**On-the-Job Training Plan for Palestine and Jordan**

**Irrigation Groundwater Assessment (IGwA)** **and WaPOR integration in NWIS**

**Content**: This on-the-job training focuses on enhancing the technical skills required to integrate WaPOR Level 2 data in the National Water Information System (NWIS) and evaluate groundwater dynamics using FAO’s WaPOR Level 3 data for both Palestine and Jordan. The training will cover:

* **Introduction to WaPOR data and python programming**: Training participants to use WaPOR data to map key water indicators such as precipitation, evapotranspiration, and land productivity on a seasonal basis for individual fields, using python programming.
* **Data Validation and Analysis**: Participants will learn to validate remote sensing data (e.g., evapotranspiration, rainfall and groundwater use) against field data.
* **Integration of WaPOR in NWIS (group 1):** Participants will learn to aggregate key water indicators relevant for their NWIS and export the results to standard formats using python programming. Results will be compared to existing methodologies and results for reporting those key water indicators.
* **Irrigation Groundwater Assessment & Dashboard management (group 2)**: Training on modelling and analyzing spatial groundwater data, including consumption and recharge rates, with a focus on identifying areas of water stress and maybe unregistered groundwater usage. In addition, generate seasonal, monthly and annual time-series reports**.** Training on co-developing and maintaining an interactive dashboard that integrates data visualizations, including maps and time-series graphs, for stakeholders to monitor water and land productivity as well as indicators on groundwater dynamics.
* ***Optional****: Water Productivity Assessments*: Training participants to use WaPOR data to map key water indicators such as precipitation, evapotranspiration, and land productivity on a seasonal basis for individual fields.

The aim is to empower local stakeholders to independently access WaPOR data, run analyses, update data and visualise the results.

**Expected Implementation**: March 2025 to June 2025 (different timelines for Jordan and Palestine)

**Location**: Online

**Trainer**: Dr. Ahmed El-Naggar, Solomon Seyoum, Suzan Dehati and Marloes Mul – IHE Delft Institute for Water Education

**Motivation**

The region faces significant challenges related to water scarcity, groundwater depletion, and the need for sustainable water resource management. **The WaPOR project** seeks to tackle these challenges by equipping local stakeholders with skills to access and analyse remote sensing data to support national water resources planning and enhance groundwater resource assessment at both field and regional scales.

**The objectives of the training are:**

* Gain foundational knowledge of remote sensing technologies, specifically **WaPOR** data for water and agricultural management.
* Equip local stakeholders with the technical skills to access, compile and analyze **WaPOR data**, using open access programming tools such as **python** and **Google Earth Engine**.
* Build capacity for **data validation** through comparison of remote sensing data with ground data, ensuring accuracy and reliability in water resource assessments.

For the technical team on the WaPOR integration in NWIS:

* Enable the technical team to access and process WaPOR data to calculate key water indicators relevant for the NWIS and export them to the relevant formats

For the technical team with focus on GW:

* Enable participants to assess **irrigation** **groundwater use and its recharge** using WaPOR and GEE data, thereby addressing issues such as groundwater overuse and water stress in the region.
* Train participants to **co-develop, manage, and update** an interactive dashboard that integrates key water indicators, supporting informed decision-making for sustainable water management.

By providing this training, the project aims to enhance the capacity of local stakeholders to monitor key water indicators using WaPOR data to support managing water resources at national level and to manage groundwater resources efficiently, ensuring that the region’s agricultural productivity and water sustainability are improved in the long term.

**Participants**

This training is designed for approximately 5-10 technical staff members from University of Jordan and two technical teams from Palestine (group 1 with focus on the integration of WaPOR into NWIS) and group 2 with focus on GW). The trainees are expected to have a basic understanding of remote sensing, GIS, and Python programming. They will gain hands-on experience in data collection, analysis, and maintaining dashboards for water and irrigation productivity.

Participants who complete the training will receive certificates and will be capable of running WaPOR based analyses contributing to long-term water resource management in the region.

**Schedule**

The training will begin in **March 2025**, with weekly online sessions (1-2hrs) with individual/team assignments (2-4 hrs). Part of the training materials are available in relevant **MOOCs** and **a dedicated OCW page will be made available for the participants**. Below is the schedule in blue for Jordan, in orange for Palestine.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Activities | 12/3 | 19/3 | 26/3 | 2/4 | 9/4 | 16/4 | 23/4 | 30/4 | 7/5 | 14/5 | 21/5 | 28/5 | 4/6 | 11/6 | 18/6 | 25/6 | Break | 20/8 | 27/8 | 3/9 | 10/9 | 17/9 | 24/9 | 1/10 | 8/10 | 15/10 |
| 1 | **Introduction to the on the job training, Remote Sensing and WaPOR** (Mul) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | **MOOC: WaPOR introduction (version 3)** (Mul, Dehati) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 | **MOOC: Python for Geospatial Analyses using WaPOR Data** (Mul, Dehati) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | **WaPOR validation** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | **WaPOR integration in WIS** (Seyoum) (Palestine: only group 1) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.1 | Python scripting for estimating key water indicators(Seyoum) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5.2 | Analysing results and exporting data in relevant formats (Seyoum) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | **Irrigation Groundwater Assessment (IGwA)** (Elnaggar) (Palestine: only group 2) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.1 | Overview of Google Earth Engine (GEE) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.2 | Fundamentals of IGwA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.3 | Setting Up GEE Pipelines and Downloading WaPOR Data |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.4 | GEE and WaPOR: From Data Preprocessing to Analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.5 | Modeling Irrigation Groundwater Dynamics: Abstraction and Recharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.6 | Model Validation, and Stress Indicators |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.7 | Introduction to IGwA dashboard for visualizing and communicating findings |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |