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NO 05 | JUNE 2023

POLICY BRIEFING UZBEKISTAN

Impact of the Qush-Tepa canal on the agricultural sector in Uzbekistan
- Summary of results -

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Executive Summary

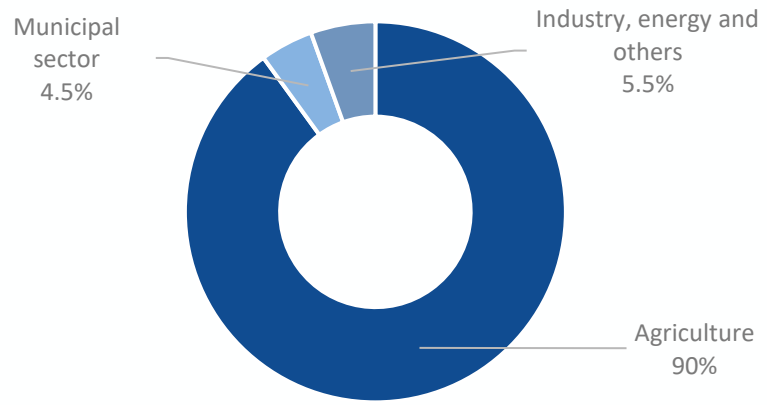
- Construction of the Qush-Tepa canal in Afghanistan will affect water availability in the Amu Darya river basin in Uzbekistan. By 2030, the water reduction due to the canal and impact of climate change is expected to be 29.4% relative to 2022
- The impact of Qush-Tepa on water availability varies between regions and is smaller in Surkhandarya and Kashkadarya, which also take in water from sources other than Amu Darya
- Reduced water availability due to Qush-Tepa and climate change will have implications for the agricultural sector in Uzbekistan, which consumes 90% of water in Uzbekistan
- Usable cropland is expected to decrease by 18.9% in the Amu Darya basin (in a 25% water intake from Qush-Tepa scenario upon completion of the canal). With current land allocation policies, all crops except cotton and wheat will decline, with largest decline for the area under rice cultivation
- Value added from cropping will also decline in this scenario, by 12.9% for the Amu Darya basin, which would account for 6.2% of current national cropping value added and 0.7% of 2022 GDP
- Employment is reduced by up to 250,000 jobs in the Amu Darya basin in the 25% intake scenario
- To address these negative impacts, recommended policies include:
  - Targeted subsidies for adoption of efficient irrigation technologies
  - Extension services to increase awareness and knowledge of efficient irrigation among farmers
  - Flexible water tariffs at regional level instead of quotas, adequately priced to reflect scarcity
  - Liberalisation of land allocation policies for wheat and cotton to allow for efficient crop allocation
  - Regional development policies to mitigate negative impacts of water scarcity

Structure

1. Background
2. Estimation of reduced water supply
3. Impact on the agricultural sector
4. Discussion of results
5. Policy recommendations

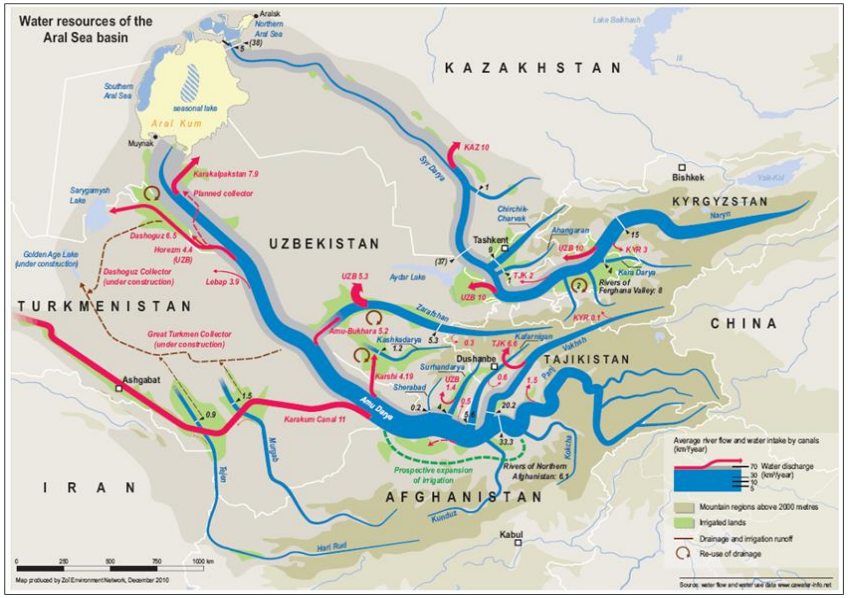
1. Background (1/2)

