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## Policy Paper 2026 Water Harvesting in Tafila: Towards Sustainable Water Security

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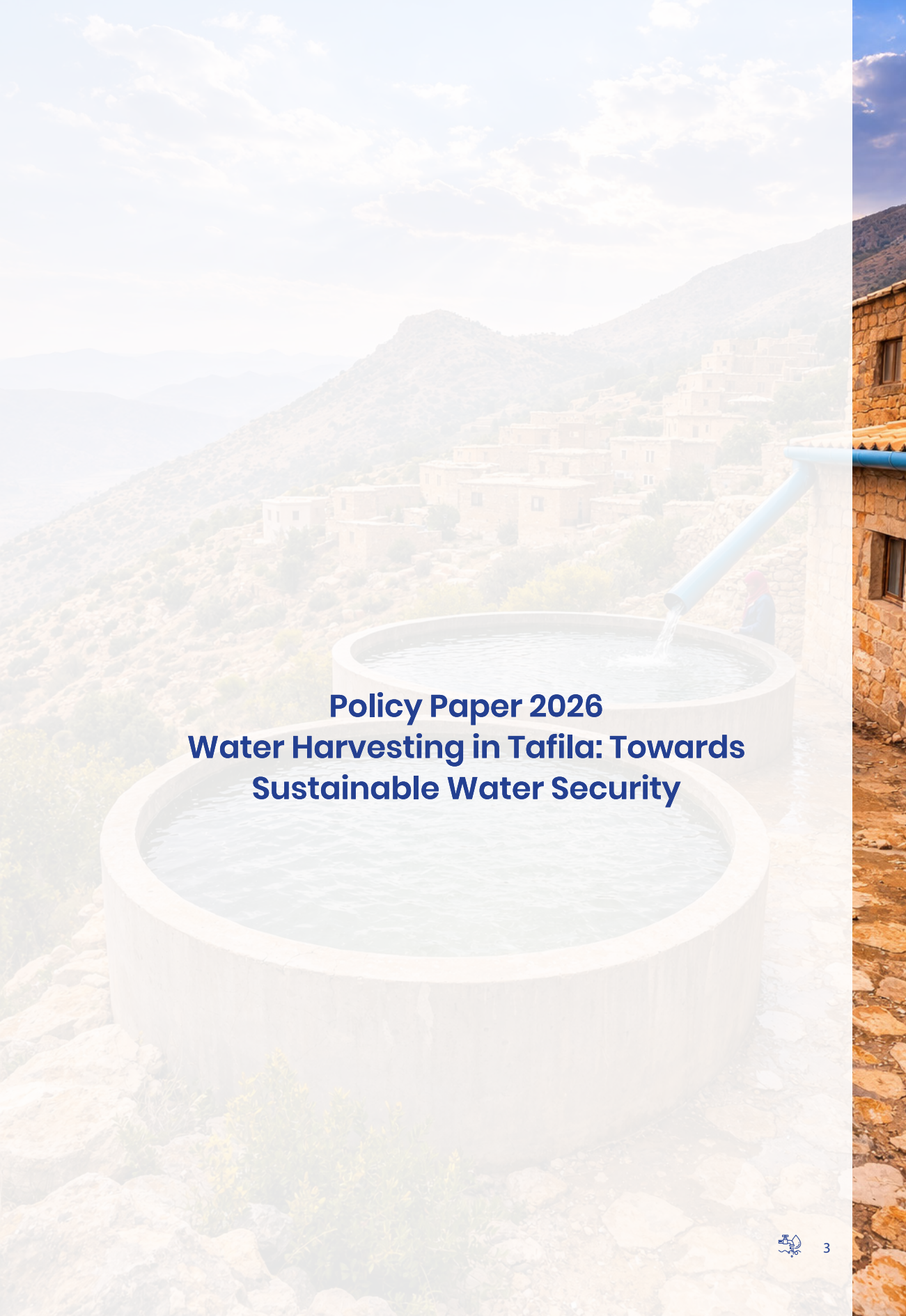
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The background image shows a scenic view of a village built on a hillside in a mountainous region. In the foreground, a large, circular concrete water harvesting tank is visible, with a blue pipe pouring water into it. A person wearing a red headscarf stands near the tank. The village consists of many small, light-colored stone buildings. The surrounding landscape is hilly and arid, with some sparse vegetation. The sky is blue with scattered white clouds.

## **Policy Paper 2026**

# **Water Harvesting in Tafila: Towards Sustainable Water Security**

## Project Background

This paper comes within the project of “Empowering and Strengthening Civil Society Organizations in Jordan by Enhancing Institutional and Technical Capacities to Foster Coordination for Achieving Sustainable Development Goals.” The project is implemented under the umbrella of (ACTED), in partnership with the Information and Research Center – King Hussein Foundation, funded by the European Union Delegation to the Hashemite Kingdom of Jordan.

The project aims to contribute to strengthening civil society organizations in Jordan, characterized by inclusivity, participation, empowerment, and independence, alongside supporting an open and constructive dialogue among various civil organizations. It focuses on supporting organizations operating in the fields of human rights, democracy, good governance, environmental protection, and climate change, as well as economic cooperation, with special attention given to issues of inclusivity, circular economy, and migration. Within this framework, ACTED works on providing specialized training programs for capacity building and enhancing coordination mechanisms among these organizations to support the sustainability of their work.

Through empowering 21 civil society organizations and 42 local associations in Jordan, developing their institutional structures, and enhancing their technical capacities, the project strengthens their role as active actors in protecting human rights and supporting sustainable development. It also seeks to reinforce coordination and cooperation among civil society organizations and enhance dialogue with key stakeholders, thereby contributing to supporting relevant policy reform.

In alignment with these goals, this current policy paper is titled **“Water Harvesting in Tafilah Governorate: Towards Sustainable Water Security.”** It was prepared in cooperation with the project’s advisory committee, which includes experts and representatives from civil society organizations, the private sector, and official institutions in Tafilah Governorate. The paper aims to analyze water gaps in the governorate and propose an integrated package of practical, actionable recommendations to contribute to enhancing water security, stimulating agricultural investment (both plant and animal), and achieving the goals of the Economic Modernization Vision (2023–2033) in promoting the agriculture and water sector as one of the promising sectors for sustainable development in Tafilah Governorate. This aligns with the awareness program launched by the Food and Agriculture Organization of the United Nations (FAO), in coordination with the Ministry of Education, on rainwater harvesting and water consumption rationalization in the governorates of Karak, Tafilah, and Ma’an, within the project of “Building Resilience to Cope with Climate Change in Jordan through Improving Water Use Efficiency in the Agriculture Sector (BRCCJ),” funded by the Green Climate Fund.<sup>1</sup>

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1 Launching an awareness program for rainwater harvesting and water consumption rationalization in schools across the governorates of Karak, Tafilah, and Ma’an.  
<https://www.khaberni.com/news801254/> Date accessed: May 3, 2026



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The Information and Research Center extends its deepest gratitude and appreciation to the members of the Advisory Committee, who actively contributed to the formulation, preparation, and review of this policy paper through their diverse expertise, insightful visions, and legal and technical feedback. Their contributions resulted in a comprehensive paper that reflects the aspirations of workers in the agricultural sector. These collective efforts and practical recommendations reflect a true partnership between national institutions, civil society organizations, and experts, serving as a model for participatory work aimed at influential and sustainable policy reform.

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## 1. Executive Summary:

Tafilah Governorate suffers from an acute water crisis that worsens year after year, as a result of consecutive drought seasons and declining rainfall rates, which reached only 124.11 mm in 2024, alongside the drying up of most springs, whose number dropped to only 48 springs with a sharp decline in their productivity. Around 111,500 people live in the governorate, distributed over 22,344 households, and more than 193,000 heads of livestock depend on degraded water sources, which has led to high agricultural production costs and exacerbated poverty (17.2%) and unemployment (20.4%) rates.

This paper presents two integrated strategic options to enhance water security in Tafilah through water harvesting:

The First Option: Constructing concrete water tanks for households to collect rainwater from rooftops and secure a supplementary water source for families, thereby alleviating financial burdens and enhancing population stability in peripheral areas.

The Second Option: Constructing earthen catchment basins (Hafirs) for farmers and livestock owners to collect surface runoff water for watering livestock, contributing to recharging groundwater resources and combating desertification.

This policy relies on financial allocations budgeted within the Strategic Plan for Tafilah Governorate (2023–2027), where 900,000 JOD was allocated for water harvesting projects across all directorates, and 600,000 JOD for researching water storage sources.<sup>2</sup> It also builds on international partnerships with the European Union (EU) and the United Nations Development Programme (UNDP) under the (DAILL) program to ensure technical execution and sustainable funding.

Implementing both options together will contribute to improving the quality of citizens' lives, protecting the livestock sector, creating new job opportunities for youth in the construction and innovative agriculture sectors, and reducing internal migration from peripheral areas toward the center of the governorate.

## 2. Water Status in Jordan and the Importance of Water Harvesting

Jordan, a middle-income country with limited natural resources, faces severe challenges in water scarcity, ranking among the most water-poor countries in the world. Jordan lies within a semi-arid to arid climatic region, as the proportion of land receiving more than 200 mm of annual rainfall accounts for only a limited percentage of its total area of approximately 89,000 square kilometers. Meanwhile, desert and semi-desert areas cover most of the country's territory, which limits the potential for natural water resource replenishment.<sup>3</sup>

These climatic conditions have clearly reflected on per capita water shares; the annual per capita share of renewable water resources in Jordan dropped from about 196 cubic meters in 1990 to approximately 61–62 cubic meters only in recent years. This level falls far below the global water poverty line of 500 cubic meters per capita annually, placing Jordan among the countries suffering the most from water scarcity worldwide.<sup>4</sup>

Estimates indicate that the total available water resources in Jordan amount to about 1.1 billion cubic meters annually from various sources, including surface water, groundwater, and treated wastewater. However, water demand exceeds these quantities due to population growth, urbanization, and agricultural expansion, leading to an increasing water deficit, part of which is compensated for through the intensive exploitation of groundwater, which constitutes a large percentage of the Kingdom's water sources.<sup>5</sup>

These challenges are further compounded by climate change, which leads to disrupted rainfall patterns, rising temperatures, increased drought periods, and land degradation. These changes directly affect the agricultural sector, which consumes a large percentage of water resources and heavily relies on rainfall and surface water, thereby threatening the sustainability of agricultural production and the livelihoods of rural communities.<sup>6</sup>

Under these circumstances, water harvesting emerges as one of the practical and sustainable solutions to enhance water resources management, particularly in semi-arid regions that rely on seasonal rainfall. Water harvesting includes a range of techniques aimed at collecting and storing rainwater and torrents to utilize them for agricultural, domestic, and environmental uses, thereby contributing to reducing pressure on conventional water sources and enhancing the capacity of local communities to adapt to climate change.

This approach gains particular importance in the southern governorates of Jordan, including Tafilah Governorate, which faces water challenges related to fluctuating rainfall and limited local water resources, despite possessing suitable geographical potential to develop water harvesting projects in valleys and agricultural areas. Hence, there is a prominent need to develop supportive policies and programs to expand the application of water harvesting techniques in the governorate, contributing to enhancing local water security and supporting sustainable agricultural development.

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3. Water productivity baseline assessment in Jordan, 2022, [Water productivity baseline assessment in Jordan | United Nations in Jordan](#)

4. Ministry of Water and Irrigation. (2023). National Water Strategy in Jordan 2023–2040. Amman: Ministry of Water and Irrigation.

5. Water–Energy Nexus: Addressing Stakeholder Preferences in Jordan, 2020, [Water–Energy Nexus: Addressing Stakeholder Preferences in Jordan](#)

6. Water productivity baseline assessment in Jordan, 2022, [Water productivity baseline assessment in Jordan | United Nations in Jordan](#)



### 3. General Background and Local Context

#### 3.1. Geographical Location of Tafilah Governorate

Tafilah Governorate is located in the southwestern part of the Hashemite Kingdom of Jordan, 183 km south of the capital, Amman. Its total area is 2,209 km<sup>2</sup>, making it the seventh largest governorate in the Kingdom by area, accounting for 2.5% of Jordan's total landmass. Tafilah has the smallest population among the Kingdom's governorates, housing only about 1% of Jordan's total population.

