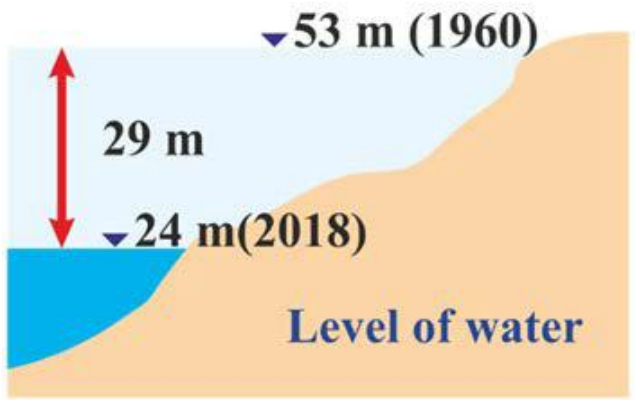
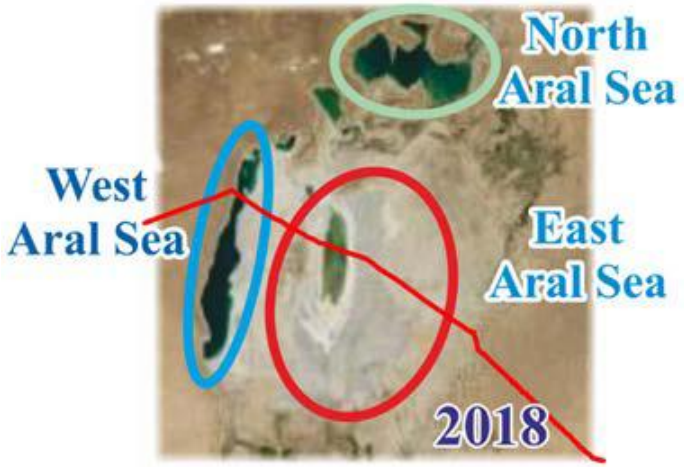


