



MINISTRY OF ECOLOGY,  
ENVIRONMENTAL PROTECTION  
AND CLIMATE CHANGE OF THE  
REPUBLIC OF UZBEKISTAN



# CLIMATE-SMART AGRICULTURE MODELS FOR THE ARAL SEA REGION

GGGI Uzbekistan Infobrief for Green Rehabilitation Investment  
Project for Karakalpakstan Republic to Address Impacts of the  
Aral Sea Crisis (Aral Sea GRIP)

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A Master Fruit LLC

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# INTRODUCTION

The Republic of Karakalpakstan is located in the northwest of the Republic of Uzbekistan on the Amu Darya flatlands and southern shores of the Aral Sea. The desiccation of the Aral Sea has severely impacted the agriculture sector in Karakalpakstan, placing the livelihoods of farmers and local communities at risk. Climate change exacerbates these challenges, making innovative solutions critical for ensuring the region's agricultural resilience and sustainability.

Under the KOICA-funded Green Rehabilitation Investment Project for Karakalpakstan Republic to Address Impacts of the Aral Sea Crisis (Aral Sea GRIP), the Global Green Growth Institute (GGGI) has introduced Climate-Smart Agriculture (CSA) models to drive sustainable development in agriculture. These models are implemented in the project's four districts—Bozataw, Kegeyli, Chimbay, and Karauzyak—and serve as practical demonstrations for farmers, local entrepreneurs, and other stakeholders.

The project equips the selected farms and forestry enterprises with water-saving technologies and strategically plants windbreaks to enhance agricultural productivity and mitigate climate risks. Additionally, the project provides training to farmers to ensure the proper use and maintenance of these technologies.

By showcasing the potential of CSA models through these demonstration sites, GGGI aims to empower farmers and entrepreneurs to adopt sustainable practices on their own farms, contributing to the long-term resilience of Karakalpakstan's agricultural sector!



# CLIMATE-SMART AGRICULTURE MODELS (CSA)

Under the Aral Sea GRIP project, six CSA models have been designed for the most vulnerable regions of Karakalpakstan.

- Winter wheat with windbreaks, hose reel sprinkler and drip irrigation
- Fruit orchard with drip irrigation and windbreaks
- Tree nursery with windbreaks, sprinkler and drip irrigation
- Field-protective windbreaks (Karatal) along the irrigation canals of agricultural lands
- Greenhouses with drip irrigation
- Microgreens production for women with disabilities

