Regional Scalability Plan – Case study 15

Tzipori river restoration IL

The national restoration project of Tzipori stream

Imprint

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Content

1 For the reader

The national restoration project of Tzipori stream

How we got here

The Kishon Rivers and Drainage Authority is a statutory entity that is responsible for stream restoration and reducing flood risks in the Kishon watershed. The Kishon river is one of the largest coastal rivers in Israel and is located in the northern Part of the country. The Tzipori stream is a tributary of the Kishon river, And because of its many unique qualities, was selected to be target of a national restoration project.

The Tzipori Stream Restoration Project is dedicated to revitalizing the natural environment surrounding the Tzipori Stream in Israel. This initiative aims to restore and preserve the stream's ecosystem, enhancing biodiversity and water quality through sustainable management practices. By collaborating with local communities and environmental organizations, the project seeks to protect the stream's cultural and ecological significance while promoting recreational opportunities and educational programs for visitors and residents alike. Through these efforts, the Tzipori Stream Restoration Project strives to ensure the stream's health and beauty for future generations to enjoy.

1) The plan includes a brief introduction from the Tzipori watershed rehabilitation master plan and summarizes the action plan for the years 2023-2026.

2) The main goal of the Tzipori stream rehabilitation plan is to restore and enhance the ecological health, water quality, and natural landscape of the Tzipori stream and its surroundings. The current regional scalability plan is intended to present the vision for the future of the area to local communities, regional stakeholders, including local municipalities NGO's and governmental authorities, such as the ministry of agriculture, the ministry of environmental protection and the Nature and Parks Authority.

3) This document is a product of a joint effort between the Kishion Drainage Authority, The Steinhardt Natural History Museum in Tel Aviv University and 'AGMA' a national non-profit organisation for the dissemination of professional knowledge in stream rehabilitation.

4) The Regional Scalability Plan (RSP) offers significant advantages to various stakeholders. Government actors benefit from a structured framework that enhances efficiency in managing environmental restoration, improving coordination and regulatory compliance. Local community members stand to gain through enhanced quality of life and increased resilience to climate change, as the plan integrates climate adaptation strategies and promotes strong community involvement. Economic actors, including local farmers and service providers, could profit from sustainable natural resource management, reducing risks and fostering a stable business environment. Furthermore, the plan's dedication to sustainable development attracts investment, stimulating economic growth. Educationally, the plan creates opportunities for research, learning, and community education programs focused on environmental stewardship and sustainability, thereby cultivating a knowledgeable and engaged population.

2 Focus of the RSP

2.1 Regional characteristics

The Tzipori Stream, also known as Wadi Al-Malik in Arabic, is situated in northern Israel's Lower Galilee region, characterized by a Mediterranean climate. Spanning approximately 32 km, the river flows east to west from the Nazareth Mountains (at 430 meters above sea level) to the Bay of Haifa (at sea level), where it merges with the Kishon River just before it empties into the Mediterranean Sea. Encompassing about 300 square kilometers, the Tzipori watershed is the largest sub-basin of the Kishon watershed.

Throughout history, the Tzipori basin has been a hub for various cultures and settlements, owing to its abundant water supply and fertile agricultural terrain. Presently, the region encompasses agricultural fields, residential areas, and forests connecting the cities of Nazareth and Haifa. The basin forms a di-verse tapestry of communities, housing Christian and Muslim Arabs, Bedouins, secular and ultra-Orthodox Jews, and Druze. This cultural diversity is mirrored in a range of settlements, from bustling urban centers and towns to communal agricultural communities like kibbutzim and moshavim, as well as picturesque villages.

Ecologically, the Tzipori Basin and stream serve as a crucial national corridor, connecting the Sea of Galilee to the Mediterranean Sea and supporting diverse aquatic and terrestrial wildlife. The stream's unique wetland habitats are of significant ecological importance, hosting a wide array of wetland species, including several endangered plants, amphibians, and invertebrates.

However, the region faces numerous challenges due to its relatively dense population. Major issues include severe pollution from raw and treated sewage, agricultural runoff, and livestock effluents; significant development plans that will increase population density, particularly near the stream's sources; private land ownership complicating planning and implementation; hydrobiological barriers; heavy livestock grazing; modern agricultural practices causing soil erosion and pollution from fertilizers and pesticides; water abstraction from the stream; invasive plant species; and various social complexities. Additionally, there is an ongoing need to mitigate flood risks in the Haifa metropolitan area.

2.2 Justification for the region

The Tzipori stream rehabilitation project won a national contest for its outstanding efforts in ecological restoration and sustainable development. The project plan effectively restores the natural ecosystem with active involvement from local communities representing diverse cultural backgrounds. It integrates sustainable agricultural practices, promotes extensive educational and research programs, and emphasizes the stream's role as a vital ecological corridor. The project employs innovative environmental management techniques and comprehensive watershed planning to tackle complex social and environmental challenges. As a result, the Tzipori stream project emerges as a pioneering model for future river ecological restoration initiatives.

Originally, the master plan was intended to encompass the entire Tzipori basin, which coincides with the jurisdiction of the local drainage authority. However, as the plan was being developed, adjustments were made to narrow the scope based on budgetary considerations and projected timelines. The new boundaries were selected primarily based on geographical and hydrological factors, focusing specifically on the area immediately surrounding the Tzipori Stream, defined by its visible basin boundaries.