Fig: Embassy UZ





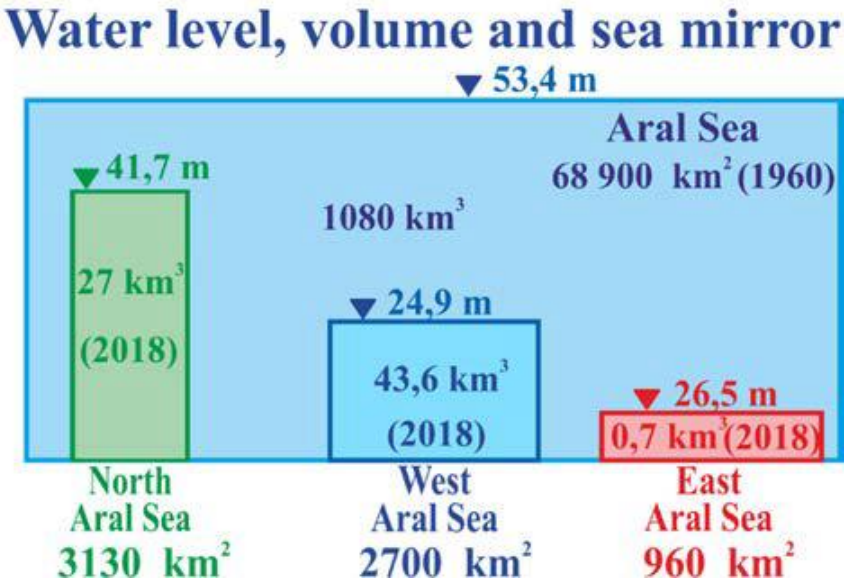


Fig: Embassy UZ

Water Use

Surface wate plays the biggest role

ZIELE

- < 220 mm/a precipitation
- 90% water use by agriculture

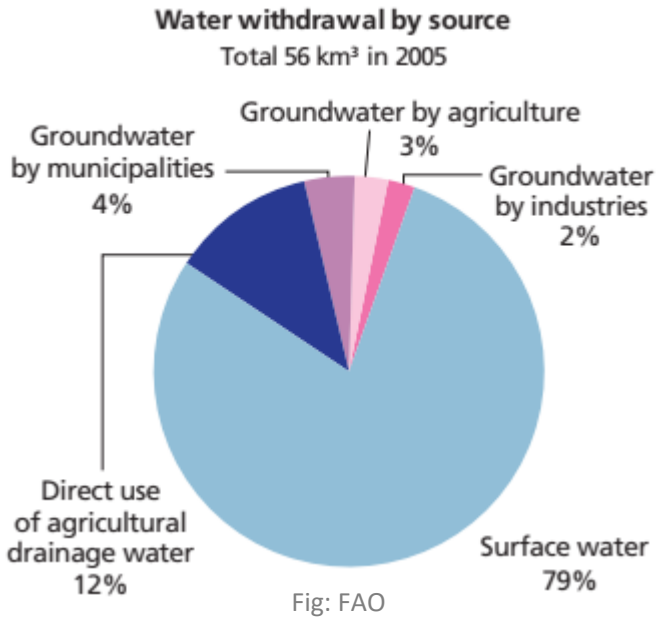
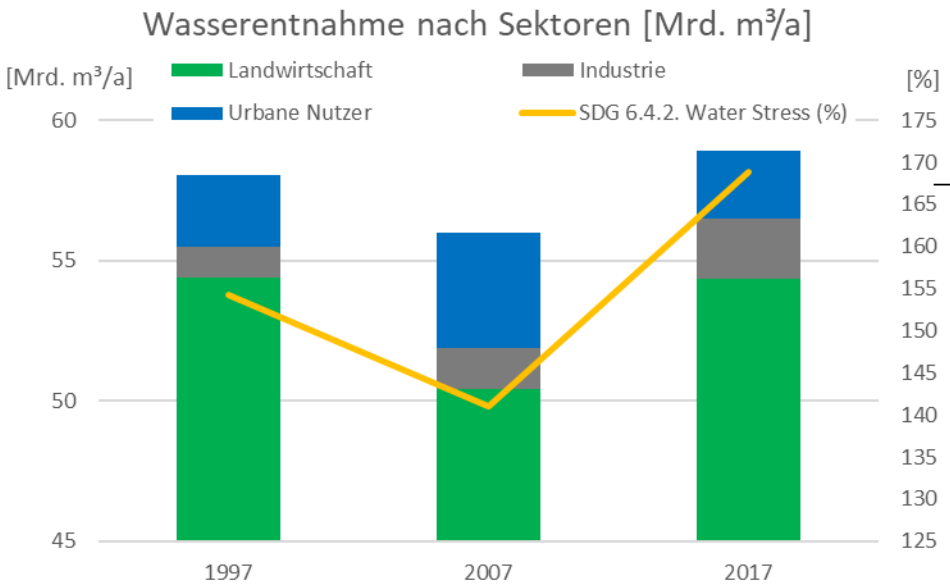
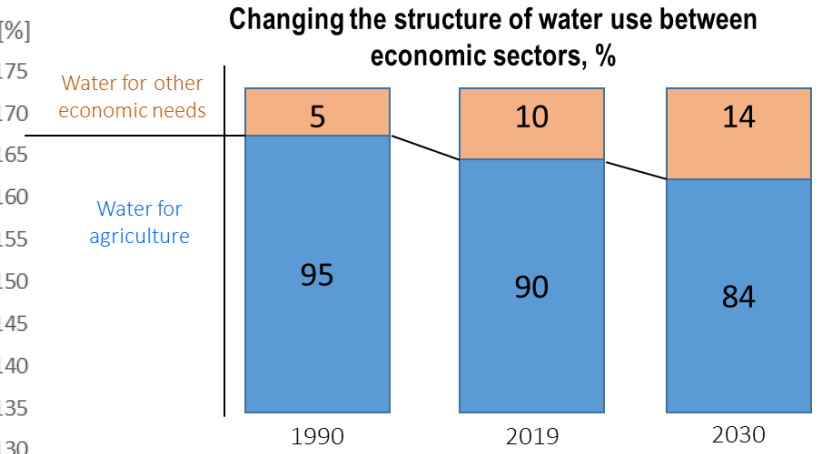