**819 ha**  
of land protected  
through CSA measures  
including:

**441 ha**  
of land equipped  
with water-saving  
irrigation systems

**21,800**  
trees planted

Bozataw



Kegeyli



Chimbay



Karauzyak



Former Aral Sea

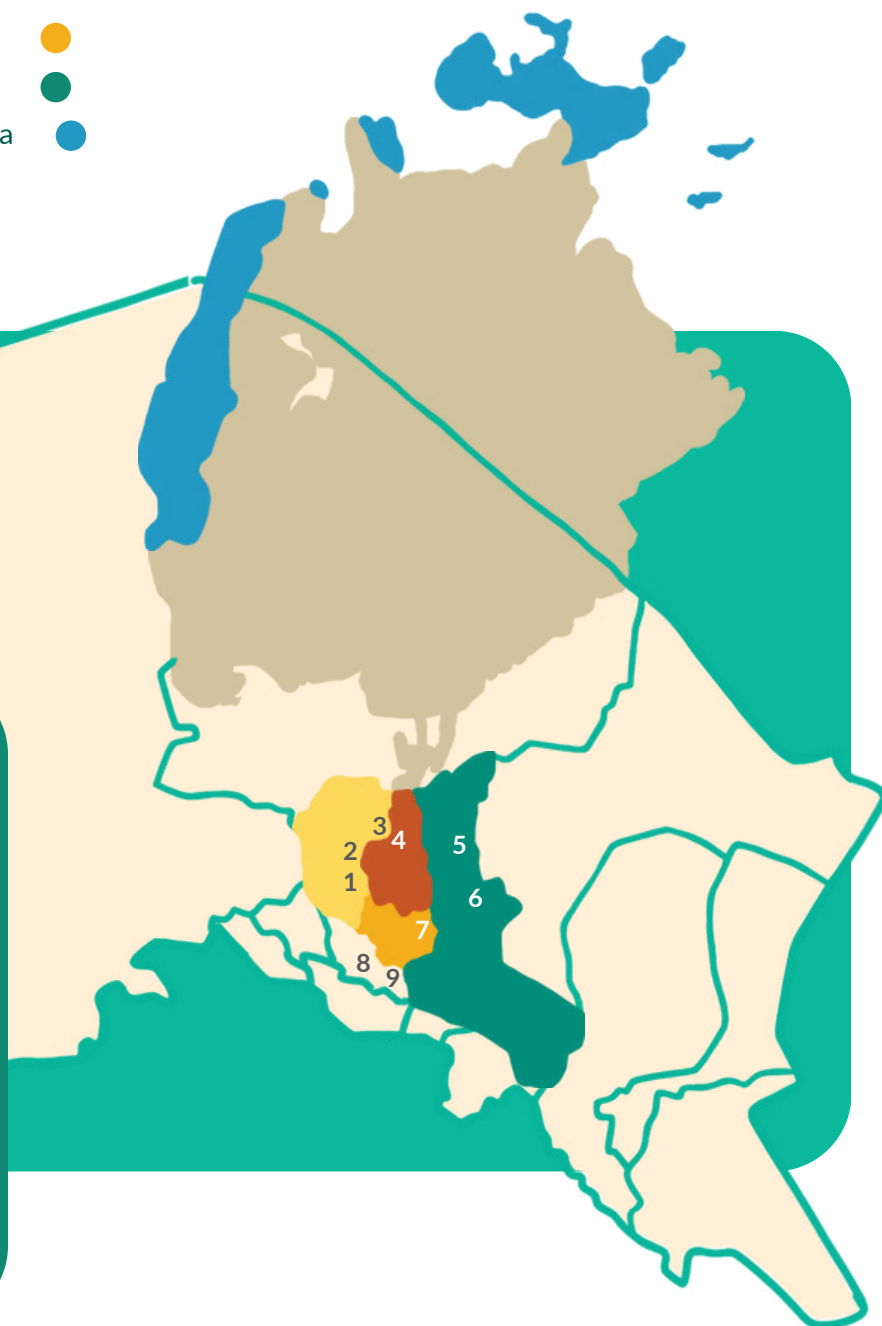


Current Aral Sea



## IMPLEMENTATION SITES

1. Aktuba Jaylaw Cooperative
2. Bozataw Tree Nursery
3. MCHS Orol Agro Farm
4. Juzbasi Farm
5. Karauzyak Tree Nursery
6. Asxat-Rufat Farm
7. Agroimpex Farm
8. Nukus "Monocenter"
9. International Innovation Center for Aral Sea basin









# WINTER WHEAT WITH WINDBREAKS, HOSE REEL SPRINKLER AND DRIP IRRIGATION

## MODEL DESCRIPTION

Climate-resilient winter wheat production supported by hose reel sprinkler irrigation for wheat and windbreaks of apricot and Russian olive trees with drip irrigation. Hose-reel sprinkler irrigation systems work by unrolling a hose equipped with rotating sprinklers that evenly distribute water across the crops. Hose reel sprinklers ensure mobile and efficient water use, reduce evaporation, and provide precise irrigation, even on uneven terrain. This model enhances climate adaptability, boosts productivity, and improves crop quality, promoting sustainable farming practices while mitigating wind erosion and water scarcity.