Water use in Uzbekistan by sectors



Source: Ministry of Water Resources

Water supply in Uzbekistan



Source: cawater.info

- Water plays an important role for the economy of Uzbekistan
  - 90% of water is used by the agricultural sector for irrigation purposes
  - Agriculture accounts for about 25% of GDP
- 85% of water used in Uzbekistan originates in neighbouring countries
  - The two most important water sources are the Syr Darya and Amu Darya rivers
  - The Amu Darya, the larger of the two rivers, and main source of surface water in UZB originates in TJK and AFG
- AFG has been taking only little water from Amu Darya so far, but is now constructing the Qush-Tepa canal, which will significantly increase water intake by AFG
- **Availability of water resources play an important role for the Uzbek economy**
- **Due to few own water resources, the country is largely dependent on its neighbours for its water supply**

1. Background (2/2)

- The construction of the Qush-Tepa canal is expected to lead to extraction of up to 25% of the current water flow volume of the Amu Darya river in Afghanistan
- This will affect the availability of water resources in the downstream regions in Uzbekistan: Surkhandarya, Kashkadarya, Bukhara, Khorezm and Karakalpakstan
- The regions will be affected to different degrees depending on how much water they take in from Amu Darya, but also related to the type of crops they currently grow
  - Surkhandarya and Kashkadarya regions also have access to other sources of water besides Amu Darya
- A reduction in available water resources will have economic implications for these regions of Uzbekistan, especially on the agricultural sector
- To develop adaptation strategies and an adequate policy response, these effects need to be assessed and quantified
- **Goal of this study:**
  - **To estimate the water reduction in the Amu Darya river basin in UZB due to construction of the Qush-Tepa canal and impacts of climate change**
  - **To assess the impact of reduced water supply on the agricultural sector in the Amu Darya river basin in UZB regarding cropland reduction, value added and employment**

Disclaimer: only impacts on the crop sector are analysed, the impact on the livestock sector, food processing or energy sector are not part of this analysis

2. Estimation of reduced water supply (1/3)

Water use and intake from Amu Darya river by regions

Oblast	Water use (km^3/year)	Water intake from Amu Darya (km^3/year)
Surkhandarya	2.50	0.50
Kashkadarya	3.30	2.31
Bukhara	2.60	2.60
Khorezm	2.80	2.80
Karakalpakstan	5.06	5.06

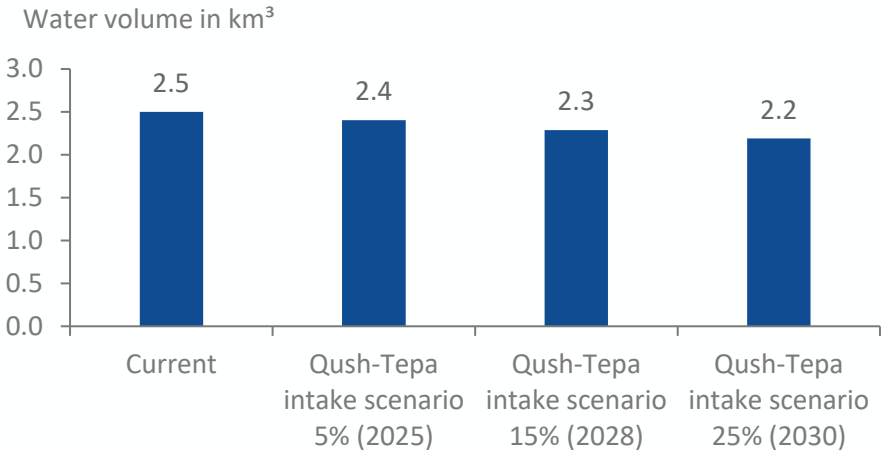
Source: own calculations based on data provided by national authorities