Historically, Tafilah was known by several names, including “*Di Taphlos*”, a Roman name meaning “Mother of Vineyards,” which reflects its ancient reputation for perennial grape and olive groves that still adorn its mountain slopes today. The governorate features a strategic location connecting northern and southern Jordan, and is close to world-renowned natural reserves such as the Dana Reserve, giving it a unique tourism and environmental advantage.

#### 3.2. Administrative Divisions and Demographic Characteristics

Administratively, Tafilah Governorate is divided into three main directorates (Liwa), which vary in area, population density, and developmental characteristics:<sup>7</sup>

| Directorate                 | Population (Capita) | Percentage | Area (km <sup>2</sup> ) |
|-----------------------------|---------------------|------------|-------------------------|
| Qasabah Tafilah Directorate | 70,400              | 63.1%      | 1,030                   |
| Busaira Directorate         | 29,240              | 26.2%      | 227                     |
| Al-Hasa Directorate         | 11,860              | 10.7%      | 952                     |
| Total                       | 111,500             | 100%       | 2,209                   |

The population is distributed across 37 residential localities throughout the governorate, most notably Tafilah City, Al-Ayn Al-Bayda, Al-Eis, Busaira, and Al-Hasa. Statistics indicate that the male population stands at 52.3% compared to 47.7% for females. The society in Tafilah is characterized by its youthful nature, with the population under the age of 15 accounting for about 36.5%, while the average family size is 5.7 members, which is among the highest rates in the Kingdom.

#### 3.3. Topography and Climate

Tafilah enjoys a unique and rare topographical diversity at the Kingdom's level, blending three distinct geographical patterns: the mountainous regions, which are concentrated in the western part of the governorate, rising to about 1,600 meters above sea level in the Al-Qadisiyah area, characterized by a cold winter and mild summer climate, and representing the highest rainfall area in the governorate. Meanwhile, the Shafa-Ghor regions represent the western slopes of the mountain highlands descending toward Wadi Araba, characterized by rugged terrain and a transitional climate between the mountainous and valley-like. Lastly, the eastern desert regions extend across the eastern peripheries of the governorate, characterized by a very dry climate and scarce vegetation cover, experiencing the highest temperatures and lowest rainfall rates.

7. Department of Statistics, Population Estimates at the End of 2025.

This topographical diversity reflects on the spatial distribution of rainfall, with annual averages ranging between 50 mm in the eastern desert regions up to 250 mm in the mountain highlands. The overall cumulative rainfall average in the governorate for the year 2024 reached only about 124.11 mm, a low rate that reflects the state of drought the region is experiencing.

### 3.4. Economic Structure and Living Standards

The economy of Tafilah Governorate relies heavily on the public sector, as governmental and military jobs account for about 49.1% of the total workforce in the governorate. In contrast, the private sector and productive activities (such as mining, agriculture, and tourism) contribute only a limited percentage, not exceeding 15% of employed individuals. This imbalance in the labor market structure makes the local economy highly dependent on the state's general budget, reducing its resilience against economic shocks.

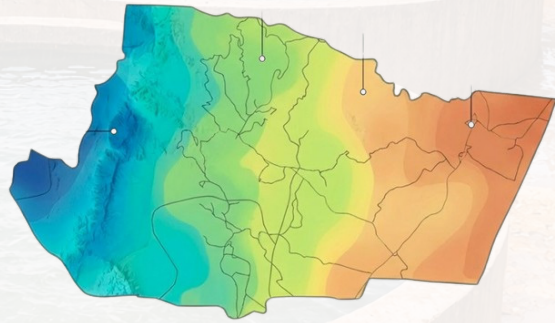
The average annual household income in Tafilah is 9,977 JOD, which is lower than the national average of 11,512 JOD.<sup>8</sup> Data indicates that households spend about 80% of their income on basic needs including food, housing, and services, limiting their ability to save and invest in productive projects. Furthermore, the poverty rate in the governorate stands at 17.2%,<sup>9</sup> which is higher than the national average, and the situation worsens in the Busaira Directorate, where the rate reaches 27%,<sup>10</sup> making it one of the most prominent poverty pockets in the Kingdom.

## 4. Problem Statement and Analysis of Challenges

### 4.1. The Water Scarcity Crisis and the Deterioration of Traditional Sources

Water scarcity constitutes the greatest challenge facing Tafilah Governorate. The dimensions of this crisis lie in the decline of springs and freshwater sources, the depletion of groundwater, the fluctuation of rainfall, and the weakness of infrastructure. Regarding the decline of springs, Tafilah was historically rich in springs and freshwater sources that fed agriculture and provided drinking water for the population; however, as a result of successive drought seasons and unorganized human intervention, the number of springs has dropped sharply, with only 48 springs remaining,<sup>11</sup> most of which suffer from a severe decline in productivity or complete drying up during summer periods.

The decrease in rainfall rates and the decline in the recharge of aquifers have led to the depletion of artesian wells upon which farmers primarily depend, thereby threatening the sustainability of the agricultural sector and increasing reliance on costly alternative water



8. Report: Population Estimates at the End of 2025, Department of Statistics, link:

[PopulationEstimatesbyLocality.pdf](#)

9. Study on the Economic and Social Reality of Tafilah Governorate for 2024, link: [Tafilah2024.pdf](#)

10. Official Website of the Department of Statistics.

11. Report: Tafilah loses %60 of its springs due to climate change, link to the report in Al-Rai newspaper:

[Tafilah loses %60 of its springs due to climate change -Al-Rai newspaper](#)

sources. Furthermore, Tafilah's climate witnesses significant fluctuation in rainfall amounts and seasonal distribution, as the cumulative average for the year 2024 recorded only about 124.11 mm,<sup>12</sup> a rate insufficient to compensate for the loss of groundwater reserves or to meet the needs of rain-fed agriculture. Finally, the water infrastructure suffers from a clear weakness, as the coverage rate of the sewage network does not exceed 38% of the governorate's area, forcing the population to use cesspools, which increases the risk of contaminating the remaining groundwater; moreover, water networks suffer from deterioration and blockages that lead to frequent service interruptions, especially during the summer.