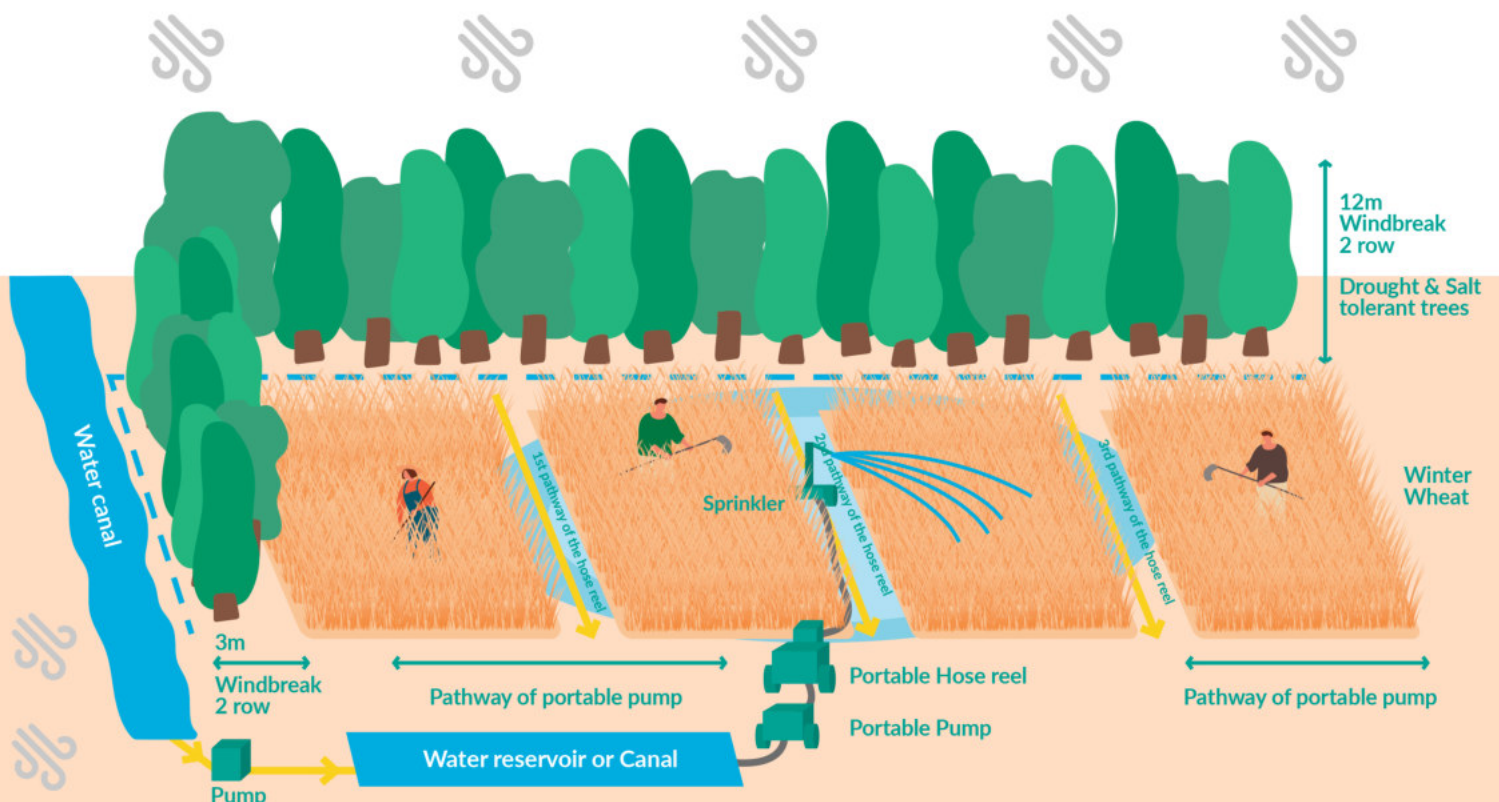
## LOCATIONS

Aktuba Jaylaw farm - Bozataw district, 167 ha of wheat  
Juzbasi farm - Chimbay district, 202 ha of wheat

## IRRIGATION SYSTEM

Hose-reel sprinkler systems for the wheat, as well as drip irrigation for windbreaks

## MODEL SCHEME









# FRUIT ORCHARD WITH DRIP IRRIGATION AND WINDBREAKS

## MODEL DESCRIPTION

Climate-resilient fruit production supported by a drip irrigation system, and protective windbreaks of apricot and Russian olive trees with drip irrigation. Drip irrigation delivers water directly to plant roots through a network of tubes and emitters ensuring effective distribution. This model enhances adaptability to climate risks, boosts productivity, improves product quality, and reduces water usage. The integration of windbreaks and efficient irrigation provides mitigation co-benefits, such as carbon sequestration, while promoting sustainable and high-value agricultural practices.