- Current water use and water intake from Amu Darya varies across the regions in the Amu Darya river basin
- Water intake from the Qush-Tepa canal is expected to increase in three steps according to the different phases of the canal‘s construction
  - Stage 1: 5% water intake, expected by 2025
  - Stage 2: 15% water intake, expected by 2028
  - Stage 3: 25% water intake, expected by 2030
- Based on the stages of construction, water availability is modelled for each of the five regions in the Amu Darya river basin in UZB
- In addition, the impact of climate change on water availability in Uzbekistan is included

➢ Available water in Amu Darya expected to decrease considerably due to construction of the Qush-Tepa canal and climate change

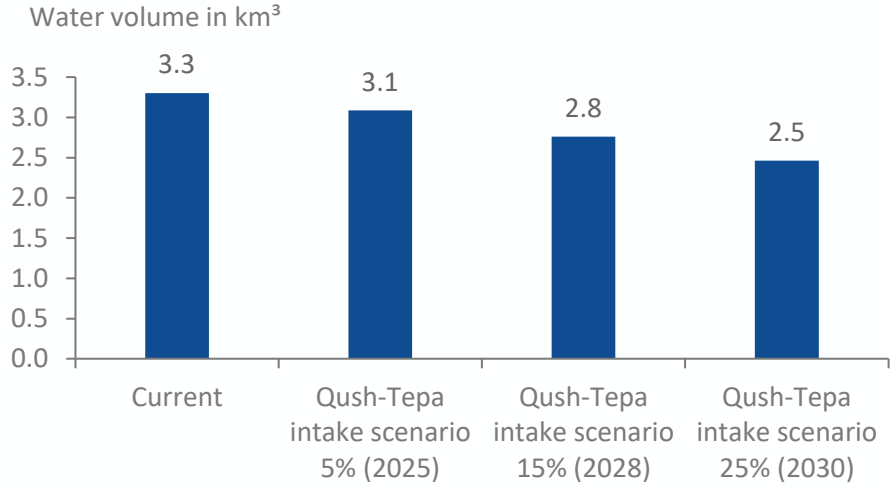
2. Estimation of reduced water supply (2/3)

Availability of surface water – Surkhandarya region



Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

Availability of surface water – Kashkadarya region



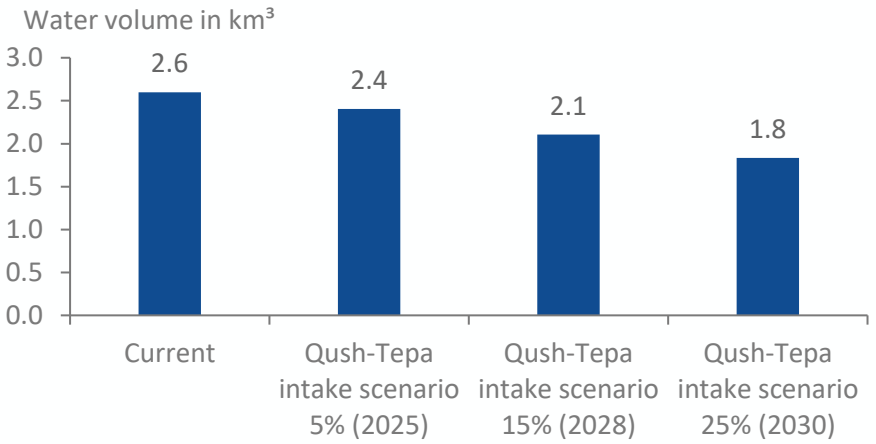
Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

- The extent to which the construction of the Qush-Tepa canal impacts the water availability in the different regions depends on how much water each region takes in from Amu Darya
- The Surkhandarya and Kashkadarya regions will experience a smaller reduction in available water resources, as they also have access to additional water sources
  - Surkhandarya: reduction of 12.4% by 2030 expected
  - Kashkadarya: reduction of 25.4% by 2030 expected