Fig: FAO





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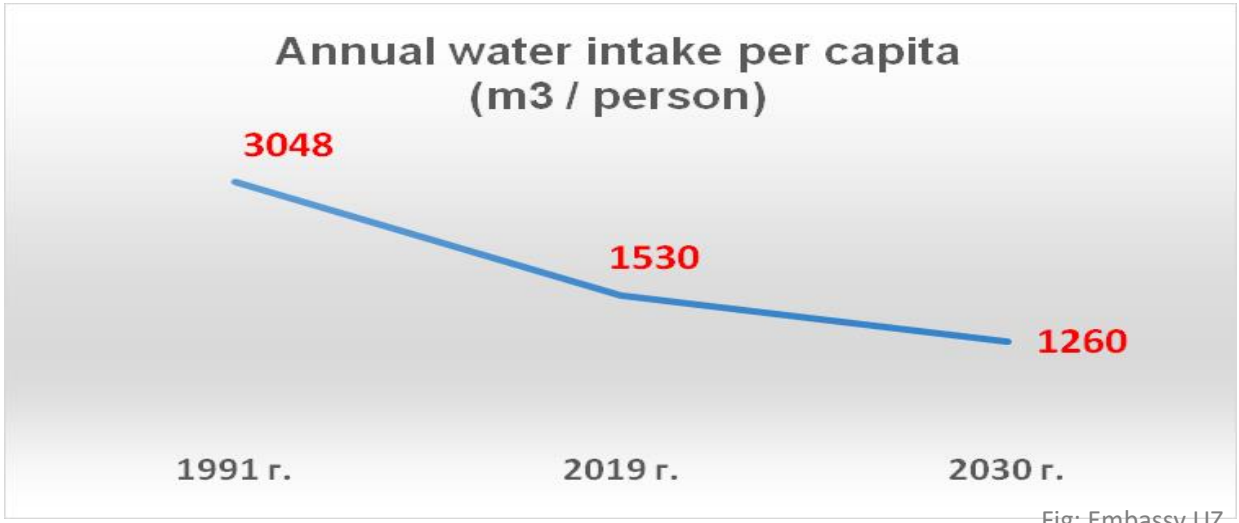


Fig: Embassy UZ

Water demand and large scale supply

- Large scale irrigation schemes
- 90% equipped for irrigation
- 70% equipped for drainage

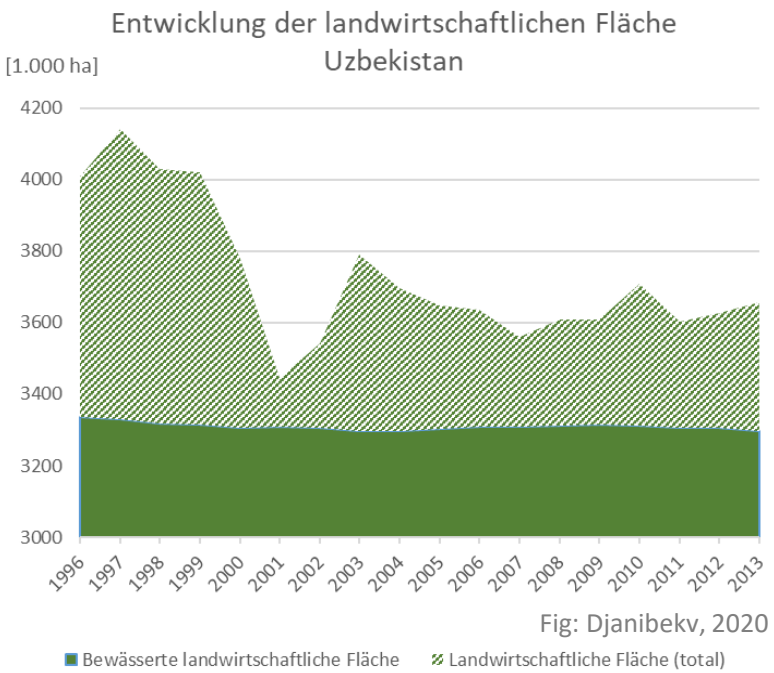
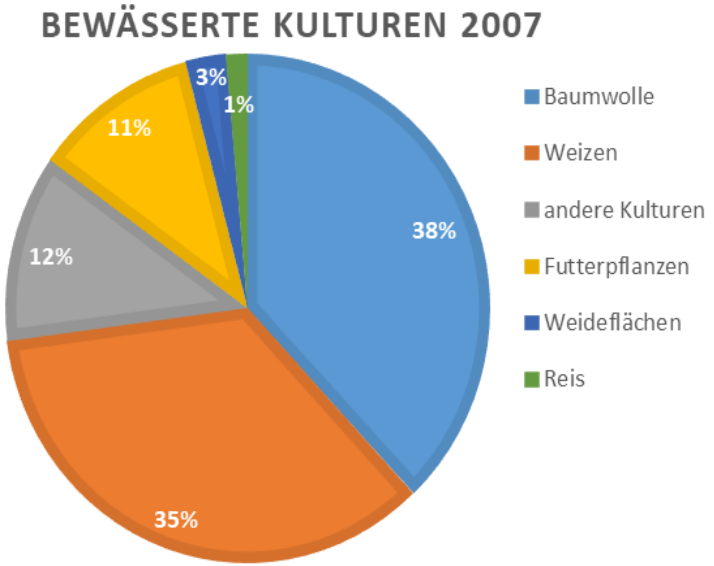


Fig: Djanibekv, 2020



Administration Water and Irrigation Sector

Dynamic institutional framework

- Reconnection to international and regional water management institutions
- Complex administrative structure
  - Surface water distribution: Ministry of Water Resources
  - Hydrotechnical Infrastructure: Gosvodkhoznadzor
  - Groundwater: Committee for Geology
- User fees independent of consumed water to Water Consumer Associations

