



Terms of Reference for Service

Title: Establishing Green-Soilless Demo sites and Smart-Efficient Irrigation Systems.

Background

Project Reference: P04780, Donor reference: AVRO-00093

About IUCN

IUCN is a membership Union uniquely composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together.

Created in 1948, IUCN is now the world's largest and most diverse environmental network, harnessing the knowledge, resources and reach of more than 1,400 Member organisations and around 15,000 experts. It is a leading provider of conservation data, assessments and analysis. Its broad membership enables IUCN to fill the role of incubator and trusted repository of best practices, tools and international standards.

IUCN provides a neutral space in which diverse stakeholders including governments, NGOs, scientists, businesses, local communities, indigenous peoples' organisations and others can work together to forge and implement solutions to environmental challenges and achieve sustainable development.

Working with many partners and supporters, IUCN implements a large and diverse portfolio of conservation projects worldwide. Combining the latest science with the traditional knowledge of local communities, these projects work to reverse habitat loss, restore ecosystems and improve people's well-being.

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About Basra - Iraq

Al-Basra is an Iraqi city; it is located near the confluence of the Tigris and Euphrates about 130 km from the Arab Gulf. Thus, it is in the northern hemisphere, in the warm temperate zone. Rainfall in Al-Basra does not exceed 100 mm per year.

Basra is the city centre. Al-Basra is the second-largest province in Iraq in terms of population. It is bordered by Kuwait and Saudi Arabia to the south, and Iran to the east, and shares local boundaries with Dhi-Qar and Maysan provinces to the north. Area: 19.070 km² Population: around 4 million. The Basra is about 8 feet (2.4 m) above sea level. It is characterized by its important geographical location, where it is Iraq's main gateway, from the south to various world countries. It represents a meeting point between Shatt al-Arab and the Arab Gulf, where all roads come together in southern Iraq.

The Basra is one of the southernmost areas greatly impacted by climate change. Basra's primary water supply has become extremely contaminated, suffering from excessive salinity, organic loading, and algal overgrowth due to mismanagement of water resources and unlawful dumping of human, agricultural, and industrial waste in rivers. This issue, compounded with water shortages from upstream damming, has made water unfit for human consumption, affecting the security of over 4 million.

About the Project

Iraq is considered the 5th most vulnerable country to the effects of climate change. The impacts of climate change are already becoming unprecedented as Iraq endures one of its driest seasons in almost half a century. Such impacts include an alarming rise in temperatures, changes to rainfall patterns, greater occurrences of drought and desertification, worsening water and soil salinity, and a rise in dust storms. According to studies, Iraq has seen a 0.5°C increase in temperature per decade as average temperatures are projected to rise by 2°C by 2050, with high emission scenarios showing a 5°C increase in mean temperature by the end of the century. Precipitation levels are expected to fall by nearly 9%, and per capita water availability is expected to decrease severely in the coming years, with rain runoff to southern provinces decreasing by 22%.

Extreme events such as heavy rainfall and flooding will heighten in intensity, affecting southernmost cities and elevating the risk of sea levels rising and coastal areas becoming submerged, including key areas in Basra province, by 2050. Such changes have a cascading effect on people's livelihoods, health, and vital ecosystems and habitats. Wetlands, such as the UNESCO World Heritage Site Mesopotamian Marshes, have been badly harmed, with a substantial decline in their area and biodiversity. This has not only resulted in the relocation of indigenous populations but has also put some native species at risk.

Water scarcity is one of the most pressing issues in Iraq. Due to declining rainfall and upstream damming from neighbouring countries such as Turkey and Iran, Iraq is experiencing significant water shortages, affecting the agricultural sector, impacting the Iraqi economy and population's livelihoods and adding to the community displacement problem. Estimates reveal that more than 7 million Iraqis are now afflicted by rising drought, and nearly 2 million people are affected by food insecurities.

Responding to these challenges, IUCN will deploy its expertise and knowledge in incorporating natural-based solutions (NBS) and the water-energy-food-ecosystem (WEFE) nexus approach as a possible solution for climate change issues affecting Al Basra, throughout the project of Delivering a climate change adaptation and resilience program for southern Iraq—Basra Marshes. The project is funded by the Swedish International Development Cooperation Agency (SIDA).

