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#### About IWMI

The International Water Management Institute (IWMI) is a non-profit, scientific research organization focusing on the sustainable use of water and land resources in developing countries. IWMI works in partnership with governments, civil society and the private sector to develop scalable agricultural water management solutions that have a real impact on poverty reduction, food security and ecosystem health. Headquartered in Colombo, Sri Lanka, with regional offices across Asia and Africa, IWMI is a CGIAR Research Center and leads the CGIAR Research Program on Water, Land and Ecosystems (WLE).

# Information Tool for Zafarabad District, Sogd Province, Tajikistan

Zafar Gafurov, Sarvarbek Eltazarov, Bekzod Akramov, Kakhramon Djumaboev and Oyture Anarbekov

International Water Management Institute (IWMI)

### The authors:

Zafar Gafurov is a Research Officer / Project Leader (Remote Sensing and GIS Specialist) at Central Asia Office of the International Water Management Institute (IWMI), Tashkent, Uzbekistan.

Sarvarbek Eltazarov is a Regional Consultant (Remote Sensing and GIS Specialist) at Central Asia Office of the International Water Management Institute (IWMI), Tashkent, Uzbekistan.

Bekzod Akramov is a Consultant (Monitoring and Evaluation Specialist) at Central Asia Office of the International Water Management Institute (IWMI), Tashkent, Uzbekistan.

Kakhramon Djumaboev is a Senior Research Officer / Project Leader (Water Resource Management Specialist) at Central Asia Office of the International Water Management Institute (IWMI), Tashkent, Uzbekistan.

Oyture Anarbekov is a Senior Research Officer / Project Leader (Water Governance/Institutional Specialist) at Central Asia Office of the International Water Management Institute (IWMI), Tashkent, Uzbekistan.

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/ GIS / remote sensing / river basins / digital technology / maps / simulation models / satellite imagery / slopes / water users associations / water table / water availability / water use efficiency / residential areas / canals / pumps / drinking water / wells / drainage / groundwater / soil types / soil texture / soil salinity / vegetation / communities / irrigation / Tajikistan /

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Project



The geodatabase and information tool was generated within the framework of the "Mitigating the competition for water in Amudarya River basin, Central Asia by improving water use efficiency" project being implemented by the International Water Management Institute (IWMI) in collaboration with the UZGIP, Uzbekistan and Sogd Water Authority, Tajikistan. Since 2015, the project has been supporting the two Central Asian states (Uzbekistan and Tajikistan) to evaluate the potential for improving water-use efficiency by mitigating measures for water and energy use in the Amu Darya and Syr Darya river basins.

For further details about the project, visit: http://sites.nationalacademies.org/PGA/PEER/PEERscience/PGA\_168055

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### Introduction

The geodatabase and information tool were generated within the framework of the "Mitigating the competition for water in Amudarya River basin, Central Asia by improving water use efficiency" project being implemented by the International Water Management Institute (IWMI) in collaboration with the UZGIP, Uzbekistan and Sogd Water Authority, Tajikistan. Since 2015, the project has been supporting the two Central Asian states (Uzbekistan and Tajikistan) to evaluate the potential for improving water-use efficiency by mitigating measures for water and energy use in the Amu Darya and Syr Darya river basins.

A strong and permanent element of the project is data generation in water-related state aspects, with a view to specifically developing a geodatabase and digital diagnostic atlas using open source data.

### **Data Accuracy and Reliability**

The geodatabase was created using open source GIS, Remote Sensing and local analogue information which was already published by world renowned organizations and used in public projects and scientific research certified by international agencies.

### **Availability and Accessibility**

The geodatabase can be obtained in digital form for use by external parties with the approval of the International Water Management Institute.

### **Software Employed**

This geodatabase and the associated maps were created on a computer machine running Windows 10 Professional and using ArcGIS 10.5, QGIS, Google Earth Engine. End users should download the package that is most appropriate for the version of ArcGIS software that they are using. It is important to note that ArcGIS is not only required to make use of the map package and the associated geodatabase.

### **Data Sources**





International Water Management Institute (IWMI)

National Aeronautics and Space Administration - Land Data Products and Services (NASA LP DAAC)



International Center for Agricultural Research in the Dry Areas (ICARDA)



Central Asian Countries Initiative for Land Management (CACILM)



European Space Agency (ESA)

World Climate Research Programme (WCRP), Coupled Model Intercomparison Project (CMIP)



Sogd Water Authority, Tajikistan

#### **Map Projection and Coordinate System**

Map projections describe the techniques that represent the Earth's curved surface on a flat map. Coordinate systems describe the grid referenced and measurement units, effectively translating the map projection. In order to overlay the GIS layers on each other, a single data frame is required. In the geodatabase, the layers are projected into a common coordinate system WG 1984 World Mercator.

### **Objective and Recommendation for Use**

The main objective of the geodatabase is to provide data, maps, charts, and infographics on water and land resources of the region in a consolidated form. The authors hope that it can be used as a tool to inform management practices and support decision making at the local, national, and regional levels.



# Satellite view of Sogd province, Tajikistan

Sogd province covers an area of 25,400 km<sup>2</sup> and is located in the northwest part of Tajikistan. The province shares a border with Jizakh, Namangan, Samarkand and Fergana provinces of Uzbekistan, and the Osh and Batken regions of Kyrgyzstan. It is separated from the rest of Tajikistan by the Gissar Range. The southern part of the province is the east-west valley of the upper Zarafshan River. North, over the Turkestan Range, is the Ferghana Valley.





## Digital Elevation Model of Sogd province, Tajikistan







### Aspect map of Sogd province, Tajikistan



### Legend









## Slope map of Sogd province, Tajikistan





### Zafarabad district of Sogd province, Tajikistan





## Water User Associations in Zafarabad district







## Residential areas in 1980

### Legend

Residential areas

Water users associations

This map illustrates information on location of the residential areas in Zafarabad district, Sogd province, Tajikistan in 1980. Residential areas covered 1,009.4 ha, making up about 2.2 percentage of the district's total area.





## Residential areas in 2017











Secondary canals



















































This map illustrates information on changes in vegetation coverage in Zafarabad district, Sogd province, Tajikistan between 2000 and 2016.



## Hydromodule zones

## Hydromodule Zones

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This map illustrates information on the distribution of hydromodule zones in Zafarabad district, Sogd province, Tajikistan. As can be seen, majority of the areas are classified as Zone 5.

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# Hydromodule zones



Ground water level	Hydromodule zones	Teil texture	Area (Ha)	Percentage
	I.	Light loam	1,961	4.8
	Ш	Moderate loam		0.0
>3	Ш	Heavy loam		0.0
	IV	Light loam	10,042	24.5
	V	Moderate loam	22,458	54.8
2-3	VI	Heavy loam	6,095	14.9
	VII	Light loam	215	0.5
	VIII	Moderate loam	162	0.4
1-2	IX	Heavy loam	35	0.1



### International Water Management Institute Headquarters and South Asia Regional Office

127 Sunil Mawatha, Pelawatta, Battaramulla, Sri Lanka *Mailing address:* P. O. Box 2075, Colombo, Sri Lanka Tel: +94 11 2880000, 2784080 Fax: +94 11 2786854 Email: <u>iwmi@cgiar.org</u>

### **Central Asia Office**

Office 118, Building 6, Osiyo Street, Tashkent 100000, Uzbekistan Tel: +998 71 2370445 Fax: +998 71 2370317 Email: iwmi-ca@cgiar.org

Website: www.iwmi.org





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