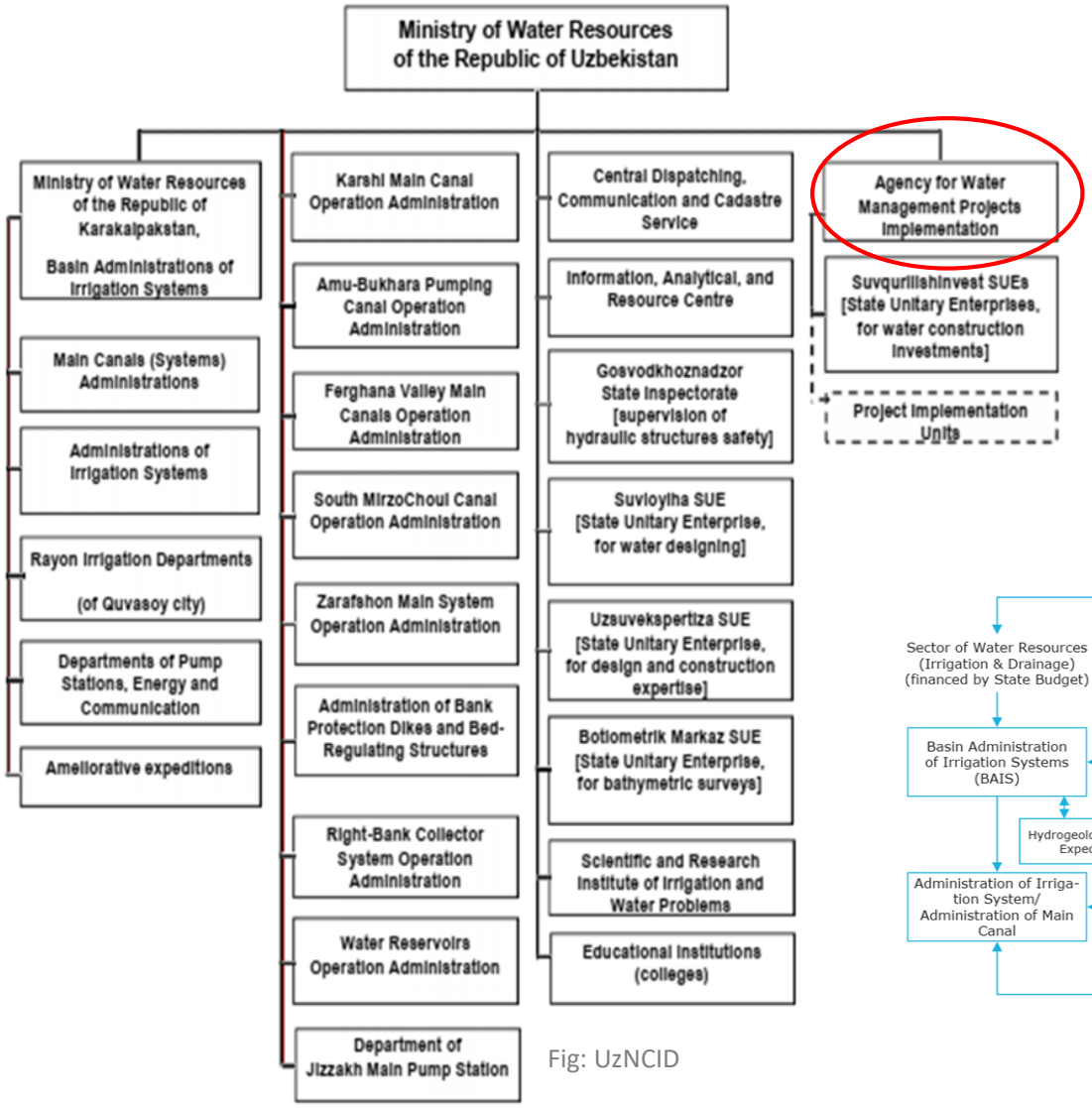


Fig: UzNCID