The overall project object is to Improving local communities' resilience and adaptive capacity to climate induced water related challenges as well as climate proofing the underlying ecosystems in the Marshes area by adopting a WEFE nexus approach and building resilient agriculture and land management practices. Accordingly, the project will work on strengthening community and ecosystem climate resilience and adaptive capacity by applying water-related nature-based solutions (NBS) throughout implementing demo site for NBSs (constructed Wetland) in Basra – Iraq. Under this project IUCN intends to implement interventions to improve the climate resilience, livelihood opportunities, and food security for the Marshes' local communities throughout the following:

Green-Soilless Farms; Implementing solar-powered soilless (smart agricultural systems) conserves and uses less water and improves farmlands' sustainability and productivity. The targeted locations suffer from water and soil salinity, thus low crop productivity and a lack of fresh water. Therefore, the soilless agriculture technique is an appropriate strategy for handling such challenges since it utilizes media other than soil (tuff, cocopeat, water, etc.), resulting in avoiding the challenge of high soil and water salinity as well as reducing water usage by looping water in a closed circle. The soilless agriculture technology offers high-yield productivity depending on the crop type since the system gives the crops the exact nutrients they require. Furthermore, soilless agriculture lowers the burden on the soil, as the soil is not exposed to fertilizers or pesticides, preserving the soil's ecology and natural qualities and reducing the likelihood that it may reach groundwater aquifers later.

Introduce efficient irrigation techniques for subsistence farmers; Innovative irrigation technologies will be introduced for smallholder subsistence farmers and breeders who can no longer rely on flood irrigation in targeted areas to increase irrigation efficiency, which currently is at most 30%. Fifteen subsistence farmers and breeders will be provided with an efficient irrigation system.

Under this tender, IUCN is seeking a contracting company have experience in the agricultural sector to establish two Green-Soilless Farms and fifteen efficient irrigation systems in selected sites in Basra, Iraq. The Soilless-Green

Farms will serve as demo sites utilizing hydroponic and aquaponic techniques to promote the Nexus approach. The efficient irrigation techniques will support the subsistence farmers (smallholders) in Basra, Iraq.

Description of the Service

This tender aims to improve the climate resilience, livelihood opportunities, and food security for the Marshes' local communities throughout followings:

1. Introduce and promote smart agriculture practices by establishing two public demonstration sites for Green-Soilless Agriculture systems to serve knowledge transformation for research centres, academic institutions, local communities, and any interested population in the Basra governorate - Iraq. These sites will be used for educational and expertise enhancement purposes that benefit the local community, and local institutions. The sites will be accessible to any interested party whether institutions or communities and will help familiarize the public and/or scientific community with the techniques used to achieve optimal water and renewable energy utilization that also maintain the ecosystem. The public demonstration sites will be established and serve as reference sites for green-soilless agriculture systems in the Basra governorate. The green-soilless agriculture sites are a multi-span greenhouse (total area of 540 m²), the first one to promote hydroponic technology and the other for aquaponic technology.
2. Introduce efficient irrigation techniques for subsistence farmers (smallholder farmers), where fifteen smallholder farmers and breeders will be provided with innovative irrigation systems (full drip irrigation system) to increase irrigation efficiency. The targeted farmers will be within geographic areas of the Basra governorate.

This tender is comprised three main phases as follows:

A. Detail design phase:

The key tasks to be undertaken to deliver this phase should be included but not limited to the following:

- Assign a team of four experts in construction, agriculture, irrigation, and renewable energy to work collaboratively on the design, supply, install, and commissioning of Green-Soilless farms and Efficient irrigation systems in full compliance with Attachment 2 the BOQ, specs, and design requirements, with IUCN oversight and guidance.
- Adhere to Attachment 2 the BOQ, specs, and design requirements that outline the design requirements and implementation standards.
- The quality of the water sources for the demo sites should be tested to be considered in designing the filtration unit and setting out the fertilizer recipe.
- The relevant expert, from the expert's team, should conduct field visits to explore and assess the targeted sites, whether efficient irrigation or green-soilless sites, and available resources and infrastructure. Consider taking advantage of the infrastructure available on the project site to benefit the PDS, if exists.
- Determining the tolerant crop varieties (seedlings) and the available sources for the selected crops considering that they should be compatible with the targeted areas conditions, highly resilient to climate change impacts, high yield productivity, and pest resistance. ...etc. considering the continuous increase in the temperature in Basra.
- Identify crop water requirements for different crops and irrigation scheduling (Green-soilless farms and efficient irrigation) then to be consider in designing of irrigation system in targeted sites.
- The filtration unit should be designed to be compatible with the available wate quality and quantity for each site (green-soilless and targeted for efficient irrigation)
- Multi-span orientation should be such that: it receives maximum sunlight in winter and prevailing winds should have the minimum effect on greenhouse structure and other operations.
- Calculate the required water, fertilizers, and pesticides for each site based on the selected crops (Green-soilless farms).