➢ **Surkhandarya and Kashkadarya regions will be least affected in terms of water supply**

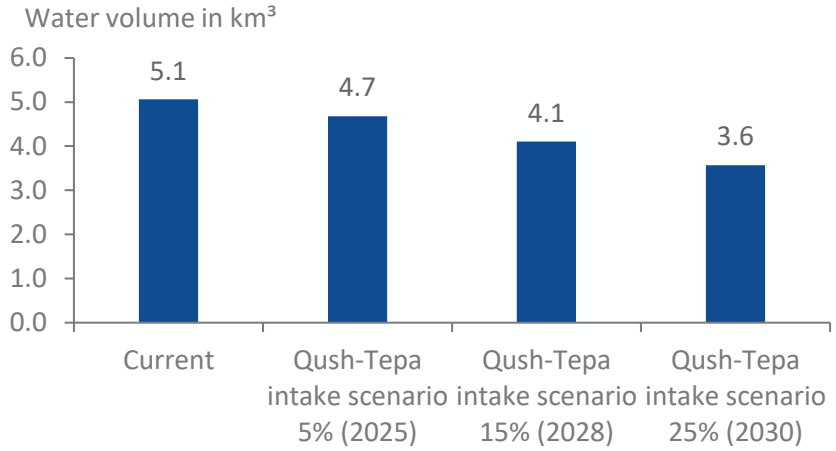
2. Estimation of reduced water supply (3/3)

Availability of surface water – Bukhara region



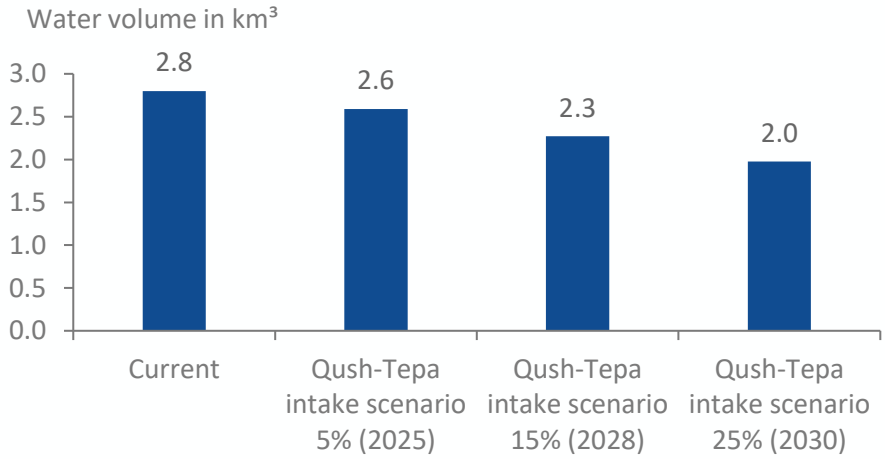
Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