Each discipline involved in the planning process then refined the specific areas they required within these catchment boundaries to gather information on the current situation and to aid in future planning endeavors.

During the planning phase, many proposals were initially drafted on a larger scale than the project's budget framework allowed, as per the winning competition budgets. Consequently, a prioritization process was undertaken for the final action plan, integrating thematic and spatial considerations. This year-long process involved consultations with the public, local government leaders, ministries, experts, and other stakeholders.

The prioritization process identified core values that guided the selection of key action areas from a river basin perspective. These values include ensuring the health of the river through water quality improvements and ecological restoration, fostering shared spaces and local identity, balancing development with the preservation of natural river systems, boosting the local economy, and serving as a model for sustainable practices.

The action plan includes environmental projects focusing on ecological restoration and water resource management in the stream, as well as initiatives addressing riparian agriculture. Social projects aim to strengthen community bonds, enhance local identity, create shared spaces, and support the local economy. Spatial management initiatives tackle conflict resolution and waste management challenges, while infrastructure projects aim to improve branding, design coherence, knowledge retention, and enhance the professionalism of the drainage and stream authority.

2.3 Linkages and synergies with other initiatives

The Zippori Stream Rehabilitation Project, being a flagship project with high potential for impact, connects to numerous processes underway in Israel concerning stream rehabilitation. Approximately four years ago, the Agama Knowledge Center for Stream Rehabilitation was established, responsible for collecting, creating, and disseminating knowledge to professionals and the general public on the subjects of stream restoration and aquatic habitats. Agama partners in the Zippori Stream rehabilitation project and contributes to the development of professional knowledge based on processes in the stream environment, including the development of models for work and research. Through their responsibility, Agama makes evolving information accessible to a variety of stakeholders and professionals throughout Israel.

Additionally, academic collaborations are underway, including significant partnerships Tel Aviv University. Among other initiatives, a "Citizen Science" project is conducted in partnership with the University of Haifa and the Technion, and processes for training leaders and educators with the Oranim College.

in these days, a partnership is being forged with another project for the rehabilitation of another costal river- the Yarkon river, which shares similar characteristics to the Zippori Stream Rehabilitation Project and can yield valuable insights for all partners.

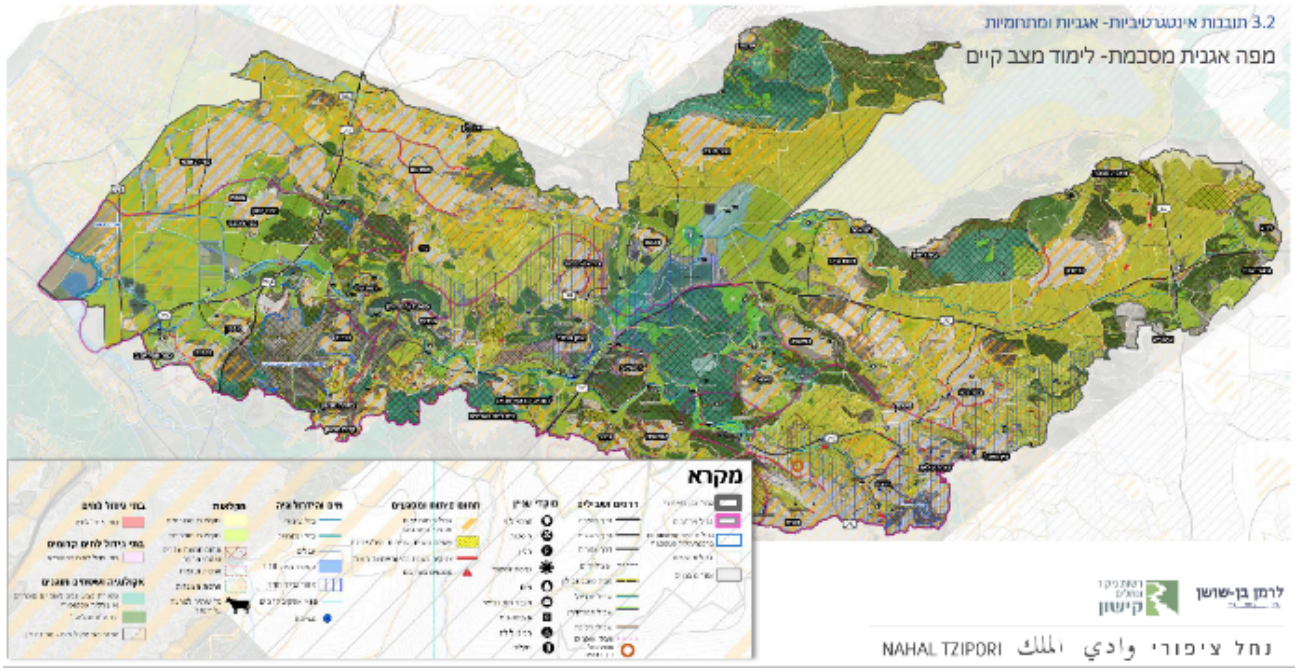
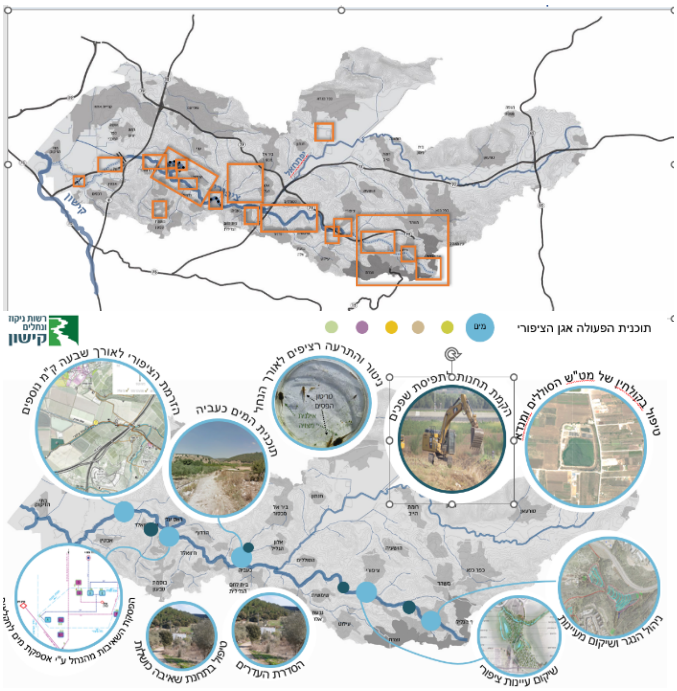