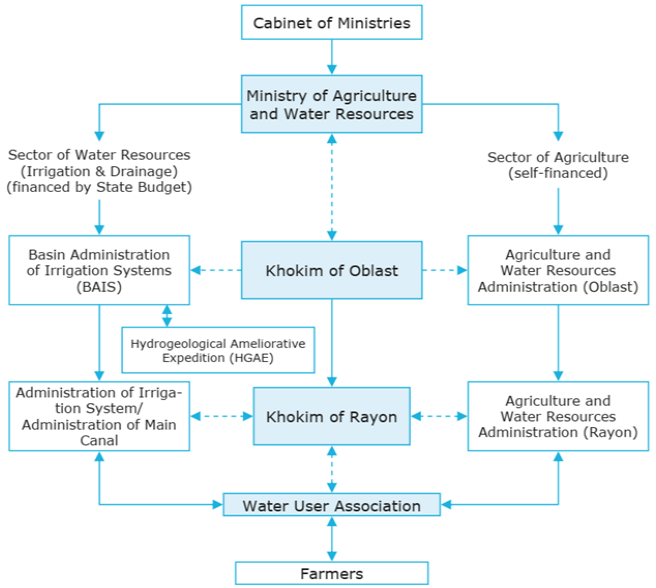
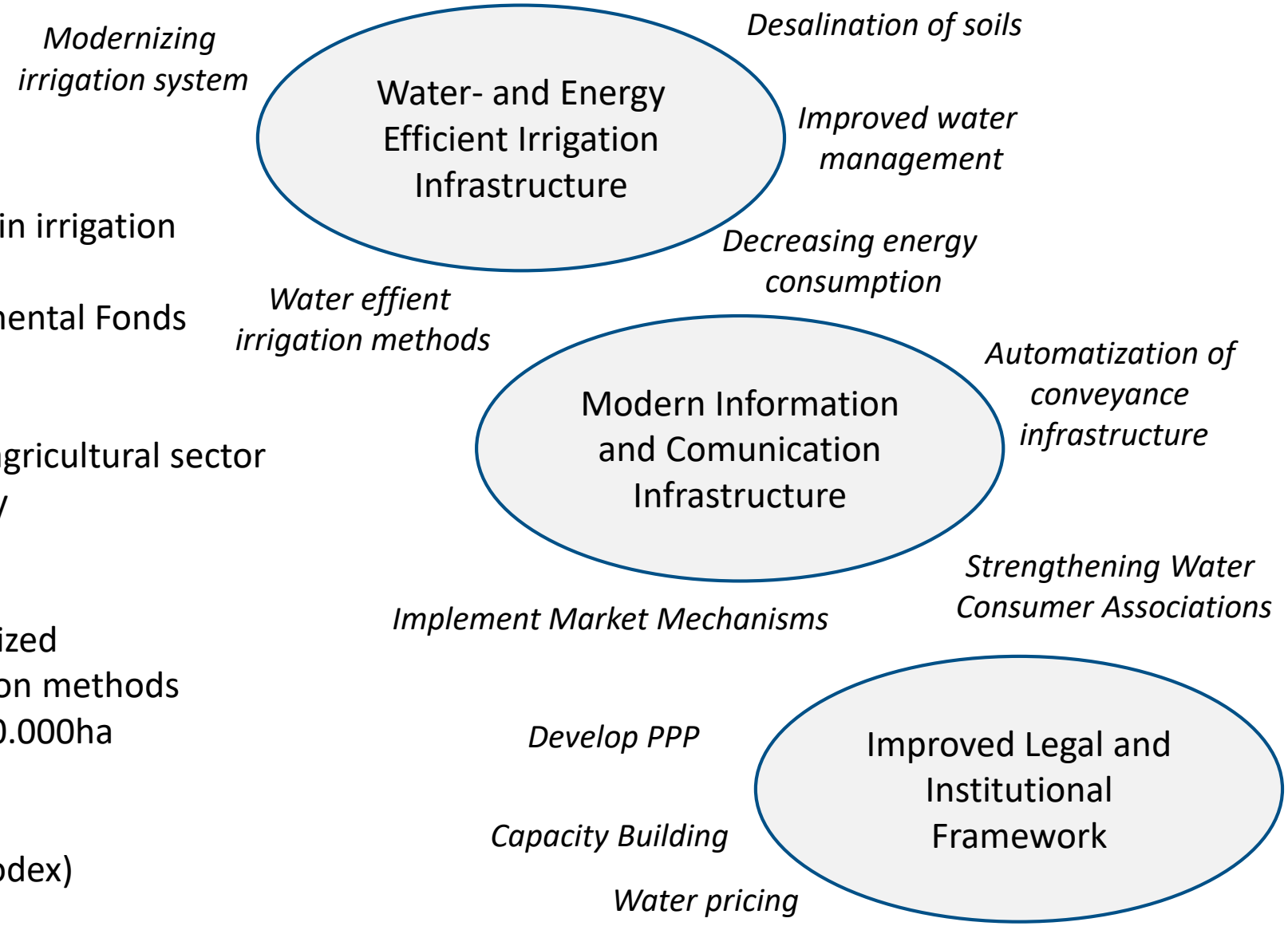