#### 4.2. The Economic and Social Impact of Drought

The water crisis entails economic and social repercussions that affect various segments of society, manifested in the rising costs of agricultural and pastoral production, the exacerbation of poverty and unemployment rates, migration from peripheral areas, and the deterioration of local food security. In the field of agricultural and pastoral production, livestock breeders in Tafilah own more than 193,645 heads of sheep and goats, which is a substantial livestock wealth that constitutes a major source of income for many families; however, the drying up of natural pastures and the decline of springs have forced breeders to purchase water and fodder throughout the year, leading to a sharp increase in care costs, decreased profit margins, and forcing some breeders to downsize their herds or exit the sector entirely.

In turn, water scarcity and the decline of associated economic activities contribute to the exacerbation of poverty rates, which reached 17.2%, and unemployment, which reached 20.4%, representing some of the highest rates among the Kingdom's governorates. These percentages double in rural and peripheral areas where households rely more heavily on agriculture and grazing. As for migration from peripheral areas, the deterioration of water and economic services in areas such as Busaira Directorate and Al-Hasa Directorate drives the population to migrate toward the governorate's center or outside it in search of job opportunities and a decent life, and this migration leads to increased pressure on services in the governorate's center. Finally, the decline in agricultural and pastoral production affects the availability of local food at affordable prices and increases the governorate's reliance on food items imported from outside, which weakens food security and increases the fragility of the local economy.

#### 4.3. Structural and Environmental Challenges

Tafilah Governorate faces structural and environmental challenges that hinder its development, manifested in rugged terrain, soil erosion, fragmentation of agricultural land ownership, environmental pollution, and institutional weakness. Regarding the rugged terrain, the steep mountainous nature poses a significant barrier to implementing infrastructure projects, increases construction and maintenance costs, and obstructs service delivery to remote residential localities. Furthermore, occasional heavy rainfall combined with sloping terrain exacerbates soil erosion, leading to the loss of the fertile topsoil layer and the accumulation of silt in earthen catchment basins (Hafirs) and dams, thereby reducing their lifespan and storage efficiency. Concerning the fragmentation of agricultural land ownership, agricultural lands in Tafilah suffer from the problem of fragmented and communal ownership (Shuyu'), making it

12. Report: Tafilah loses %60 of its springs due to climate change, link to the report in Al-Rai newspaper: [Tafilah loses %60 of its springs due to climate change -Al-Rai newspaper](#)

difficult to execute large-scale developmental projects, limiting farmers' ability to benefit from economies of scale, and hindering the introduction of modern agricultural technologies.

The institutional framework in Tafilah Governorate also suffers from weakness, as some municipalities and local authorities experience financial and administrative deficits that limit their capacity to provide basic services, maintain existing infrastructure, and propose new developmental projects.

#### 4.4. Institutional and Regulatory Challenges

The outcomes of a discussion session held in Tafilah Governorate on February 12, 2026, attended by the Directorate of Agriculture and the Directorate of Environment in Tafilah Governorate, alongside members of the governorate's Advisory Committee, revealed a conflict of priorities among the relevant ministries. It was pointed out that the Ministry of Agriculture had submitted three proposals to construct earthen dams upon a direct request from the Prime Ministry, and the financial allocations were ready. However, the Ministry of Water opposed these proposals under the pretext that the proposed dam sites are located within the recharge zones of the Tannur Dam. It is worth noting that the Tannur Dam does not serve the needs of farmers and livestock breeders in Tafilah, as its water goes entirely to the Arab Potash Company and for limited tourism purposes; meanwhile, its storage capacity stands at 17 million cubic meters, and only 5 million cubic meters entered it during the (2025/2026) season. This conflict constitutes an obstacle to expanding water harvesting projects and delays the implementation of projects that had been promised.

Participants in the discussion session confirmed the existence of an administrative decision (ministerial instructions) prohibiting the establishment of earthen catchment basins (Hafirs) or any water structures on private lands, which deprives many farmers who own suitable lands from benefiting from water harvesting. Some speakers explained that although this decision is applied generally, it is sometimes bypassed, where exceptional approvals are granted to establish dams on their private lands, while small-scale farmers are deprived of this possibility. This situation creates an inequitable environment and limits the maximum utilization of surface runoff water on privately owned lands that might be topographically more suitable.

Furthermore, a member of the Tafilah Governorate Council indicated that despite the presence of major funding allocations for water harvesting projects (as the governorate's strategic plan allocated 900,000 JOD for water harvesting projects), the distribution mechanism of these funds is influenced among council members who represent different directorates (Qasabah Tafilah, Busaira, Al-Hasa). Funds are sometimes transferred from water harvesting projects that were a priority in a specific directorate to other projects in different directorates based on majority consensus, leading to the marginalization of the needs of the areas most affected by drought. This mechanism limits planning based on actual need and weakens the effectiveness of the budgeted financial allocations.

## 5. Strategic Objectives

This paper seeks to achieve a set of interconnected strategic objectives aimed at addressing the water problem and promoting agricultural development in Tafilah Governorate. These objectives are distributed across the water, economic, social, and environmental fields as follows:

In the water field, the policies aim to enhance the sustainability of water resources by developing water sources, increasing the efficiency of available resource utilization, and protecting the remaining springs and wells from depletion and contamination. They also seek to expand water harvesting projects by constructing new earthen catchment basins (Hafirs) and dams, and increasing the number of domestic concrete tanks, to maximize the utilization of rainwater and surface runoff.

In the economic field, the objectives focus on supporting the agriculture and livestock sector by providing independent water sources for watering, reducing production costs, and improving the quality of agricultural and livestock products. They further seek to create job opportunities in the future through initiating agricultural projects and supporting small and medium enterprises in the fields of hydroponics and related ventures. The paper also aims to improve the living standards of households by alleviating the financial burdens resulting from purchasing water, providing a stable housing environment, and enhancing families' resilience to climate challenges and recurrent drought seasons. Additionally, it aims to reduce internal migration by improving basic services in peripheral areas, empowering vulnerable groups by targeting poor households in water harvesting projects, and supporting the participation of women and youth in agricultural production projects.