Availability of surface water – Karakalpakstan region



Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

Availability of surface water – Khorezm region

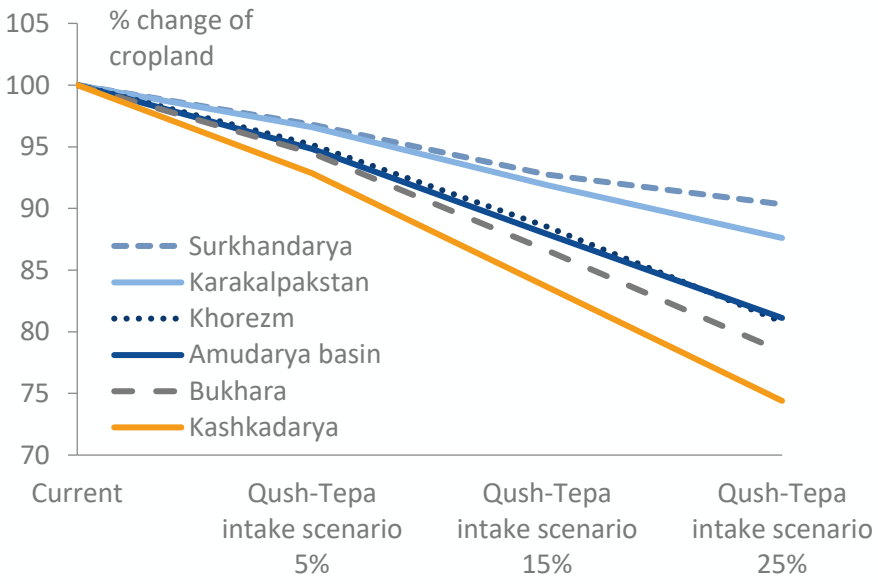


Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

- The Bukhara, Khorezm and Karakalpakstan regions are fully reliant on Amu Darya for their water supply
- Water availability is expected to decrease by 29.4% until 2030 in these regions due to the construction of Qush-Tepa and impacts of climate change
- **Bukhara, Khorezm and Karakalpakstan expected to see largest water reduction due to Qush-Tepa construction and climate change**

3. Impact on the agricultural sector (1/4)

Changes in cropland area due to reduced water availability



Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

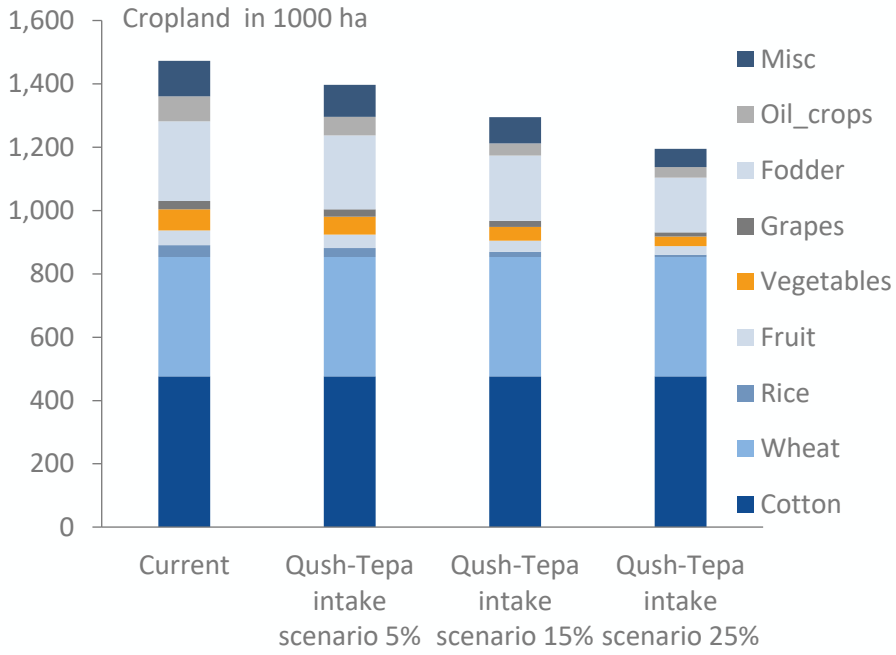
- If available water resources for irrigation decrease, less cropland can be cultivated if resource use is constant
- The reduction of cropland varies across regions depending on the degree of water reduction and current cropland structure
  - On average, cropland will decrease by 18.9% in the Amu Darya basin for the 25% water intake scenario
  - Kashkadarya will have the largest impact with 25.6% reduction in cropland until 2030
  - Surkhandarya has the smallest impact with only 9.7% reduction in cropland
- Large impact in Kashkadarya because region grows no rice, thus water savings from water-intensive rice production in favour of other crops are not possible in this region

➢ Overall cropland area to decrease significantly

➢ Kashkadarya will be the worst affected region in terms of cropland area reduction

3. Impact on the agricultural sector (2/4)

Change in cropland structure

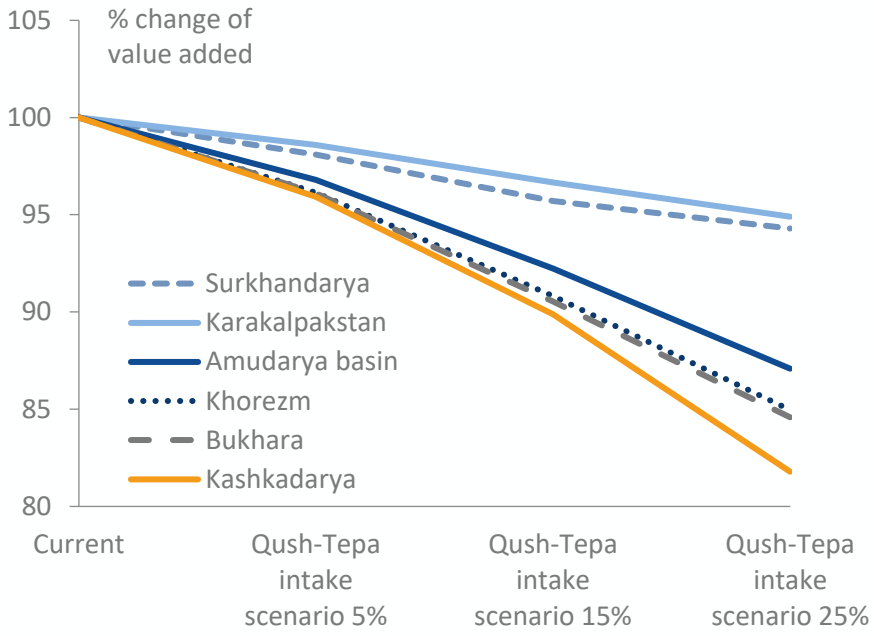


Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

- The structure of cropland in the Amu Darya basin will also change if less water is available
- Cotton and wheat remain constant due to current land allocation policies, while the area planted with all other crops declines
  - Rice production will decrease the most due to its high water-intensity, -81% for the 25% water intake scenario
  - Fruit and fodder decrease the least, but still substantially with -40% and -32% respectively for the 25% water intake scenario
- Due to current land allocation policies, all crops expect cotton and wheat decrease in the crop structure

3. Impact on the agricultural sector (3/4)

Estimated change in crop production value added



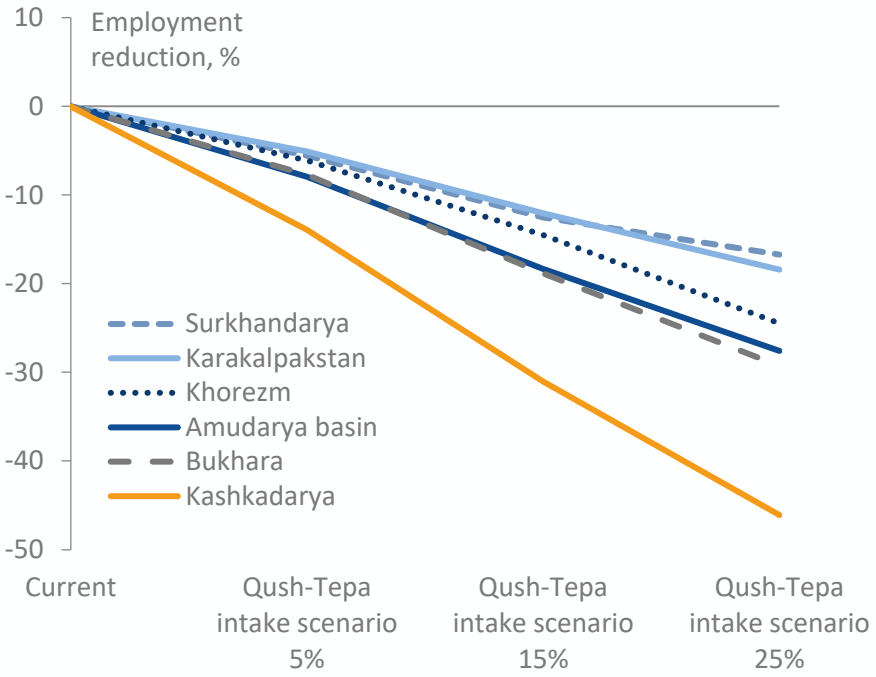
Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