Fig: UNEP

Strategy for Rehabilitation of Infrastructure

Wide scope of action

- 4-5 Bill. $ US necessary investments in irrigation infrastructure
- Financed: WB, ADB, Farms, Governmental Fonds
- Presidential decrees and action plan
- Goals till 2030:
  - 13% reduction of water use in agricultural sector
  - 20% increase in water efficiency
  - 25% less energy in pumping
  - Smart Meter systems in place
  - 100 large water works automatized
  - 2 Mio ha water efficient irrigation methods
  - Improved water delivery on 300.000ha
  - Desalinated 220.000 ha
  - 50 PPP installed
  - Legal reforms (water law and codex)



CHALLENGE

- 70% water loss → production loss 2 Bill. $US
- Extreme water extraction of 10.000-13.000 m³/ha
- 40 % of primary and secondary canals lined (30 T km)
- 25% tertiary canals lined (150 T km)

ACTION

- Rehabilitate 45% and rebuild 15% canals
- Rebuild 22 of 42 headworks (>100 m³/s)
- Rebuild 2.500 small hydrological units
- Rehabilitate 10% of 150 T km drainage + pumping stations and wells

Type of Use and Loss	Water Volume (m^3/ha and year)	Percentage of Water Available at Head Structure
Losses in main canals	2,680	20 %
Other losses outside the farm	650	5 %
On-farm canals:		
Conveyance losses	3,100	24 %
Operational losses	3,100	24 %
Water use in fields:		
Leaching	770	6 %
Irrigation	2,700	21 %
Total	**12,900**	**100**

Source: GEF, WEMP, Component A1, Final Report, 2001

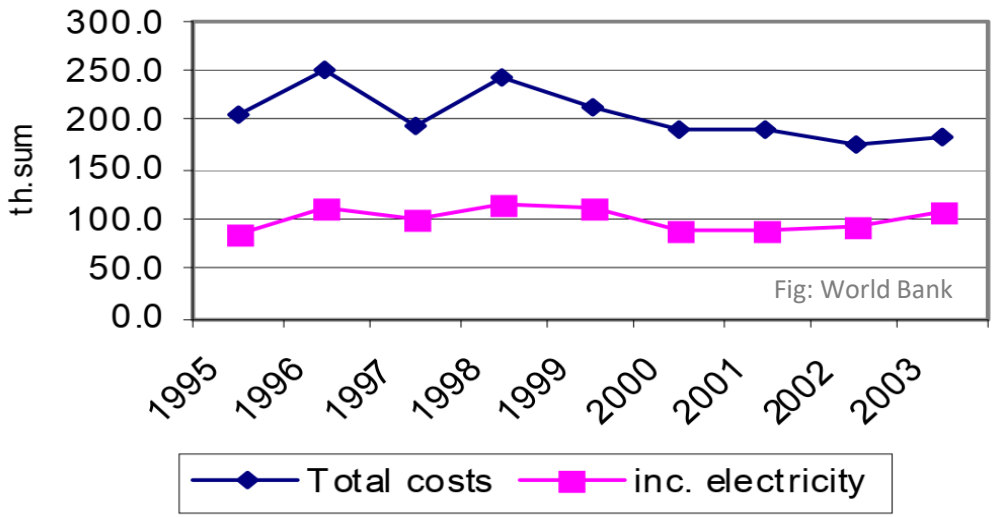
CHALLENGE

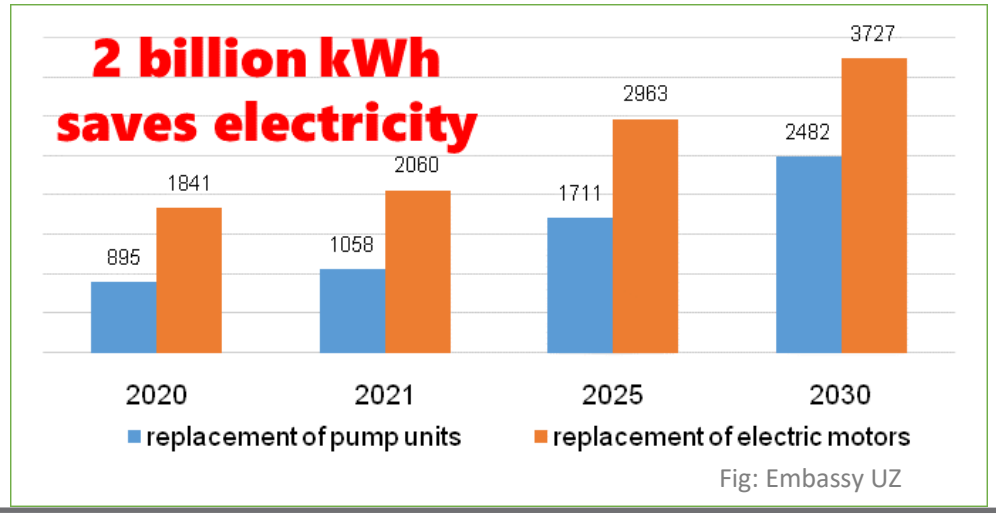
- Intense pumping demand: some schemes lift 200 m³/s for 160m
- 60% of irrigated area serviced with outdated, energy intense pumps
- Ministry runs > 5.000 Pumps and 8.000 wells