Figure 1: Map summarizing the pre-project surveys



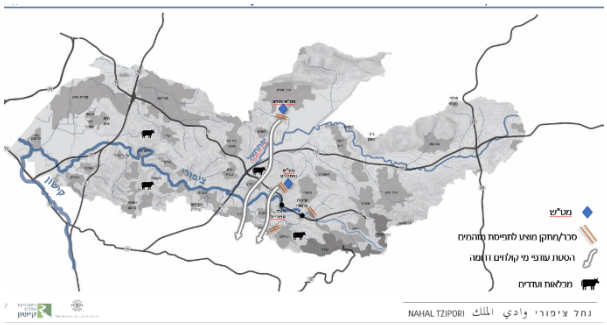


Figure 2: Map showing areas for major restoration and infrastructure projects

Figure 3: Map showing main measures to improve water quality and quantity

Figure 4: Map showing planned pedestrian paths including accessibility projects

Figure 5: Map showing expected situation of herds and effluent discharge by 2026

3 Stakeholders of the RSP

3.1 Main stakeholders

The project engages various stakeholders according to specific activities, focusing on fostering a broad partnership among relevant parties. These include government ministries such as Environmental Protection, Agriculture, Tourism, and the Water Authority, along with the Nature and Parks Authority, JNF (Jewish National Fund), local authorities within the catchment area, drainage and river authorities, as well as NGOs and civil society organizations (see Table 1).

Figure 6. A tour of the Tzipori Stream accompanied by representatives from the Water Authority and the Ministry of Environmental Protection.

Figure 7. A tour of the Tzipori Stream accompanied by representatives from the Jewish National Fund (JNF).

Today, the partnership with stakeholders operates around formal existing frameworks such as a support team composed of central stakeholders (about 30 participants) meeting monthly, and a watershed partnership involving all stakeholders meeting semi-annually (about 80 participants).

As is shown in the stakeholder mapping, among our current partners are representatives of almost all local authorities in the watershed and citizen representatives of villages that are part of two regional councils in the watershed. We see local authorities and community representatives as key stakeholders in creating sustainability within various processes in the basin. As part of the project, we focus on building capacities within local authorities to collaborate on environmental issues, mobilizing stakeholders from government offices and civil society organizations, securing budgets, and creating platforms for thinking, planning, and action based on partnerships in the basin. As part of the project team, a project coordinator was recruited to work with local authorities, promote cooperation with them, and develop capabilities and a sense of readiness to tackle challenges in the area. We aim to establish an administration that will manage the outcomes of the restoration over time, led by local authorities and community leaders.

In addition to building capacities within local authorities and civil society, we continue establishing collaborations in various operational domains with different stakeholders. The more we know the relevant stakeholders and connect them to the project via common goals, we can progressively expand the circle of partners, thereby enhancing project sustainability and operational capabilities.

For example, in the field of citizen science, a partnership was formed including government offices like the Ministry of Environmental Protection and the Ministry of Education, local authorities, representatives from

schools, residents, and academic institutions leading the project. As work processes advance, we aim to transition project leadership to schools and local authorities with support from other partners.

In the realm of local economic development, we collaborate with local authorities, NGOs, and other partners to create enduring infrastructures for joint action over time. This includes shared websites, joint marketing, and connecting the story of the watershed restoration with various narratives in the area. Future physical developments of trails, entrances, and parks will support joint activities focused on tourism and recreation in the Tzipori watershed.