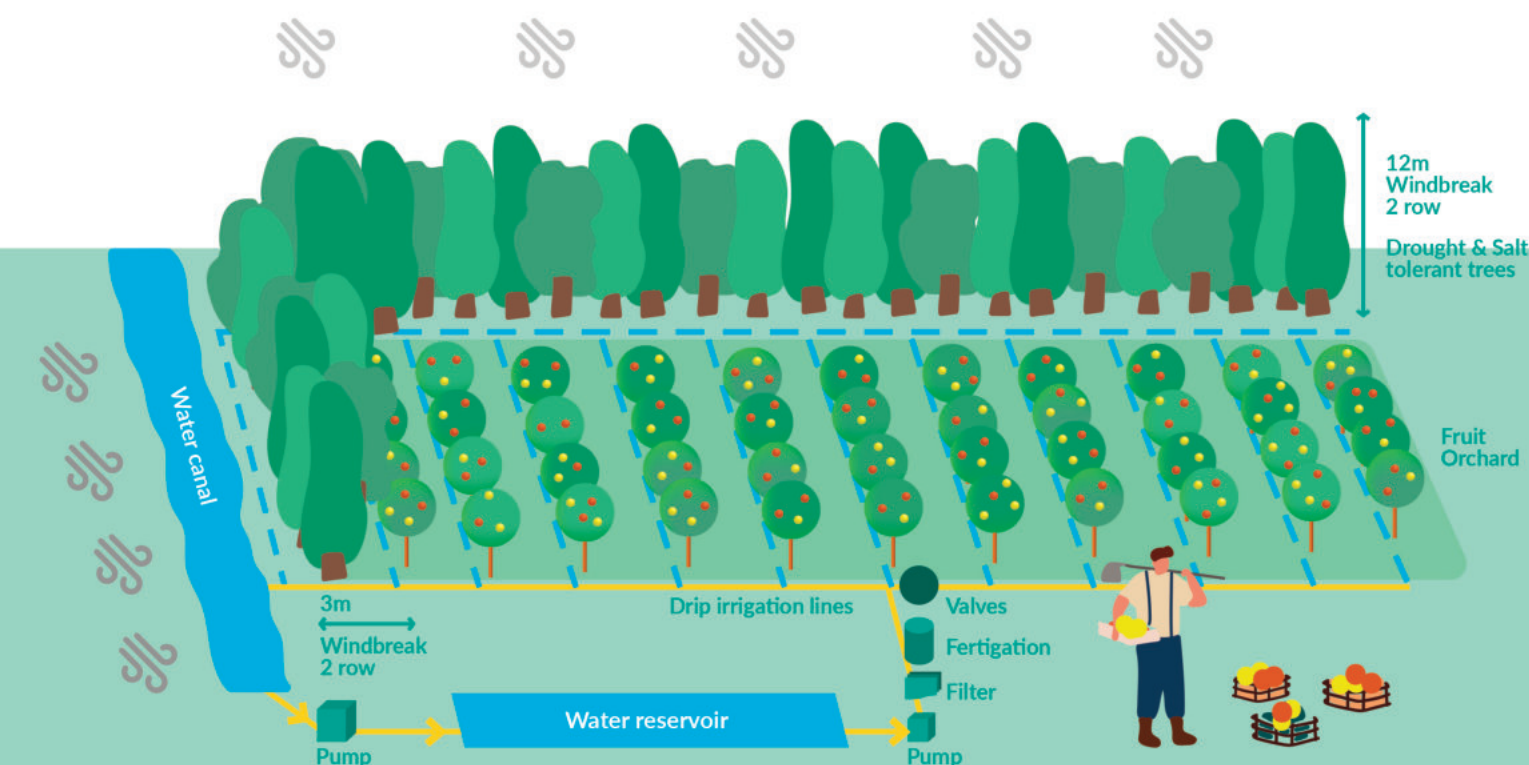
## LOCATIONS

MCHS Orol Agro farm - Bozataw district, 50 ha fruit orchard  
Asxat-Rufat farm in Karauzyak district, 2 hectares of fruit orchard  
AgrolImpex farm in Kegeyli district, 6.9 hectares of fruit orchard