- Developing a plan for crop farming (crop calendar) with full cooperation with the IUCN team based on selected crop types and the nature of each location.
- Submission of a complete package of design for the Green-soilless demo sites and efficient irrigation systems for each site, including drawings, BOQs, specifications, and implementation methodology. Both soft (AutoCAD & PDF) and hard copies.
- During design all safety precautions and environmental regulations must be considered.
- Prior to implementation, the design package must be reviewed and approved by the IUCN.

B. Implementation phase.

The key tasks to be undertaken to deliver this phase should be included but not limited to the following:

- Must obtain the full approval from the IUCN on the design package before starting implementation.
- Provide an implementation plan within a defined time frame include needed resources, materials, equipment, site priorities etc.
- The contractor should be responsible for the required resources (e.g. personal, workers, transportation, water, electricity, etc) during implementation and the accommodation facilities for his staff and workers.
- The contractor should supply, transport, install, and commission all needed resources, equipment, and materials to implement two dem-sites (green-soilless farms), as per approved design requirements, contract documents, and specifications.
- The contractor should supply, transport, install, and commission all needed resources, equipment, and materials to implement fifteen smart irrigation systems in the targeted sites, as per approved design requirements, contract documents, and specifications.
- Provide the seedlings, fertilizer, and pesticide for the first farming cycle of the demo sites.
- The contractor will be responsible for guarding the implementation sites and materials until the final handover to the beneficiaries.
- During implementation, all safety precautions and environmental regulations must be considered and followed.

C. Commissioning phase (Training, operation and handover).

- The contractor should operate all installed systems (efficient irrigation systems and green-soilless farms) for at least one weeks to ensure that all system components are optimally functional.
- According to the installed systems, the contractor should develop and submit operational and maintenance guidelines material in Arabic and English for the entire system (including agriculture, irrigation, and renewable energy devices and components) for systems operator's use.
- Developing and conducting 3-days training courses for the installed green-soilless system. As below:

Topic	Location	# of beneficiaries	Logistic & resources arrangements	Duration & materials
Soilless agriculture; operation, maintenance, and crop management	Basra – Iraq	Not less than 20 participants	• Experts. • Suitable Venues. • Catering. (coffee break and launch) • Two events roll-ups. • Stationary. • Transportation for beneficiaries. • Equipment for practical training. • Safety equipment for Practical training	<u>Three days:</u> First day: theoretical soilless agriculture (hydroponic and aquaponic). Second day: crop management Third day: practical. (prepare materials & presentation for the three days) <u>Pre-post evaluation is required.</u>

- Conduct on-site training for the efficient irrigation system operation and maintenance for each farm's beneficiaries.
- Develop and submit a list of the spare parts and warranties for the installed systems.
- As built drawing should be drafted and submitted to IUCN for all installed systems.
- All sites targeted for irrigation efficiency should be set on one map and include real coordinates.
- Green-soilless farms (demo site) should be set on one map and include real coordinates.
- Handing over all implemented sites to the beneficiaries in accordance with approved forms.

Essential Requirements

1. Qualification of experts.

The team of experts should have the following qualifications and experiences as a minimum requirement:

1. <u>Construction manager (team leader)</u>	• University degree in civil engineering or a relevant field (master's /PhD degree is an advantage). • A minimum of 10 years of general experience in designing, installing, and commissioning different projects. • A minimum of 5 years of specific experience in agriculture field. • Proven expertise and in-depth knowledge of the field of agriculture with work experience in a similar project. • Expertise in managing the implementation of various Agri-projects that applied new agricultural practices such as soilless agriculture projects. • Advanced knowledge of English and Arabic languages. • Strong interpersonal skills and the ability to communicate with various stakeholders in politically sensitive situations with diplomacy and tact.
2. <u>Agriculture expert</u>	• University degree in agriculture or a relevant field (master's /PhD degree is an advantage). • A minimum of 10 years of general experience in designing, installing, and commissioning different agriculture projects. • A minimum of 5 years of specific experience in irrigation techniques, crop management, smart agriculture practices. • Proven expertise and in-depth knowledge of the field of agriculture with work experience in a similar project. • Expertise in designing, supervising and implementing various Agri-projects that applied new agricultural practices such as soilless agriculture projects. • Advance knowledge about crop management and irrigation networks. • Advanced knowledge of English and Arabic languages. Strong interpersonal skills and the ability to communicate with various stakeholders in politically sensitive situations with diplomacy and tact.
3. <u>Irrigation expert</u>	• University degree in irrigation or relevant field (master\PhD is an advantage). • A minimum of 10 years of experience in design and implementation of • A minimum of 5 years of specific experience in crop management, smart agriculture practices, smart irrigation systems and soilless agriculture techniques. • Proven expertise in-depth knowledge of the field of agriculture, irrigation in Jordan. • Expertise in designing, supervising and implementing various smart irrigation systems (especially systems that utilize efficient water use such as soilless agriculture, aquaponic, and drip irrigation). • Advanced knowledge of English and Arabic languages. Strong interpersonal skills and the ability to communicate with various stakeholders in politically sensitive situations with diplomacy and tact.
4. <u>Renewable energy expert</u>	• University degree in Renewable energy or relevant field (master\PhD is an advantage). • A minimum of 5 years' experience in the designing and implementation of renewable energy in Agi-projects. • Proven expertise and in-depth Knowledge of the field of renewable energy in Jordan. • Expertise in designing, supervision and implementing various Renewable energy techniques for agriculture and irrigation (including the usage of renewable energy for at least one project that adopts climate-smart agriculture such as soilless agriculture). • Advanced knowledge of English and Arabic languages. Strong interpersonal skills and the ability to communicate with various stakeholders in politically sensitive situations with diplomacy and tact.

Reporting:

During the project life, the contractor should prepare and submit monthly reports for the progress of this contract including the progress, updated work plan, challenges, etc.

Non-Iraqi contractor:

This instruction applied only for non-Iraqi bidders.

The non-Iraqi bidder should have an Iraqi partner (based in Iraq) to ensure and facilitate accessibility and implementation on the ground. The non-Iraqi bidder (winner) will sign the contract with IUCN and bear all contractual obligations and responsibilities. Furthermore, the relationship between the two partners should be documented officially and enclosed with the submitted offer. And all the Iraqi partner registration documents, reference, profile, etc should be enclosed with the offer.

Duration of the tender

The contractor should design, supply, install, and commissioning the green-soilless farms and efficient irrigation systems during the period from **01.12.2024 to 30.03.2025**.

Deliverables and Activities

The contractor should deliver the following deliverables and carry out the following activities:

Deliverable/Activity	Description	Deadline
Deliverable 1:	After field visits to the targeted sites. The contractor should develop and submit an inception report for the tender phases; including an updated work plan, updated methodology, needed resources, site plan and coordinates, etc.	15/12/2024
Deliverable 2:	Submit full design packages includes design drawing, detailed BOQ, and specs in accordance with the design phase for all interventions.	30/12/2024
Deliverable 3:	Implementing, commissioning and handing over fifteen efficient irrigation systems per the implementation and commissioning phases.	15/02/2025
Deliverable 4:	Implementing, commissioning and handing over the two dem sites (green-soilless systems) per the implementation and commissioning phases.	30/03/2025

Payment Schedule

The timetable below summarises the chronological order of deliverables and indicates milestones at which IUCN will pay the contractor.

# payment	Expected time to submit the payment	The amount of payment	Payment requirements
Payment 1;	Upon signing the agreement.	20% of corresponding total amount	• The first payment is subject to receiving a back guarantee, in the amount of the first payment, from the contractor to IUCN. • The bank guarantee will be returned to the contractor by releasing the third payment under this contract.
Payment 2;	Upon (1) submit and approve the inception report and (2) submit and approve the design packages for all sites	20% of corresponding total amount	• The second payment is subjected to obtain approval on the inception report and the design of all interventions.

Payment 3;	Upon satisfactory complete implementation of the fifteen-efficient irrigation systems.	30% of corresponding total amount	• Satisfactory completion of fifteen efficient irrigation systems
Payment 4;	Upon (1) complete satisfactory implementation of the two green-soilless farms. (2) deliver the training course and on-site training.	30% of corresponding total amount	• Satisfactory completion of two dem sites (green-soilless sites). • Deliver 3-days training course on soilless technology. • Deliver the on-site training for the farmers (irrigation systems). • Handover all implemented sites.

Supervision and coordination

The consultant will report to and work under the supervision of (IUCN team).