Table 1. Stakeholder mapping

Name of stakeholder	Acronym	Sector	Involvement status	Scale (Level)	Ownership	WebLink
Ministry of Environmental Protection	MoEP	Governmental	Already involved	National	Governmental	https://www.gov.il/en/departments/ministry_of_environmental_protection/govil-landing-page
Ministry of Agriculture and Rural Development	MoARD	Governmental	Already involved	National	Governmental	https://www.gov.il/en/departments/ministry_of_agriculture_and_rural_development/govil-landing-page
Ministry of Social Equality	MoSE	Governmental	To be invited	National	Governmental	https://www.gov.il/en/services/department/90fba09e-a331-4c19-a6d3-8301993f382e?unitId=&topicId=&rnd=704357921
Keren Kayemeth LeIsrael-Jewish National Fund	KKL/JNF	Forestry	Already involved	National	Private (Commercial, investor, etc)	https://www.kkl-jnf.org/
Israel Nature and Parks Authority	NnPA	Nature protection	Already involved	National	Public	https://en.parks.org.il/
Kishon Rivers and Drainage Authority	KRDA	Water resources	Already involved	Catchment	Public	https://kishon.org.il/kishon-river-authority/
The Society of Protection of Nature in Israel	SPNI	Nature protection	Already involved	National	NGO	https://natureisrael.org/
The Water Authority	WA	Governmental	Already involved	National	Governmental	https://www.gov.il/en/departments/water_authority/govil-landing-page
Israel Antiquities Authority	IAA	other	Already involved	National	Governmental	https://www.antiquities.org.il/default_en.aspx
Tzipori settlement		Citizen representatives	Already involved	Municipal	Public	https://www.zippori.org/objDoc.asp?PID=43589&OID=1042689
Ilut settlement		Municipalities	To be invited	Municipal	Public	https://ilut.muni.il/he/Home/Index
Hoshaya settlement		Citizen representatives	Already involved	Municipal	Public	https://www.emekyizrael.org.il/190/
Mashhad settlement		Municipalities	Already involved	Municipal	Public	N.A.

Name of stakeholder	Acronym	Sector	Involvement status	Scale (Level)	Ownership	WebLink
Reine settlement		Municipalities	Already involved	Municipal	Public	N.A.
Nof HaGalil city		Municipalities	To be invited	Municipal	Public	https://www.nof-hagalil.muni.il/483/
Zarzir settlement		Municipalities	Already involved	Municipal	Public	N.A.
HaSolelim Kibbutz		Citizen representatives	Already involved	Municipal	Public	http://www.hasolelim.org.il/
Kaabyie-Tabash-Hajajra local council		Municipalities	Already involved	Municipal	Public	https://www.kaabiyye-tabbash-hajajre.muni.il/Pages/default.aspx
Shefaamer city		Municipalities	Already involved	Municipal	Public	https://shefaram.muni.il/he/Home/Index
Jezreel Valley regional council		Municipalities	Already involved	Municipal	Public	https://www.emekyizrael.org.il/
Bir El-Maksur local council		Municipalities	Already involved	Municipal	Public	https://www.bir-elmaksur.org.il/he/
Ras Ali settlement		Citizen representatives	Already involved	Municipal	Public	https://www.zvulun.org.il/%D7%9B%D7%A4%D7%A8-%D7%A8%D7%90%D7%A1-%D7%A2%D7%9C%D7%99/
Ibtin settlement		Citizen representatives	Already involved	Municipal	Public	https://www.zvulun.org.il/%D7%90%D7%99%D7%91%D7%98%D7%99%D7%9F/
Ramat Yohanan Kibbutz		Citizen representatives	Already involved	Municipal	Public	https://www.zvulun.org.il/%D7%A8%D7%9E%D7%AA-%D7%99%D7%95%D7%97%D7%A0%D7%9F/
Zvulun regional council		Municipalities	Already involved	Municipal	Public	https://www.zvulun.org.il/
Shefa'amer farmers committee		Agriculture	Already involved	Local	NGO	N.A.

Name of stakeholder	Acronym	Sector	Involvement status	Scale (Level)	Ownership	WebLink
Safe and clean valley initiative		Citizen organization	Already involved	Regional	Community group	https://www.facebook.com/green.and.safe.eyz/
Yad hanadiv philanthropic foundation	YH	philanthropy	Already involved	National	Private (Commercial, investor, etc)	https://www.yadhanadiv.org.il/

4 Green deal goals

4.1 SMART Green Deal goals relevant for the region: primary goals

Climate related goal(s)

Objective: Managing the water and soil resources in the basin through nature-based solutions in light of climate change.

Goals: Implement nature-based solutions to regulate runoff and increase recharge upstream (Reineh area) by 12.2023

Restore at least one central tributary of the Tzipori stream in cooperation with JNF by 12.2025.

Biodiversity related goals

- Ensuring a continuous flow of water along the stream from the Tzipori springs to the Kishon in all months of the year.
- Removing barriers to the movement of water, materials, plants and animals and creating hydrological and biological continuity along the stream.
- Maintaining diverse habitats along the stream
- Increasing the variety of wet habitats outside of the river bed
- Expanding the woody stream belt for a variety of environmental benefits
- Eradicating invasive plant species along the stream.

Inclusivity goals/ Goals for local community/public participation

- Leadership development and working with activists:
  - At least 2 leadership courses/workshops of ~20 participants each year, and at least 80 residents leading at least 30 sustainable initiatives by the end of 2026.
  - Promoting social and economic entrepreneurship initiatives as part of the restoration process.
- Public participation and partnership with stakeholders in the basin:
  - Improving relations with local authorities and promoting joint activities across sectors and communities.
  - At least 10 regular participants in the various partnership meetings.
  - Environmental joint initiatives promoted by basin authorities - at least 4 initiatives in each of the regions by the end of 2026.
- Developing environmental awareness as a tool to create environmental change in the community and the education system
  - Developing an educational program including evaluation metrics and Implementation in all schools along the stream by end of 2026.
  - Increasing the number of educational institutions participating in the Tzipori basin program.