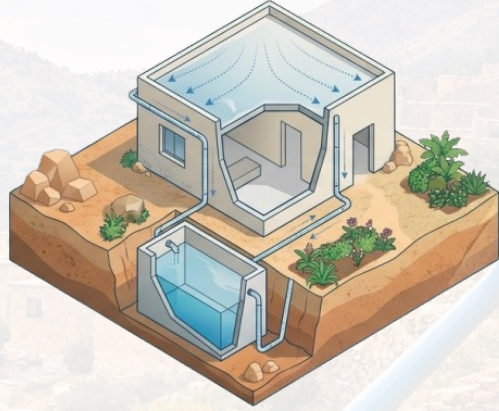
In the environmental field, the objectives aim to combat desertification by increasing vegetation cover, rehabilitating pastoral rangelands, and improving land management. They also seek to protect biodiversity throughout the governorate, protect natural water sources from pollution and depletion, and mitigate soil erosion by establishing water barriers, afforesting sloped areas, and applying sustainable agricultural practices that preserve fertile soil and extend the lifespan of water projects.

## 6. Proposed Policy Options

### 6.1. The First Option: Constructing Concrete Water Tanks for Households

#### Justifications and Compelling Reasons

The construction of concrete water tanks for households represents one of the most effective solutions to address the water crisis in Tafilah Governorate. These tanks activate domestic water harvesting by collecting rainwater from house rooftops, which is a renewable and free water source that can be utilized for various domestic uses. This reduces reliance on the public network, which suffers from frequent interruptions especially during the summer, and provides a supplementary water source that ensures continuity of service. Furthermore, these tanks contribute to reducing the financial burdens on families, as the residents of Tafilah are forced to purchase water tankers at high prices during interruption periods, which is of paramount importance in a governorate suffering from high poverty (17.2%) and unemployment (20.4%) rates. Domestic tanks also allow control over the cleanliness of the collected water and protect it from contamination, providing safe drinking water for households compared to water transported via tankers, which might be contaminated.



#### Target Groups

This policy targets all households in Tafilah Governorate, giving priority to the following groups:



Underprivileged and poor families, where the poverty rate reaches 30%, and the tanks can be integrated into poor household housing maintenance projects, for which 500,000 JOD has been allocated.



Households in peripheral areas that face weak public network coverage and high costs of purchasing water, as these tanks contribute to enhancing their resilience and reducing migration motives.



Rural families with domestic agricultural activities who can use the collected water to irrigate home gardens and rear poultry and small livestock.

#### Implementation Mechanism

Implementing this option requires coordination among multiple entities and adhering to the following mechanisms:



Identifying the water needs of each area through technical studies and field inspections, choosing appropriate tank locations (indoors or outdoors), and determining the required storage capacities.



Setting standard specifications for concrete tanks to ensure their quality and durability, while taking into account the climatic and topographical conditions of the governorate.





Providing funding through the Governorate Council budget (which has allocated amounts for the maintenance of poor households' housing), concessional lending windows (the Development and Employment Fund and the Agricultural Credit Corporation), and support from international organizations.



Executing and supervising through certified contractors, with technical supervision by the Directorate of Public Works and Housing and the governorate's municipalities, to ensure commitment to specifications and quality.



Organizing awareness campaigns on the importance of domestic water harvesting, and educating households on maintaining and cleaning the tanks periodically.

### Expected Cost

The cost of a concrete tank varies according to capacity, location, and execution conditions, with local estimates usually ranging between 1,500 and 3,000 JOD per tank. The Strategic Plan for Tafilah Governorate (2023–2027) has allocated the following relevant amounts:



Water harvesting projects (including tanks and earthen catchment basins (Hafirs)): 900,000 JOD.<sup>13</sup>



Housing maintenance for underprivileged and poor families: 500,000 JOD (tanks can be integrated within these projects).

### Expected Social Impact



Improving the quality of life by providing clean and continuous water for domestic uses, and reducing waiting times and the effort exerted in securing water.



Saving between 200 and 500 JOD annually per household from water purchasing expenses, which is a significant amount for low-income families.



Reducing migration motives from peripheral areas that suffer from weak water services. Alleviating the domestic burdens placed upon women in securing water, and allowing additional time to participate in economic and educational activities.



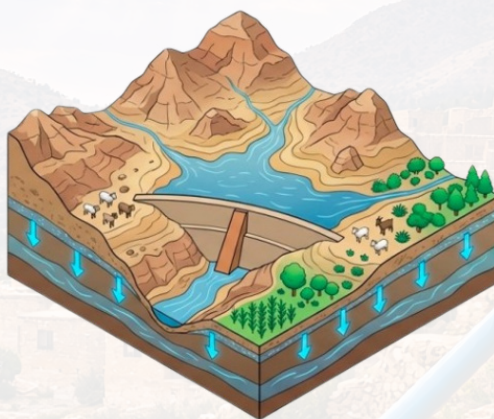
Increasing community awareness regarding the importance of water conservation and reuse.

13. The Strategic Plan for Tafilah Governorate 2027–2023, issued by the Tafilah Governorate Council.

## 6.2. The Second Option: Constructing Earthen Catchment Basins (Hafirs) for Farmers and Livestock Owners

### Justifications and Compelling Reasons

Earthen catchment basins (Hafirs) and small dams represent one of the most important conventional and sustainable solutions for rainwater harvesting in mountainous and arid regions. The importance of this option lies in its capacity to compensate for the drying up of springs, as only 48 springs remain in Tafilah Governorate, most of which suffer from a sharp decline in productivity, making earthen catchment basins (Hafirs) a vital alternative source for providing water for watering purposes. Furthermore, these catchment basins (Hafirs) contribute to providing free watering for livestock, thereby alleviating the financial burdens on livestock breeders who are currently forced to purchase water throughout the year. Among the benefits is also the recharging of groundwater resources through the infiltration of stored water, which enhances the sustainability of nearby wells and springs. Additionally, earthen catchment basins (Hafirs) play an effective role in combating soil erosion, as they reduce the runoff velocity of surface water, limit the erosion of fertile topsoil, and contribute to improving pastoral rangelands by developing the surrounding vegetation cover, providing natural pastures for livestock.



