

Impacts of climate change on sustainable irrigated agriculture in the Karshi Steppe of Uzbekistan

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- In many parts of the world, decreases in state funding for irrigation management in the late 20th century have led to the widespread deterioration of irrigation systems
- As a result, the responsibility for irrigation management has been transferred from government to community-level water user groups
- These are generally promoted by either local government agencies or donor organizations
- In some instances, self-initiated and self-organized community user groups have also formed, designing their own rules and imposing sanctions
- However, such groups have experienced mixed results in various parts of the world, which can be attributed to various factors
- Growing problems with on-farm irrigation water management were a major reason for initiating water consumer associations (WCAs) in Uzbekistan to manage the irrigation system through collective action

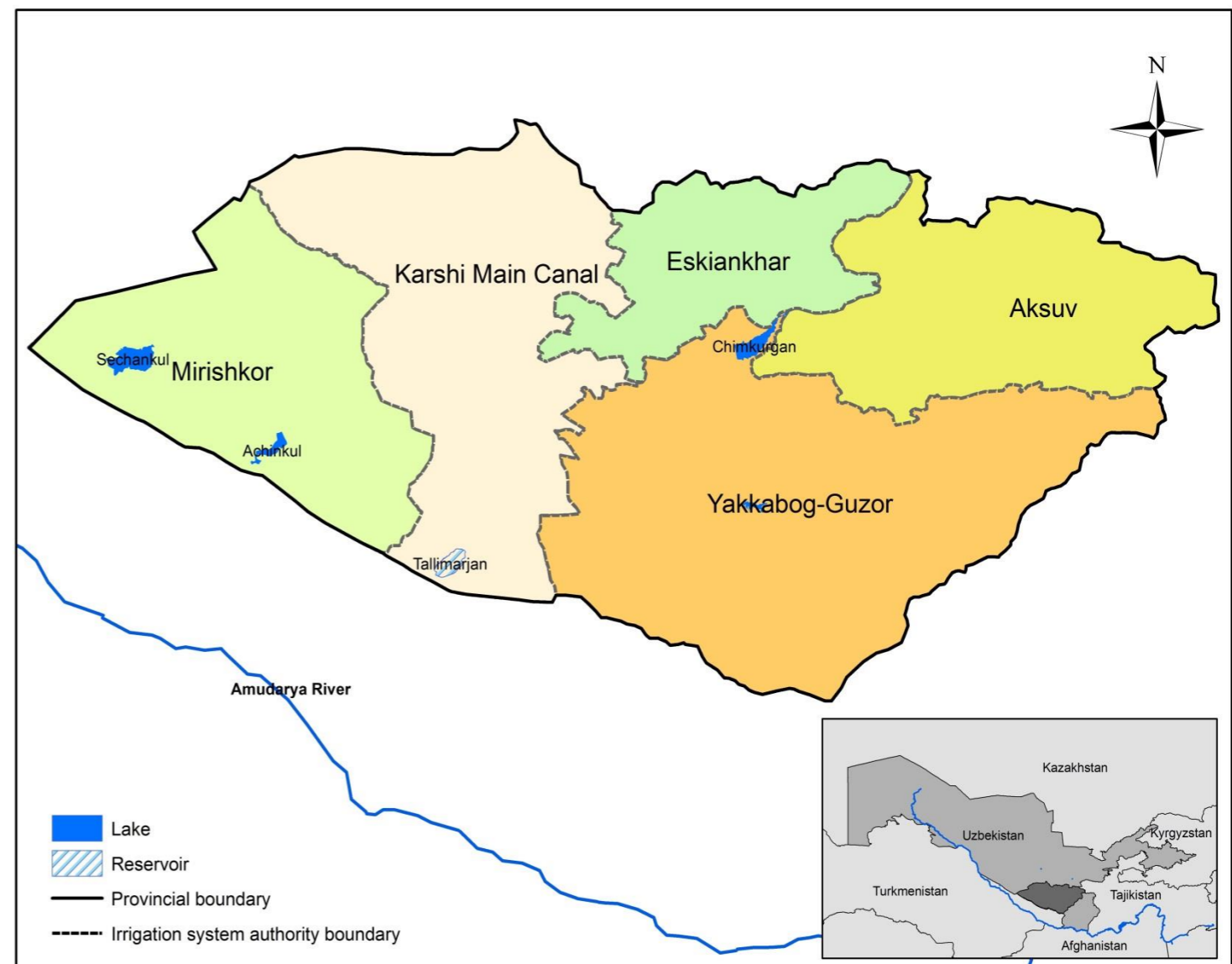
- At the initial stages, the government and the donor community helped with resource mobilization and provided financial support
- However, this initial support was insufficient to develop the WCAs into effective governance systems
- Most WCAs have been unable to ensure timely water distribution or generate sufficient funding to sustain their operation
- Climate change may further exacerbate the existing water tensions