- As cropland declines and crop structure changes, cropping value added is reduced
- Average reduction in cropping value added of 12.9% for the 25% water intake scenario in Amu Darya basin in UZB expected
  - Largest decline in cropping value added for Kashkadarya: -18.2% for 25% water intake scenario
  - Smallest decline in Surkhandarya: -5.7% for 25% water intake scenario
- Reduction would signify a 6.2% decline in national cropping value added and a 0.7% reduction of 2022 GDP in the 25% water intake scenario
- Likely smaller macroeconomic impact, as scenario occurs only in 2030

- **Significant impact on value added in the cropping sector is expected**
- **Macroeconomic impact will not be very large**
- **But impacts at regional level are severe in some cases such as Kashkadarya**

3. Impact on the agricultural sector (4/4)

Reduction of employment in crop production



Source: own estimations based on data provided by national authorities; Note: modelled scenarios include impacts of climate change and Qush-Tepa canal

- Reduction of employment in crop production expected as cropland decreases and crop structure changes
  - Loss of almost 250,000 jobs for entire Amu Darya basin in 25% water intake scenario
  - Kashkadarya with largest reduction of roughly 97,000 jobs in 25% water intake scenario
- Large effects on employment are also related to current land allocation policies for wheat and cotton
  - Labour intensity of wheat and cotton is lower than for other crops
  - Due to land allocation policies, other more labour-intensive crops like fruit, vegetables or fodder are reduced over proportionally
- Negative impact on employment in crop production will be significant at regional level

4. Discussion of results

- Due to a lack of reliable data, modelling results cannot incorporate alternative policy scenarios, like the liberalisation of the land allocation policies for cotton and wheat
- The land allocation policies for wheat and cotton de-facto pre-define a specific area of cropland to be planted with these crops, which restricts farmers ability to react to the external shock of decreased water availability through changed crop allocation
- To assess potential changes in cropping structure for a scenario with liberalised land allocation policies and with increased water constraints, we compare value added per crop relative to water use per crop
- A comparison based on the available data indicates:
  - The cropland area planted with wheat would remain at similar or higher levels as currently as long as wheat prices stay high (similar to 2022 levels)
  - The cropland area planted with cotton would decline
  - More fruits and fodder would be planted on cropland currently allocated to cotton
  - The area planted with vegetables, oil crops and grapes would decrease as water availability declines
  - The area planted with rice would decrease sharply as cultivation of highly water-intensive rice becomes increasingly less profitable in Uzbekistan

➢ **Without land allocation policies for cotton and wheat, the cropping structure of Uzbekistan would look differently, especially cotton planting area would decline**

5. Policy recommendations

Cropland usage

- Investment subsidies for water saving irrigation technologies such as drip irrigation are recommended to increase adoption of these technologies. Subsidies should be targeted at smaller farmers, as larger farmers are more likely to adopt such technologies on their own
- Subsidies should be scaled according to the risk profile of crops. More high-risk crops (e.g., high value crops sensitive to drought or pests) could receive larger subsidies. Alternatively, subsidies could be combined with mandatory insurance to better manage risk and increase adoption rates
- Introduce or expand extension services focused on more efficient irrigation technologies to increase awareness and understanding of the benefits of these technologies among farmers
- Introduce flexible water tariffs at regional level that adequately reflect water scarcity. The government should provide methodologies and guidelines for tariffs to be set at local level

Crop allocation

- Speeding up liberalisation of land allocation policies for cotton and wheat is strongly recommended
- Quotas for water extraction should be replaced by appropriately priced and flexible tariffs to incentivise the optimisation of crop allocation by farmers

Regional development

- To account for varying impacts across regions, focus on regional development policies to identify economic sectors with high potential for growth and employment generation (e.g., using regional development plans)

About the German Economic Team

Financed by the Federal Ministry for Economic Affairs and Climate Action, the German Economic Team (GET) advises the governments of Ukraine, Belarus*, Moldova, Kosovo, Armenia, Georgia and Uzbekistan on economic policy matters. Berlin Economics has been commissioned with the implementation of the consultancy.
**Advisory activities in Belarus are currently suspended.*

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