### Agricultural and Economic Impact



Earthen catchment basins (Hafirs) allow farmers and livestock owners to obtain water for watering at a very low cost compared to purchasing water tankers.



The catchment basins (Hafirs) contribute to the stability of the livestock sector, which comprises more than 193,000 head of livestock, by protecting breeders from high water and fodder costs.



The stored water provides the possibility of expanding planted areas and increasing productivity, especially in rain-fed agriculture and fruit trees.



The availability of water resources contributes to improving the quality of agricultural and animal products, thereby enhancing their competitiveness in local markets.



### Implementation Requirements

Implementing earthen catchment basins (Hafirs) in Tafilah requires commitment to specific technical and regulatory requirements:

- Identifying catchment basins (Hafirs) locations based on surface runoff paths, watershed areas, and rainfall rates to ensure collection efficiency.
- Giving priority to areas with high livestock density, regions suffering from severe spring dryness, and government lands close to residential localities.
- Determining the catchment basins (Hafirs) dimensions (depth and area) based on the expected runoff volume, while considering safety factors to prevent side collapses, and designing a spillway for excess water to avoid exceeding capacity.
- Using clay or plastic materials to reduce water infiltration in areas with sandy or fractured rocky soil.
- Obtaining the necessary approvals from the Ministry of Water and Irrigation, the Directorate of Agriculture, the municipalities, and the Department of Lands and Survey.
- Forming water user committees to oversee the implementation and maintenance of the catchment basins (Hafirs), and establishing mechanisms for the equitable distribution of water among beneficiaries.

## 7. Comparison and Analysis of the Two Options

Comparison Table

| Aspect of Comparison               | Concrete Tanks (Households)                            | Earthen Catchment Basins / Hafirs (Farms)                            |
|------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------|
| Capital Cost                       | Medium to high per unit (1,500–3,000 JOD per tank)     | Low compared to the volume of collected water                        |
| Operating and Maintenance Cost     | Low (periodic cleaning)                                | Medium (silt removal, side repairs)                                  |
| Direct Impact                      | Improving the living standard of households            | Supporting the agriculture and livestock sector                      |
| Impact on Poverty and Unemployment | Reducing household expenses, improving quality of life | Reducing production costs, creating job opportunities in rural areas |
| Sustainability                     | Very high, lasting for decades                         | Depends on rainfall and periodic maintenance                         |
| Scalability                        | Can be implemented in every residential locality       | Linked to the availability of suitable lands and runoff paths        |
| Environmental Impact               | Positive (rationalizing consumption)                   | Positive (groundwater recharge, combating desertification)           |
| Execution Time                     | Short (days to weeks per tank)                         | Medium (weeks to months per project)                                 |
| Beneficiary Participation          | High (households oversee their own tank)               | Medium (collective management of the catchment basin)                |
| Impact on Migration                | Reducing migration from peripheral areas               | Enhancing stability in rural areas                                   |

## Why is it recommended to implement both solutions together?

Implementing both options in a balanced and integrated manner achieves comprehensive development for the following reasons:



The first option focuses on water security for households, while the second option focuses on water security for productive activities (agriculture and grazing), which ensures the protection of livelihoods alongside improving the quality of life.



The implementation of both options leads to distributing the risks associated with climate change; during a weak rainy season, domestic tanks can be relied upon to secure basic drinking needs.



Tanks can be implemented in all residential localities, whereas earthen catchment basins (Hafirs) are limited to rural areas with open spaces, thereby ensuring the inclusivity of the intervention.



Tanks contribute to reducing household expenses, which increases their ability to invest in agricultural production, while earthen catchment basins (Hafirs) contribute to reducing agricultural production costs, thereby improving rural income.



Earthen catchment basins (Hafirs) help recharge the groundwater that feeds the wells that households might use, while tanks reduce the pressure on these wells.

## 8. Stakeholders and Their Roles

### The Executive Council of Tafilah Governorate

The Council is chaired by the Governor of Tafilah and comprises the directors of government departments (including Public Works, Water, Agriculture, and Municipalities). It undertakes the following tasks: (technical supervision of project execution, preparation of studies and technical specifications, floating tenders and procurement procedures, monitoring progress and ensuring quality, and coordinating among different sectors).<sup>14</sup>

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14. Article (11) of the Local Administration Law No. (22) of 2021 stipulates the duties of the Governorate's Executive Council, including:

"A- Preparing draft strategic and executive plans for the governorate, aligning them with the strategic plans prepared by municipal councils and other official entities, ensuring their consistency with national strategies and plans, and referring them to the Governorate Council to take the appropriate decision regarding them.

B- Preparing the governorate's draft budget within the ceilings specified by the General Budget Department at the Ministry of Finance and referring it to the Governorate Council, provided that a percentage of no less than (%40) of the governorate's budget is allocated for the purposes of establishing development projects.

C- Preparing the governorate's needs assessment directory for development and service projects, including the needs assessment directory received from municipalities and other official entities, and referring it to the Governorate Council.

D- Proposing service, investment, and development projects along with their estimated costs and priorities, and monitoring their implementation, while taking into account the development projects proposed by municipal councils, departments, and government and official institutions within the governorate, and referring them to the Governorate Council."



## Tafilah Governorate Council

In its capacity as the council that approves projects, it undertakes the following duties: (approving budgets and financial allocations for projects, identifying developmental priorities based on citizens' needs, and monitoring project execution and compliance with specifications).<sup>15</sup>

## Directorate of Agriculture

The role of the Directorate of Agriculture focuses on: studying suitable locations for earthen catchment basins (Hafirs), providing agricultural guidance to farmers, implementing afforestation projects around the earthen catchment basins (Hafirs), monitoring soil health and water quality, and allocating reclaimed lands to youth.<sup>16</sup>

## Water Authority / Water Administration

Conducting hydrological feasibility studies for earthen catchment basins (Hafirs), monitoring water quality in tanks and catchment basins (Hafirs), granting the necessary technical approvals, and monitoring the protection of water sources from contamination.<sup>17</sup>

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15. Article (5/A) of the Local Administration Law No. (22) of 2021 stipulates the duties of the Governorate Council, including: "1- Approving draft strategic and executive plans related to the governorate, which are referred to it by the Executive Council, and monitoring their implementation."