## IRRIGATION SYSTEM

Drip irrigation for the fruit orchard  
and windbreaks

## MODEL SCHEME









# TREE NURSERY WITH WINDBREAKS, SPRINKLER AND DRIP IRRIGATION

## MODEL DESCRIPTION

Tree nursery production supported by sprinkler irrigation and windbreaks with drip irrigation to prevent land degradation and safeguard livelihoods. Sprinkler irrigation works by spraying water over crops through a system of pipes and nozzles, mimicking rainfall. The water is distributed in droplets, providing coverage across the field, even on uneven terrain, helping the plants absorb the water efficiently. This model conserves water, enhances soil quality, and provides a sustainable source of seedlings for reforestation and agricultural projects. By integrating windbreaks, the nursery is protected from climate threats, ensuring stable production, environmental and economic resilience.

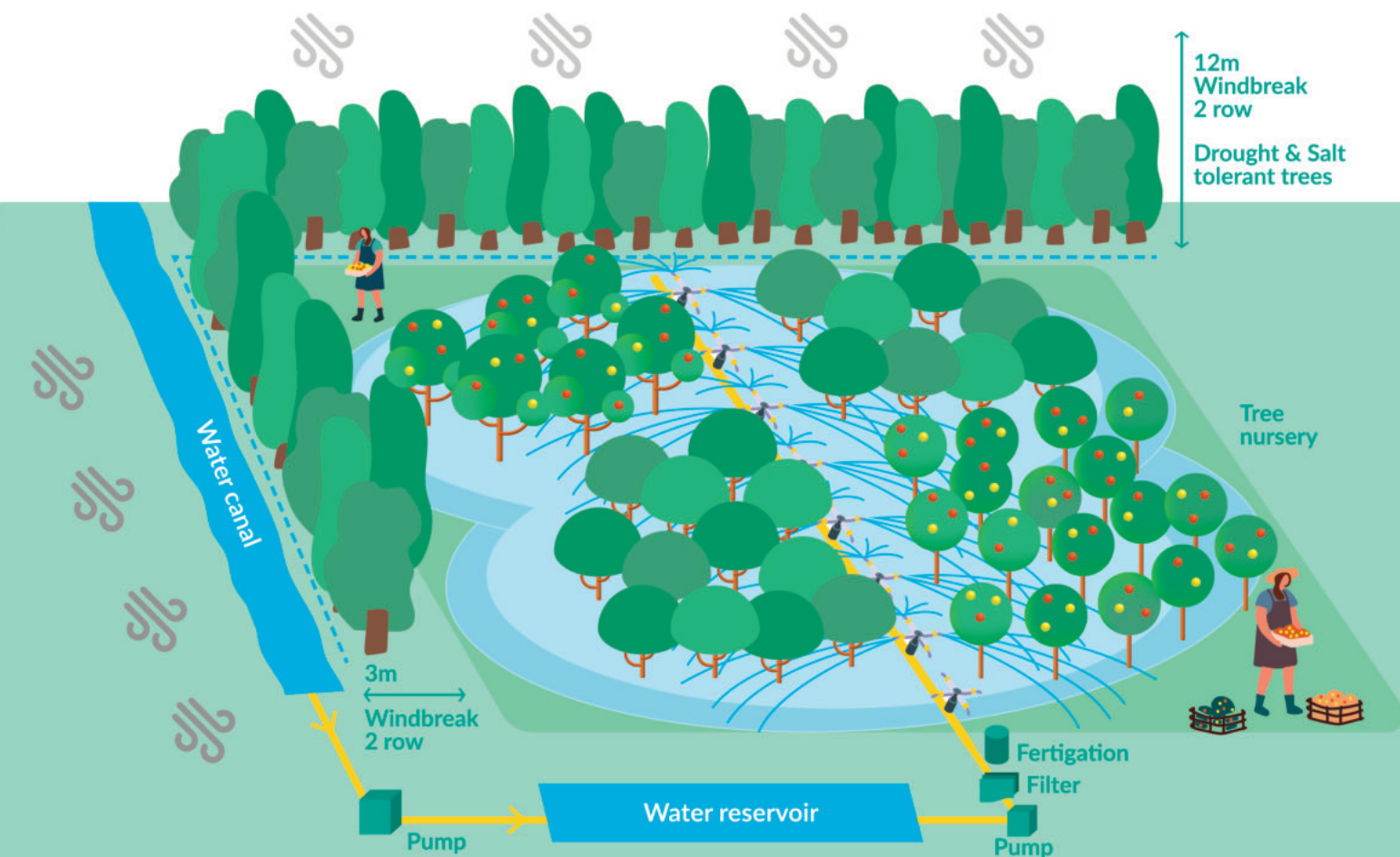
## LOCATIONS

Karauzyak Forestry Committee Tree Nursery - Karauzyak district, 7 ha  
Bozataw Forestry Committee Tree Nursery - Bozataw district, 7 ha

## IRRIGATION SYSTEM

Modular sprinklers for the tree nursery, as well as drip irrigation for windbreaks

## MODEL SCHEME







# FIELD-PROTECTIVE WINDBREAKS (KARATAL)

## MODEL DESCRIPTION

Crop production supported by black willow (karatal) windbreaks to enhance productivity, improve product quality, and mitigate climate risks. Field-protective windbreaks act as natural barriers that slow the wind speed down and its harmful impacts. This model reduces soil erosion and sequesters carbon, contributing to environmental resilience. Additionally, the branches of the windbreaks can be harvested and utilized for goods production, creating opportunities for sustainable business development.