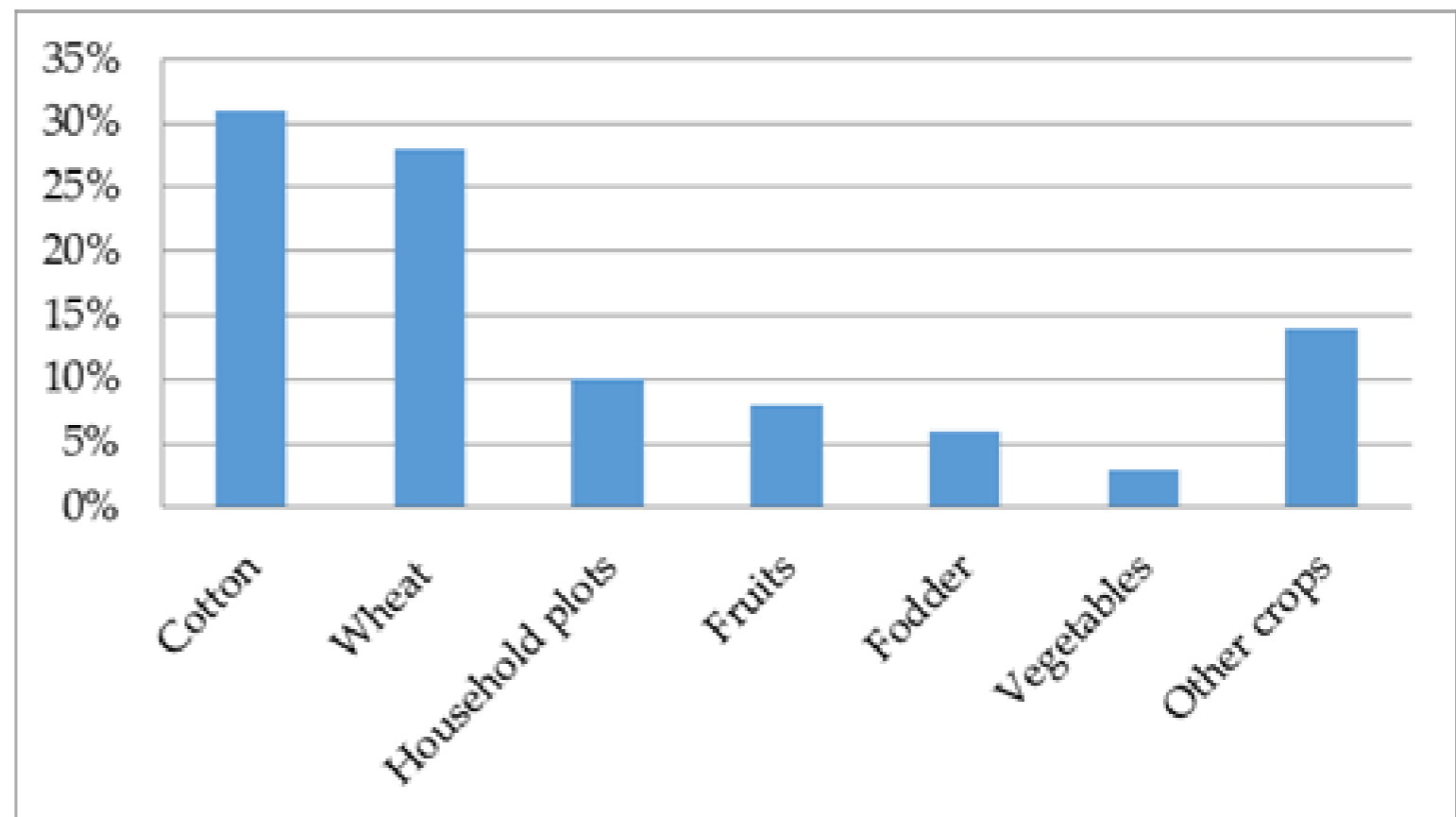
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Assess the water management efforts of WCAs and farmers in the Kashkadarya Province, Uzbekistan, and to offer recommendations for improved water management at the WCA level

- Kashkadarya Province is located in the southern part of Uzbekistan, in the lower reaches of the Amudarya River
- It covers an area of about 28,570 km²
- Population is about 3 mln, of which 60% live in rural areas
- Average annual precipitation is 245 mm and the average annual potential evapotranspiration is above 1240 mm
- About 45% of irrigated lands are salinized to some degree
- Soil types are dominated by sierozems



- About 75% of the water is supplied by the Amudarya River through a cascade of pumping stations; typically lifted over 130 m by seven pumping stations
- The remaining water comes from the Zarafshan River through the Eskiankhar canal (5%) and from the Kashkadarya River and other internal rivers (20%)
- Due to the gigantic Karshi Steppe Reclamation Program, irrigated land in the province increased from 63,000 ha in 1915 to 514,000 ha in 2010
- There are about 21,000 farmers in the province



Crop allocation plans for Kashkadarya Province in 2016

- Study was conducted in June 2016
- Case study research: eight WCAs were chosen for closer study based on MSCD approach
- Empirical work was based on focus group discussions (FGDs) with WCA members
- Semi-structured interview format was designed
- The study WCAs are all in Karshi Main Canal or Mirishkor ISA in the Amu-Kashkadarya BISA



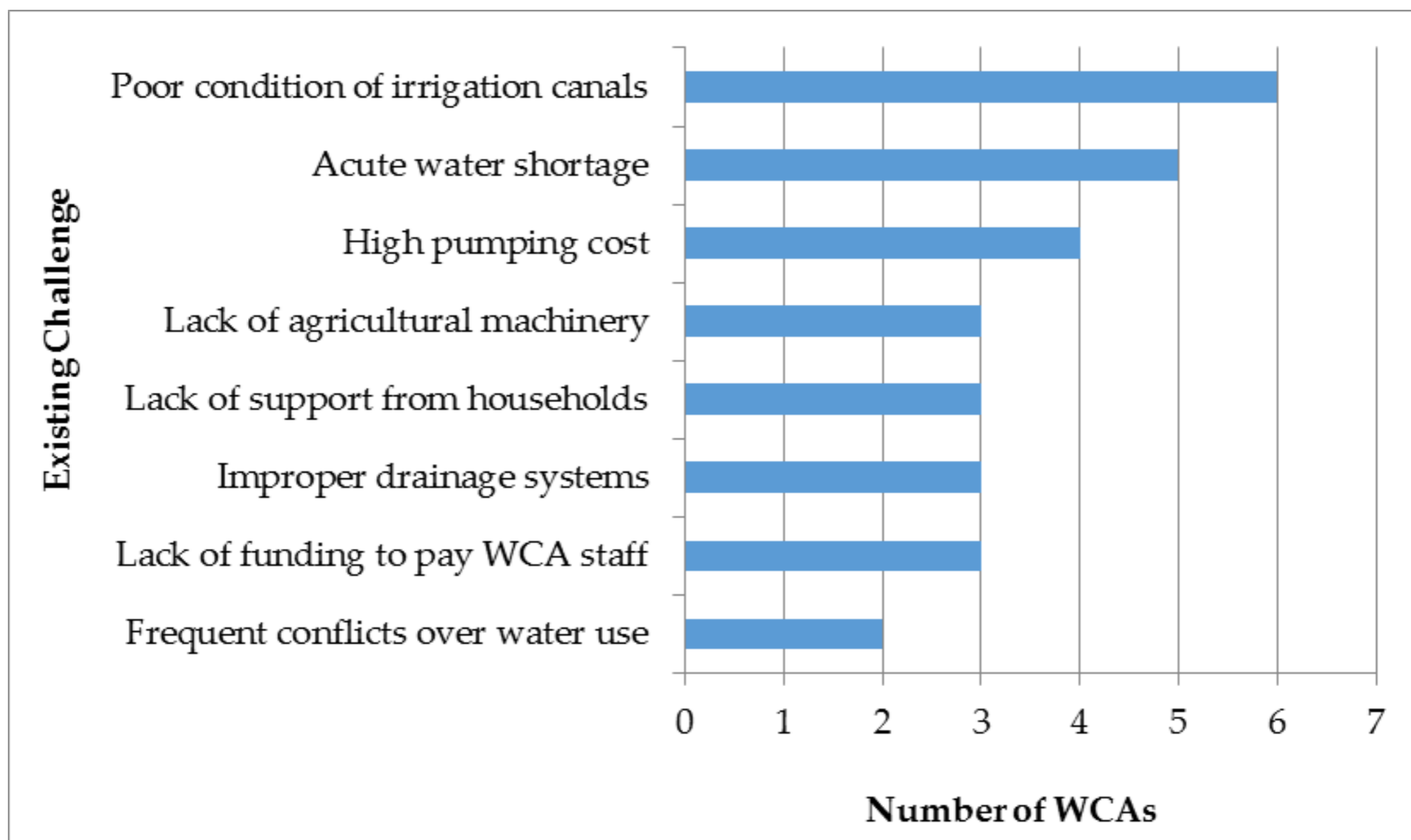
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WCA	District	Manager's Education (Specialization)	Canal Location	Irrigated Area (ha)	Number of Members	Number of Interviewees (Female)
Kuhnasoym Kashkadarya	Karshi	University (irrigation)	Head	4006	72	3 (0)
Muglon Obi Hayoti	Kasbi	University (irrigation)	Tail	4887	127	4 (1)
Zargar Tong Yulduzi	Koson	University (irrigation)	Tail	3789	46	9 (0)
M.Murot	Nishon	Vocational school (general)	Head	2588	37	5 (0)
Chashmai Mirob	Mirishkor	University (agriculture)	Head	3150	60	5 (0)
Tuychi Ogli Mamurjon		Vocational school (agriculture)	Tail	3200	84	13 (3)
Turkiston	Muborak	University (irrigation)	Tail	6461	68	4 (0)
Olovhon Farhod		Vocational school (general)	Tail	3000	58	6 (0)