2- Approval of the governorate's draft budget referred to it by the Executive Council for inclusion in the General Budget, provided that the draft falls within the financial ceilings specified by the Department of the General Budget at the Ministry of Finance, and that the governorate's budget allocates no less than (%40) for development projects.

3- Approval of the governorate's needs assessment directory for developmental and service projects referred to it by the Executive Council, and the prioritization of those needs.

4- Identification of areas suffering from a deficit in services and development.

5- Approval of service, investment, and developmental projects referred to it by the Executive Council, and monitoring their implementation.

16. Article (3/A) of Agriculture Law No. (13) of 2015 sets forth the objectives of the Ministry of Agriculture, which include:

"2. Ensuring the sustainability of agricultural natural resource utilization without harming the environment.

3. Creating an enabling environment for investment in the agricultural sector.

4. Developing rural areas and the Badia region, and enhancing their productive capacity."

17. Article (6) of the Water Authority Law and its Amendments No. (18) of 1988 sets forth the mandates of the Authority, which include:

"B. Formulating plans and programs to implement approved water policies related to domestic and municipal water as well as wastewater, and exercising control and supervision over them; in addition to developing water resources in the Kingdom and utilizing them for domestic and municipal purposes, including drilling productive wells, developing springs, treating and desalinating water, and treating wastewater resulting from these uses, as well as performing executive operations to increase their capacity, improve their quality, and protect them. For this purpose, 'municipal water' shall mean water used for domestic, commercial, industrial, and tourism purposes, which is supplied through public networks.

C. Directing and regulating the construction of public and private wells, exploring for water at its sources, drilling experimental, exploratory, and productive wells, and licensing the drilling of wells, drilling rigs, and drilling contractors."

### Governorate Municipalities

The role of the governorate's municipalities focuses on: implementing domestic tank projects within their responsibilities, maintaining earthen catchment basins (Hafirs) and water infrastructure, issuing necessary licenses, and raising community awareness regarding the importance of water rationalization.<sup>18</sup>

### International Organizations

Providing funding and financial support, offering technical support and international expertise, monitoring project execution in accordance with international standards, and supporting local capacity building.

### Agricultural Cooperatives and Charitable Associations

The role of cooperatives and charitable associations involves: initiating agricultural projects when water stock is available from earthen catchment basins (Hafirs) and concrete tanks, engaging the local community in projects, managing shared earthen catchment basins (Hafirs), providing support to poor families, and organizing awareness and education campaigns.<sup>19</sup>

### Administrative Governors

Administrative governors, led by the Governor, play a role in organizing and protecting water sources in the governorate pursuant to the Administrative Formations Regulation No. (47) of 2000. Article (25/b, c) thereof stipulates that "The Governor, in cooperation and coordination with competent authorities and in accordance with current legislations, shall work to provide public services in the governorate, follow up on their continuity and development, particularly the following: b. Providing safe drinking water in cities, villages, and residential localities, and securing sewage services. c. Organizing and protecting public facilities in cities and villages, such as rangelands, water sources, fields, public squares, and cemeteries, and allocating the necessary lands for them, if available."

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18. Articles (15) and (16) of the Local Administration Law No. (22) of 2021 stipulate the mandates and powers of the municipal council and the municipality.

19. Cooperatives (formerly known as cooperative societies) are governed by the Cooperatives Law No. (13) of 2025, whereas charitable associations/societies are governed by the Law of Societies and its Amendments No. (51) of 2008.

## 9. Financing and Implementation Pathways

### Available Funding Sources

| Source                                              | Details                                                | Expected Allocations                      |
|-----------------------------------------------------|--------------------------------------------------------|-------------------------------------------|
| <b>Governorate Budget</b>                           | Annual investment project allocations                  | JOD for water 900,000 harvesting projects |
| <b>Development and Employment Fund</b>              | Concessional loans for youth and productive households | Up to 75,000 JOD per project              |
| <b>Agricultural Credit Corporation</b>              | Loans for farmers and livestock breeders               | According to the feasibility study        |
| <b>Relevant International Organizations Program</b> | Technical and financial support for water projects     | According to annual agreements            |
| <b>Royal Initiatives</b>                            | Supporting housing for underprivileged families        | JOD 500,000                               |
| <b>Private Sector</b>                               | Investment partnerships in water projects              | According to investment opportunities     |

### Concessional Lending and Financing Windows



Development and Employment Fund: Provides loans up to 75,000 JOD for small and medium enterprises, at reduced interest rates and with grace periods of up to one year, which can be utilized to construct domestic water tanks or small agricultural projects.<sup>20</sup>



Agricultural Credit Corporation: Provides loans to farmers and livestock breeders to finance well drilling, purchase production inputs, construct greenhouses, and expand existing agricultural projects.<sup>21</sup>



Cooperatives: Cooperatives can obtain funding from the (Cooperative Development Fund) to implement collective water harvesting projects that serve their members.

20. According to Article (4) of the Development and Employment Fund Law No. (33) of 1992 and its Amendments, the Development and Employment Fund aims to: “empower individuals, households, and poor, low-income, or unemployed groups to engage in labor and production, thereby contributing to combating poverty and unemployment.” To this end, Article (5) of said Law stipulates that “in order to achieve the objectives set forth in Article (4) of this Law, the Fund shall contribute to the following: A. Providing the necessary financing, either directly or indirectly, to individuals, households, and groups among the beneficiary categories under concessional terms.”

21. According to Article (5) of the Agricultural Credit Corporation Law No. (12) of 1963 and its Amendments, “the Corporation aims to contribute to supporting, developing, and advancing agriculture in the Kingdom, enhancing productive efficiency in the agricultural sector, and increasing and improving production. To this end, the Corporation shall undertake the following:

A. Granting loans of various types and terms for various agricultural purposes within the general framework of the Kingdom’s development plans.”