4.2 SMART Green Deals relevant for the region: secondary goals

Flood and drought goals:

- Ensuring a natural flow regime in the stream and basin according to the seasonal cycle based on natural flows originating from springs and winter floods.
- Stopping pumping and abstraction of stream water and supplying alternative water through
- conveyance systems and regional water corporations.
- Reducing flood risks and creating floodplains to help reduce flood damage risks: Creating a flood plain downstream, reducing flood risks and encouraging wetland habitats by 12.2025.

Green growth goals + circular economy:

- Tourism in the basin is developed and managed as a community of tourism communities and provides a professional and marketing support to tourism entrepreneurs, in collaboration and synergy with additional sponsoring and supporting bodies in the area:
  - Support and assistance in establishing 3 tourism communities operating jointly on a spatial and/or sectoral basis, appointing a coordinator for each community.
  - The communities will meet quarterly from 2024 as part of a guided tourism forum.
  - 100 men and women from the stream's Arab community involved in economic activities that support stream restoration, tourism and agriculture (by the end of 2026).
- Tourism supports the local economy:
  - At least 8 new tourism-economic-social-environmental initiatives in the Arab settlement area by the end of 2026, including support for marketing and promotion of the initiatives.

Minimizing planning barriers for tourism development and contributing to realizing tourism designations, to increase economic tourism opportunities throughout the river.

Health and wellbeing goals:

- Developing a system of leisure and multi-day recreation that provides an enriching and meaningful visitor experience, expressing the diversity of values and themes.
- Developing entrances to the stream that encourage visitor dispersion along the stream and enable local economic development.
- Trail systems: A system of national, regional and local trails that speak a single, clear and coherent language; a system of accessible trail sections for populations with special needs:
  - Modify the Israel Trail route in relation to the river restoration plan by 12.2024.
  - Interpretive signage of the trail system, including the installation of 'milestone' markers along the trail – until 2026.
  - Creating a continuous walking trail along the entire length of the stream (approx. 25-30 km): completion of central path by 12.2024, full completion by 2026.; create physical links between nearby settlements and the stream until 2026.

Knowledge goals:

- Managing the accumulated knowledge and experience as a basis for further river restoration processes.
- Integrating the knowledge among professional stakeholders in Israel and worldwide.
- Expanding the knowledge of the project team
- Conceptualization, demonstration and integration: Documenting processes, actions and findings that have a learning value for the professional community in Israel, with the intention of peer learning, creating a model, integrating, demonstrating and conceptualizing working methods for future projects.

Zero-pollution goals: description or modelling based estimate of (reduced) pollution

- Objective: Ensuring optimal water quality in the stream and removing pollutants. Goals:
  - Reduction of treated wastewater discharges to the stream by 50% by 12.2024, complete elimination by 2026.
  - Reducing the frequency of sewage pumping station malfunctions and sewage discharge into the stream by upgrading 3 stations by 2025 and 3 more by 2026.
  - Improved water quality by 25%, based on monitoring to be carried out in 2024, and by 75%, based on monitoring to be carried out in 2026.
  - Treatment of focal and seasonal sources of pollution (monitoring includes Organic carbon load (DOC, TOC), Oxygen demand (COD, BOD), Salinity, Conductivity, Chloride, Sulphate, Bacterial (E.coli, Enterococci)).

Sustainable food system goals :

- Making agriculture in the Tzipori Basin more environmentally friendly:
  - At least 5 physical projects to reduce soil erosion from agricultural land adjacent to the stream at high risk points, including monitoring.
  - Developing agro-ecological interface tools to manage the buffer between agriculture and the natural environment, especially wetlands, including protocols to increase biodiversity in buffer areas.
  - Initiate practical research on agro-ecological issues in the catchment area in collaboration with researchers. At least one per year and at least 5 by 12.2026.

- Minimise the environmental impact of grazing in the river channel by regulating it in a way that improves the productivity, welfare and economics of livestock owners. Including management of waste associated with the herds.
    - regulating 30% of livestock herds within 3 years and 50% within 5 years
- To implement a water program that will provide irrigation security for the basin and decrease stream and springs water usage.
- A number of smallholder farmers are returning to cultivation.
- Establishment of an agricultural partnership consisting of all relevant actors. Keeping the partners involved throughout the project and extending the partnership beyond the project.

5 From general goals to actions

5.1 From Primary goals to actions

5.1.1 Climate Goal

Managing water and land resources:

- Expanding, restoring and connecting to the flood plain segments along the stream to reduce flood risk.
- Implementing NBS above the town of Reineh for runoff reduction.
- Physical restoration of “Rimonim” wadi and recreational infrastructure (with the cooperation of the local residents and farmers).

5.1.2 Biodiversity Goal

1. Restoring water to the stream:

- Stopping diverting base flow at the ‘Maalik’ dam downstream by 06.2025
- Reduce agricultural water abstraction from the river by 50% from 06.2024 and by 80% from 12.2025, and in the middle of the river by 50% from 12.2025, and compensate the river for water abstraction that cannot be reduced by 2024.