ACTION PUMPING STATIONS

- Rehabilitate 80% of 75 large (>100 m³/s)
- Rehabilitate 50% of 500 medium
- Rehabilitate 30% of 550 small (<1 m³/s)
- Rehabilitate pumps of WCA in tertiary canals
- High demand for energy efficient solar systems

Firgure 1. Total O&M Cost and the cost of electricity (constant 2003 prices)





Improving Irrigation Methods

CHALLENGE

- 20 years ago 70% furrow and 30% flood irrigation
- Today 3% of irrigated area equipped with water efficient systems (mainly fruits and vegetables)
- Strong competition with Chinese and Russian technology

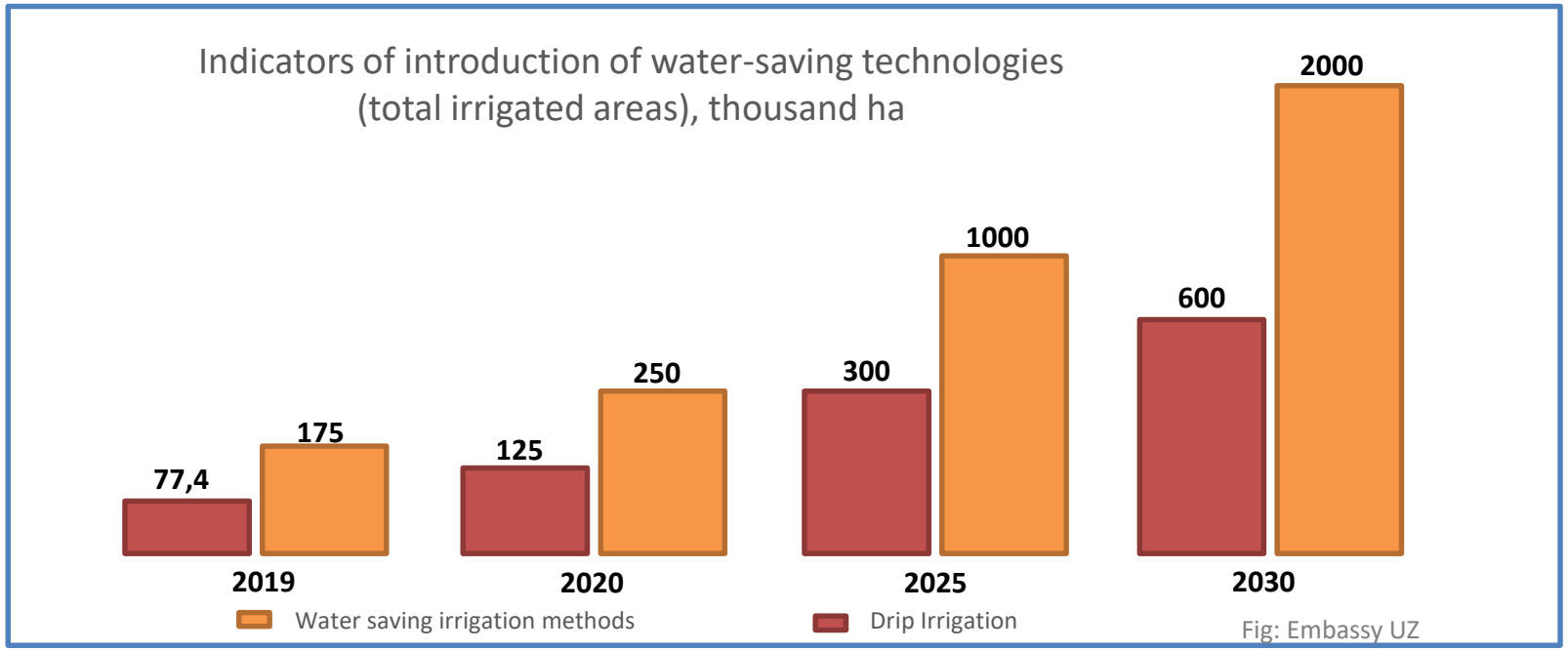


Fig: Embassy UZ

ACTION

- Ambitious expansion goals for efficient irrigation systems with large investments
- Need for foreign expertise for drip irrigation and efficient methods