### Implementation Timeline

| Phase                  | Main Activities                                                                      | Expected Duration |
|------------------------|--------------------------------------------------------------------------------------|-------------------|
| Preparation            | Preparing technical studies, identifying locations, preparing tender documents       | months 2          |
| Floating and Awarding  | Floating tenders, awarding to contractors, signing contracts                         | month 1           |
| Execution              | Executing earthen catchment basins (Hafirs) and tank projects, technical supervision | months 7          |
| Handover and Operation | Handing over projects, training beneficiaries, starting operation                    | months 2          |

### Public-Private Partnership (PPP)

The Public-Private Partnership Projects Law No. (19) of 2023<sup>22</sup> can be utilized in Tafilah Governorate as a strategic tool to enhance water harvesting by transforming innovative ideas into sustainable investment projects, through the following mechanisms:

#### 1. Submission of Direct Project Proposals (Unsolicited Proposals)

The law allows the private sector (companies or cooperatives) to directly present ideas for water harvesting projects to government entities (such as the Ministry of Agriculture, the Water Authority, or municipalities), provided that they include innovation in design or management and are not previously listed in the government project registry. Article (15) of the law stipulates that: “A- Any private sector entity may directly present a partnership project idea to the Ministry or the government entity in accordance with the conditions specified in the regulation issued pursuant to the provisions of this Law. B- If the project submitted in accordance with the provisions of paragraph (A) of this Article is qualified, it shall be registered as a partnership project in the registry, and its implementation shall proceed in accordance with the provisions of this Law; the rights and privileges of the proposer shall be determined according to the provisions of the regulation issued pursuant to the provisions of this Law.” As an example: smart water harvesting systems can be developed in rugged mountainous areas to utilize surface runoff water for watering olive groves.

22. The Public-Private Partnership Projects Law No. (19) of 2023 was published in the Official Gazette, Issue No. 5874 on page 3616, dated August 2023 ,13.



## 2. Partnership and Investment Models (BOOT)

The law permits the use of contractual models such as “Build, Operate, Own, Transfer” (BOOT), where the investor finances, constructs, and operates water harvesting facilities for a specified period (up to 35 years) before transferring their ownership to the state. Article (16) of the law stipulates that: “Partnership contracts shall be for a specified duration based on the feasibility report and the requirements of each project, provided that this duration does not exceed (35) years.” Fields of application can include constructing earthen catchment basins (Hafirs) or small dams (such as Abu Khashaibeh Dam or Tannur Dam) and equipping them with solar energy pumps and modern irrigation networks.

## 3. Enhancing Domestic and Institutional Water Harvesting

The private sector can enter into partnerships to implement water harvesting systems from the rooftops of houses and public buildings in Tafilah, within climate change adaptation plans supported by international bodies such as the United Nations Development Programme (UNDP). The gains in this scenario include reducing domestic water consumption and providing a supplementary irrigation source for small-scale agriculture.

## 10. Expected Outcomes

-  Providing an additional storage capacity of no less than 100,000 cubic meters of water annually through earthen catchment basins (Hafirs) and tanks.
-  Reducing water purchase expenses for households by 20–30% annually (equivalent to 200–500 JOD per beneficiary household).
-  Expanding planted areas by 15%, and increasing the productivity of existing lands by 10–20% as a result of the availability of irrigation water.
-  Providing 100–150 direct job opportunities during the construction phase, and 50–70 permanent job opportunities in the maintenance and management of earthen catchment basins (Hafirs) and related agricultural projects.
-  Reducing water purchase expenses for livestock breeders by 30–40%, contributing to the sustainability of more than 193,000 heads of livestock.
-  Reducing migration motives from peripheral areas by an expected rate of 10–15% within 3 years.
-  Alleviating domestic burdens on women, and providing opportunities for economic participation, through the development of projects for home agricultural production.

## 11. Recommendations

Based on the analysis above, we recommend that governmental, local, and donor entities undertake the following:

### Technical and Executive Recommendations



Accelerating the implementation of water harvesting projects by activating the budgeted projects within the Strategic Plan (2023–2027) valued at 900,000 JOD, with a focus on areas most affected by drought.



Preparing detailed technical studies for each project, including costs, technical solutions, implementing entities, and timelines.



Selecting sites according to scientific criteria, giving priority to areas with a high density of livestock and close proximity to surface runoff paths.



Using insulating materials to reduce water leakage from earthen catchment basins (Hafirs), and applying modern irrigation systems (drip irrigation) in agricultural projects linked to water harvesting.

### Financial Recommendations



Allocating stable annual provisions for the budgets of the Governorate Council, the Directorate of Agriculture, and the Directorate of Water for water harvesting projects.



Activating concessional lending windows by facilitating procedures to obtain loans from the Development and Employment Fund and the Agricultural Credit Corporation, and increasing awareness of these windows among youth and farmers.



Attracting international funding from European Union organizations and the Food and Agriculture Organization (FAO), and exploring new financing opportunities.



Utilizing the Public-Private Partnership Projects Law No. (19) of 2023 in Tafilah Governorate as a strategic tool to enhance water harvesting by transforming innovative ideas into sustainable investment projects.

### Community and Institutional Recommendations



Implementing awareness campaigns on the importance of water harvesting and water consumption rationalization, and training farmers on modern irrigation techniques.



Training the cadres of municipalities and the Directorate of Agriculture on techniques for designing, executing, and maintaining water harvesting projects.

### Comprehensive Recommendations



Allocating a portion of the hydroponics budget (800,000 JOD) for projects linked to water harvesting, especially in the Tannur Dam area.



Accelerating the implementation of the agricultural land reclamation project (600,000 JOD) and allocating these lands to job-seeking youth, while equipping them with water harvesting systems.



Implementing the poor rural families support project (1 million JOD) to finance small-scale projects linked to water harvesting, such as poultry rearing and domestic food industries.



Benefiting from tourism sites close to water harvesting projects (such as Tannur Dam and Dana Reserve) to promote eco-tourism and rural tourism.