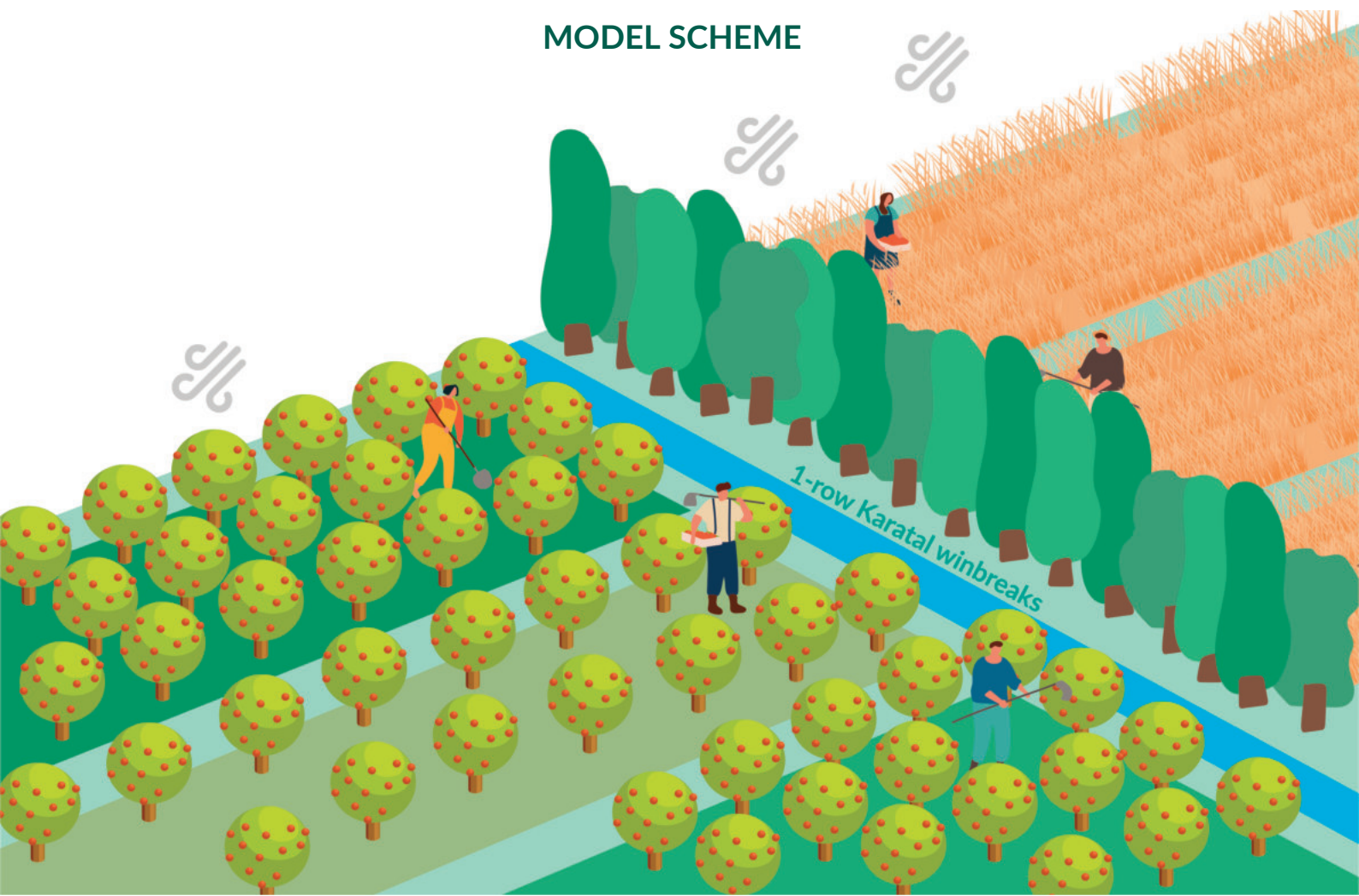
## LOCATIONS

27.6 km of 13,800 trees protecting 14 farms with wheat and fruit orchards vulnerable to the harmful effects of regional winds in Karauzyak, Chimbay, Bozataw, and Kegeyli

## IRRIGATION SYSTEM

No direct irrigation - windbreaks are planted along the irrigation canals of agricultural lands

## MODEL SCHEME









# GREENHOUSES WITH DRIP IRRIGATION

## MODEL DESCRIPTION

Greenhouse crop production using drip irrigation to optimize water use, enhance crop yields, and improve product quality. This model mitigates climate risks by providing a controlled environment for year-round cultivation, conserving water resources, and reducing exposure to extreme weather events. The greenhouse enables farmers to grow high-value crops efficiently, creating opportunities for increased income and sustainable business development.

## LOCATIONS

Nukuss “Monocenter” under the Ministry of Employment and Labor Relations of the Republic of Karakalpakstan

## IRRIGATION SYSTEM

Drip irrigation system for crops

## MODEL SCHEME









# MICROGREENS PRODUCTION FOR WOMEN WITH DISABILITIES

## MODEL DESCRIPTION

In-house microgreens production is ideal for women with disabilities because it requires minimal space, is easy to manage, and can be done indoors, making it accessible for individuals with limited mobility. The use of simple, manageable equipment like shelves, phytolamps, and spray guns allows women to participate in farming activities without the need for heavy labor or large outdoor areas. This type of farming offers flexible working hours, enabling women to earn an income and gain independence while promoting their health, well-being, and social inclusion.

## LOCATIONS

16 women with disabilities received training designed by Aral Sea GRIP and International Innovation Center for Aral Sea basin (IICAS). Later, all the necessary equipment was delivered to their homes.



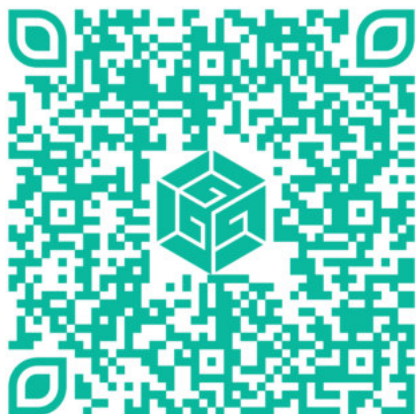








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