2. Hydro-biological continuity:

- Restructuring barriers along the stream. 7 barriers will be removed or improved by 12.2024 and a further 8 by 12.2026.
- Improving the functional ecological connectivity of road crossings.

3. Structural complexity of the stream and vegetation restoration:

- Improving the structural complexity of three key sections in the stream between 2024 and 2025
- Extension of the wooded stream belt in the middle of the stream, including the planting of trees typical of the area by 12.2025 and downstream by 12.2026.
- Establish protocols for proper and environmentally responsible routine maintenance

4. Wetland habitats:

- Restoration of upstream springs by 12.2025; Restoration of a wetland by 12.2024; R Restoration of Tzipori springs by 12.2023; Restoration of 3 winter pools by 12.2026.

5. Comprehensive treatment of invasive species along the river by 12.2023 and ongoing maintenance throughout the life of the project.

5.1.3 Inclusivity goal

- Leadership development and working with activists- implementing leadership courses to participants from all the different communities in the watershed, Continuing work with training participants on promoting initiatives, connecting to processes in the region, and strengthening the formation of a network of local leaders.
- Public and stakeholder participation: annual conference; website of the project; incorporating public participation in all different processes in the watershed.
- Place making: execution of events led by project partners and activists.

5.2 From secondary goals to actions

5.2.1 Zero pollution goals

Objective: Ensuring optimal water quality in the stream and removing pollutants.

Main actions:

- Upgrading 2 wastewater treatment facilities and diverting the excess pipes to a reservoir in adjacent basin for agricultural use.
- Upgrading at least 3 sewage pumping stations in the basin, in collaboration with the water and sewage cooperations.
- Construction of 3 stations to catch polluted runoff during dry season.

5.2.2 Green growth goals

- Support for 10 local tourism initiatives in 2024 and 2025; Completing one tourism course each year for 2023 and 2024 with an emphasis on Arab society;
- At least one event per year aimed at strengthening local tourism operators and targeting the general public.

5.2.3 Flood and drought goals

- Create a functioning floodplain downstream the Tzipori river in an area of about 10 hectares

5.2.4 Health and Wellbeing goal

- Creating defined roads and trails to separate users (traffic, pedestrians, agriculture machinery, etc.), Completion of trails along the stream and from the settlements to the stream.
- Adjusting trails for accessibility purposes.

5.2.5 Sustainable food system goals

- Making agriculture in the Tzipori Basin more environmentally friendly:
  - Development of 10 protocols for agro-ecological management (with financial support) by 12.2023 and integration of 5 of the protocols into the financial support procedure of the Ministry of Agriculture by 2026.
  - Establishment and implementation of protocols by farmers -150 dunams each year until 2026.
  - Implementation of runoff treatment facilities in 3 areas of intensive agriculture (100 dunams and more) by 2026, including monitoring. Reduce pesticide concentrations in the main-stream by about 40% by 12.2026.
  - integration of innovative cultivation and treatment methods through a professional course
- Irrigation security and reduction of stream water use: Connecting a water pipeline to a number of points downstream (system water, not stream water - to be connected to flood reservoirs in a second phase) and connecting commercial consumers to the pipeline; receiving water allocation for smallholder farmers and herds from the government authority; Connecting an additional water pipeline in the center of the stream (system water, not stream water); providing technical and financial support for transitioning to pipeline irrigation

5.3 Other Actions towards primary/secondary goal

- Water quality: Upgrading sewage treatment facilities and treated wastewater reservoirs in the stream's basin to stop sewage and treated wastewater from flowing into the stream; upgrading sewage pumping stations and adding facilities for eliminate pollution from seasonal runoff.
- Water quantity: Connecting farmers to the water system pipelines (desalinated or reservoir water) to stop drawing water from the stream; removing a dam downstream and moving the reservoirs a few kilometres downstream for flow continuity (implementation conditioned on external factors).
- Ecology: Many physical actions of geomorphological restoration of the stream (structural complexity, expanding and restoring stream banks, etc.); restoring riparian vegetation and creating buffer zones; planning and proprietary actions to make room for the stream and expand the area for restoration actions; actions to remove major waste barriers that block and interfere with the stream's path; removing barriers along the stream (including bridge and road crossings) to create hydrobiological continuity; restoring wetland habitats and floodplains and restoring some of the stream's tributaries; eradicating invasive species along the stream.
- Collaboration with farmers (through financial support) to create environment- and ecology- supporting strips in agricultural fields near the stream (buffer zones, sowing plants that increase biodiversity, service crops to prevent soil erosion, and more).
- Actions to physically remove livestock from the stream.
- Land management and maintenance and landscape development actions: Creating walking and cycling trail systems along the stream, between settlements to the stream and accessible trails; Creating a signage, information and recreation infrastructure system; Creating entrances (parking lots) to disperse visitors along the stream and relieve pressure on the local ecology at popular spots along the stream; Creating physical barriers to prevent vehicle entry to the sides of the stream; Infrastructure actions to separate road/ trail users; Clean-up actions of major waste nuisances.
- A mobile physical structure is planned for community activities in the stream area.