- FGDs were transcribed and, like the field notes, analyzed using qualitative data analysis software (Atlas.ti)
- It enables the retrieval of data based on various criteria, such as the occurrence of specific words, & key statements to be quoted in reports
- A coding structure (coding schemes grouped into code definitions) was developed & used to identify the most common themes & their frequency

Coding Scheme	Code Definition
household community canals	Lack of support from households Poor condition of irrigation canals
conflict dispute clash	Frequent conflicts over water use
drainage waterlogging salinity fertility scarce shortage	Improper drainage systems Acute water shortage
WCA excavator crane machinery electricity pumps	Lack of agricultural machinery High pumping cost
debts salary ISF	Lack of funding to pay WCA staff

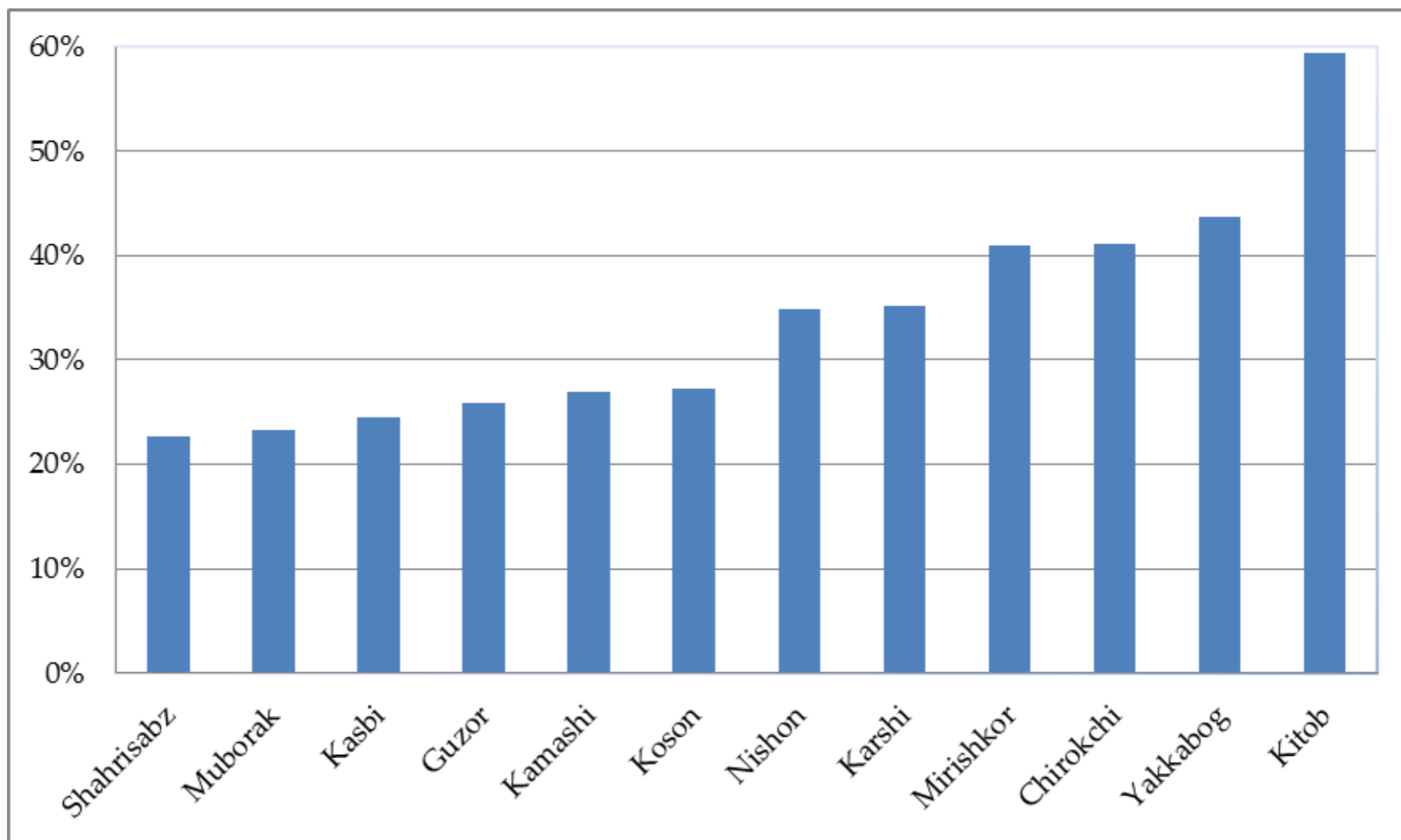
- Key challenges identified by the study participants:



Main determinants:

- Outdated infrastructure
 - irrigation canals are in poor condition as they were built during the 1970s
 - water loss in the selected WCAs amounted to 40-45%
- Incongruence with formal vs informal institutions
 - lack of enforcement and sanctioning mechanism
 - low level of fee collection
- Domination of institutionalized Soviet mental and behavioral patterns
 - path dependence to illustrate the persistence of old institutions in spite of reforms
 - expect local authorities to either maintain the irrigation canals or tell resource users how to maintain them

- Financial sustainability of WCAs is essential to improving farm management and increasing farm productivity
- Kitob and Yakkabog districts are located close to a mountainous area with relatively high precipitation and are mainly oriented to fruits



Muglon Obi Hayoti WCA:

- Located in the Kasbi district and was established in February 2007
- The WCA has 127 members and 16 staff
- 4887 ha of irrigated land, of which about 58% is devoted to cotton, 34% to wheat, and the remainder to fruits, fodder, and other crops
- ISF is about 36,000 Uzbek soum (UZS) per hectare (exchange rate 3000 UZS to 1 USD)
- A canal goes through household plots, but the households have not been supportive with canal maintenance
- WCA members are supposed to contribute about 197 million UZS for irrigation services each year
- As of June 2016, about 22.5 million UZS (approximately 12%) had been collected in cash or in-kind contributions

Chashmai Mirob WCA:

- Located in the Mirishkor district and was established in February 2006
- It has 60 members and covers 3150 ha of irrigated land
- About 45% of which is planted by cotton and 45% by wheat. The remaining 10% is devoted to gardening, fodder, and other crops.
- The WCA has benefited greatly from donor support through the RESP II, funded by the World Bank during 2008-2016
- A demonstration farm was also established where farmers can learn about techniques for improving water use efficiency
- ISF was set at 16,500 UZS/ha for members who use pumps and 34,000 UZS/ha for other members
- The WCA has not been able to improve the ISF collection rate, with just 40% of the anticipated revenue collected
- Almost 70-75% of households can be considered relatives, so trust is very high

- This study indicated ways to improve irrigation management in post-socialist transitional settings
- A number of lessons can be learned from the two decades of WCA experience in the province:
 - Irrigation canals were built during the Soviet period and require massive reconstruction, as most are filled with silt;
 - Financing for rehabilitation to make irrigation networks functional plays a critical role in increasing farm productivity and thus, farmer income;
 - Collecting adequate ISFs is necessary for the long-term existence of WCAs;
 - Availability of agricultural machinery & canal-cleaning equipment contributes to creating an environment for profitable crop production;
 - Households and local farmers who have been living together and practicing irrigated agriculture for a long time have shown the greatest success.

Thank you for your attention !

Questions?



Impact of Institutional Change on Irrigation Management: A Case Study from Southern Uzbekistan

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

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Abstract

The rapidly growing population in Uzbekistan has put massive pressure on limited water resources, resulting in frequent water shortages. Irrigation is by far the major water use. Improving irrigation water use through the institutional change of establishing water consumer associations (WCAs) has been identified as a way to increase agricultural production and meet the food demand in the area. However,