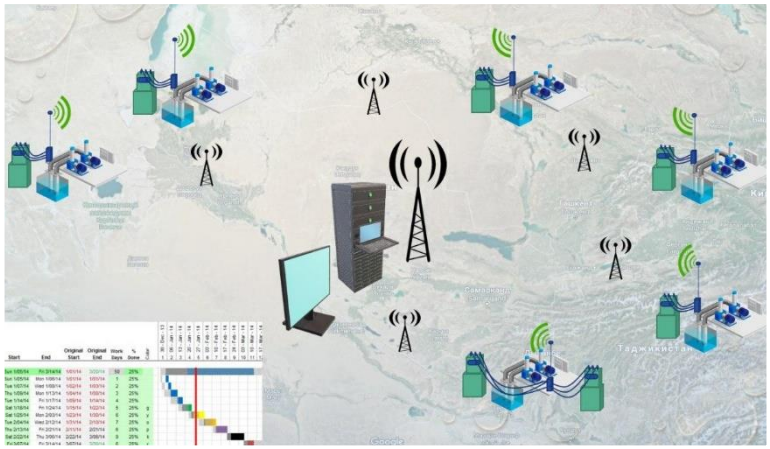

Fig: Embassy UZ


Fig: Embassy UZ

Improving Monitoring Infrastructure

Key Facts and Figures

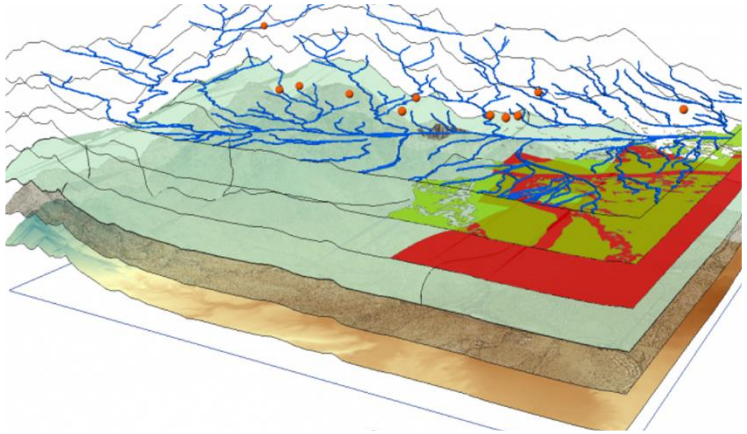
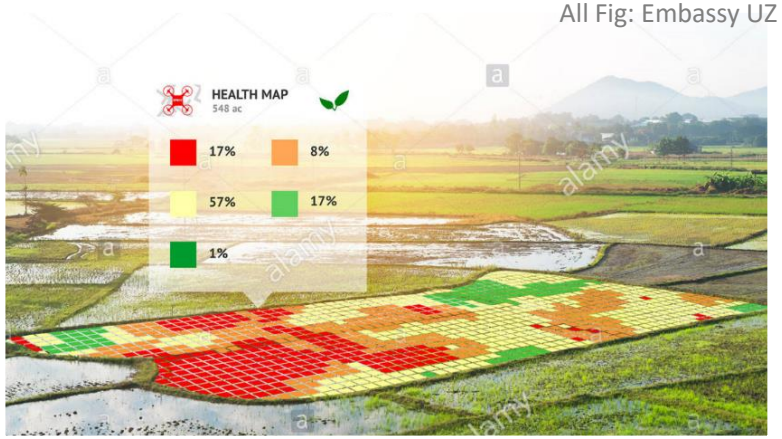


All Fig: Embassy UZ

CHALLENGE

- 18.000 hydrological monitoring points run by government with 50% repair and 10% rehabilitation demand
- 40.000 monitoring points in tertiary canals with 40% repair demand

ACTION

- Installation of digital monitoring and data processing network
- High need for know-how and technology in data conveyance, modeling, control and prediction

Status-Quo and Opportuities

- Uzbekistan is a growing and liberalizing economy in the heard of central asia
- There is a high demand on know-how and technology transferee in water management
- Demand for action is recognized by the government, effort is made to attract foreign investment
- Showcasing German Technology may be facilitated by international donors and national programs
- Potential for scaling up with private and governmental investment is massive

Water- and Energy Efficient Irrigation Infrastructure

Modern Information and Comunication Infrastructure

Improved Legal and Institutional Framework

Thank you for your attention