Restoration actions: actions planned along the Tzipori stream:

- Water quality: Upgrading sewage treatment facilities and treated wastewater reservoirs in the stream's basin to stop sewage and treated wastewater from flowing into the stream; upgrading sewage pumping stations and adding facilities for eliminate pollution from seasonal runoff.
- Water quantity: Connecting farmers to the water system pipelines (desalinated or reservoir water) to stop drawing water from the stream; removing a dam downstream and moving the reservoirs a few kilometres downstream for flow continuity (implementation conditioned on external factors).
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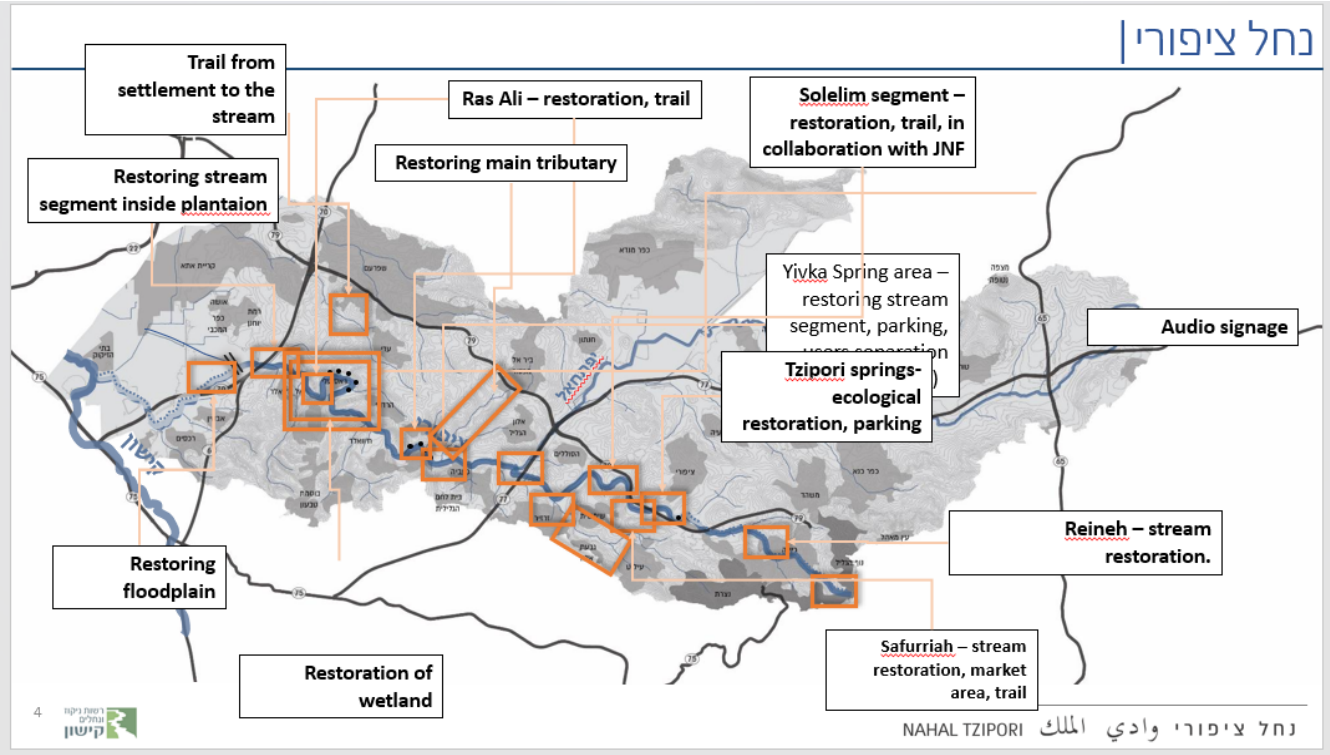

Figure 8. Technical-physical conservation measures that were carried out or will be executed in the coming years:

Actions that build institutional Partnerships:

- The Tzipori Restoration Project works with many agencies and stakeholders, and is constantly working to expand the circle of stakeholders in the project, as well as pooling budgets from a variety of agencies. These include: government ministries (Environmental Protection, Agriculture, Tourism, Water Authority); Nature and Parks Authority; JNF; local authorities in the watershed; drainage and river authorities; NGOs and civil society.

- The project has an accompanying team - a multi-stakeholder partnership that acts as a forum for consultation and discussion on a range of issues. There is also a broad basin stakeholder partnership and several regional partnerships. A coordinator has recently been appointed to strengthen cooperation with local authorities in the Arab sector of the river basin.
- The project has several studies that have been and will be carried out, mainly in an agri-environmental context. In addition, many of the team members and consultants in the project are researchers or associated with institutional organizations, strategic work on stream restoration and more, creating another circle of connections and ties.
- In addition to the above, the project is defined as a demonstration project and is accompanied by the Streams and Drainage Basins Knowledge Centre ('Agma'), which provides the framework for demonstrating and integrating the lessons learned from the Tzipori project into the professional community in Israel. This will include webinars, co-learning meetings, knowledge and information transfer, facilitating connections between people, tours and more.

Public Participation actions:

- The restoration project includes the implementation of a very extensive and diverse community, educational and tourism programs. The emphasis in all of them is on local identity and identification with the stream and basin while taking responsibility by the basin residents for their environment and community: to create sharing and partnership with the stream communities, to strengthen the connection between and within communities, to expand and empower community leadership in the stream basin, to create a sense of connection and identification with the place and stream, to strengthen feelings of belonging to the community and place, to empower communities in the Arab sector in the stream basin, to increase environmental awareness and knowledge, to increase local livelihoods through sustainable local tourism, to try to encourage small agriculture, to increase personal and community resilience.
- The community process is based on a method of transferring responsibility for the environment and community from KDSA and partners to the community itself over the years of the project - by creating strong local leadership and providing tools for residents and tourists in the basin. This process is integrated with comprehensive educational work with various populations across age groups. One activity is the creation of a citizen science system, in collaboration with several researchers and the project's ecology team.
- As part of the project last year, a survey was conducted among the Tzipori stream community to choose a logo for the restoration project. In the coming year, a website is planned to be created that will be used to communicate with the community and for tourism in the basin, as well as complementary activity on social networks and through a newsletter.

Monitoring actions:

The Tzipori restoration is considered the first project of full river restoration. Past projects were focused on specific river/ stream segments, and many times these investments went down the drain, since ex-territorial pollution sources were not included in the planning.

- The Tzipori is a holistic plan, which is an opportunity for a more cost-effective and sustainable plan.
- Cost-effectiveness of the plan were not yet examined.

Funding actions:

The project is supported by the Yad Hanadiv Foundation in the form of matching funding. Most of the complimentary budget comes from governmental funding, but there is also pooling of budgets and cooperation with various stakeholders (JNF, Water Authority and more) as well as financing from KRDA's internal budget.

5.4 Responsible stakeholders and their roles

	Stakeholders			
Actions	**Implementation of restoration actions**	**Manage and coordinate the RSP action**	**Funding the RSP actions**	**Monitoring**
Managing water and land resources	KRDA, KKL, local authorities	KRDA,KKL, local authorities	MoARD, MoEP,YH	KRDA
Restoring water to the stream	WA, KRDA	WA, KRDA	WA,YH	MoEP
Hydro-biological continuity	KRDA	KRDA	YH	KRDA, SMNH-TAU
Structural complexity of the stream and vegetation restoration	KRDA, KKL, NnPA	KRDA,KKL	YH, KKL, MoEP	KKL, SMNH-TAU
Wetland habitats	KRDA, KKL, NnPA	KRDA, KKL	YH,KKL, MoEP	NnPA, SMNH-TAU
Comprehensive treatment of invasive species	KRDA KKL NnPA	KRDA KKL	YH KKL MoEP	KKL NnPA
Leadership development and working with activists	KRDA KKL local authorities SPNI	KRDA	YH KKL local authorities	KRDA local authorities
Public and stakeholder participation	KRDA local authorities SPNI	KRDA	YH KKL local authorities KRDA	KRDA local authorities AGMA
Place making	KRDA local authorities SPNI	KRDA	YH KKL local authorities KRDA	KRDA local authorities

Actions	Implementation of restoration actions	Manage and coordinate the RSP action	Funding the RSP actions	Monitoring
Ensuring optimal water quality in the stream and removing pollutants	WA	KRDA	YH WA	WA MoEP
Support and strengthen local tourism	KRDA Local authorities	KRDA Local authorities	MoSE YH Local authorities	KRDA Local authorities
Creating defined roads and trails to separate users, Completion of trails along the stream and from the settlements to the stream, Adjusting trails for accessibility purposes.	KRDA Local authorities	KRDA Local authorities	YH Local authorities KRDA	Local authorities
Making agriculture in the Tzipori Basin more environmentally friendly	MoARD KRDA	KRDA	MoARD YH	MoARD

6 Timeline

This demonstration project with Yad Hanadiv fund is planned for the years 2023-2026. Now days the project management is working on an economic plan for the continuation of the project and stream restoration. Once an annual operating and maintenance cost estimate is available for the restored stream, a financing plan can be developed based on it. This plan would involve the participation of regional stakeholders who would be members of the management board, as well as the creation of an infrastructure for potential revenue generation from tourism activities in the stream.

7 Opportunities for financial implementation

This project rose as an opportunity through a set budget by the Yad Hanadiv and other sources. Thus, the costs associated with the project are intertwined and based on the available budget.

The full investment budget for the RSP until 2026 is 20 Million Euro from Yad Hanadiv and 20 Million Euro from all other sources (governmental, municipal, philanthropic etc). Therefore, the total budget at this time stands on 40 million Euro.

This allows us to plan according to the limitations of the set budget. This can be limiting when attempting to create a long-term scale for the project. However, future adjustments or an increase in the budget may happen and allow more flexibility as the years pass.

8 Uncertainties and assumptions/ boundary conditions

- Continuation of budgets - most of the budgets are yearly (government funds) and there is a lot of uncertainty, especially in light of the situation in Israel these days
- How to continue to maintain the project (and monitor over time) - who are the partners? Where do the budgets come from? What is needed to succeed in maintenance? The economic assessment of the projected annual operating and maintenance (O&M) costs for a restored stream which is being built nowadays. will serve as a crucial foundation for developing a comprehensive management plan and securing sustainable funding.
- How to continue the collaborations with the communities and with the stakeholders in an optimal way.
- Statutory and planning limitations and barriers that make it difficult to implement various actions (private areas, lack of enforcement by the authorities, lack of cooperation by certain authorities, problematic programs).
- Regulatory and bureaucratic limitations that make it difficult to implement actions and the implementation of the vision (lack of enforcement powers, etc.).