



Food and Agriculture
Organization of the
United Nations

Online administered training

WATER USE EFFICIENCY



IMPROVING PERFORMANCE ASSESSMENT FOR ENHANCING IRRIGATION MANAGEMENT

Background

Increasing agricultural productivity, in the face of growing population worldwide, is a key goal for all countries to combat food insecurity and promote overall socio-economic development. The benefits of the agricultural sector to the broader growth, however, can be hampered by the limited availability of water resources and the increasing pressure on them, due to the rapid expansion of water demand. The role of irrigation, accordingly, is growing into a key operational strategy for a rising number of governments to increase agricultural productivity.

Water use efficiency has a significant role in addressing the challenges faced by the agricultural water use. By 2030, irrigated land in developing countries will increase by 34 percent, while the amount of water used by agriculture will increase by only 14 percent. Increasing food production with less water, particularly in countries with scarce water resources, is one of the major challenges. Yet, global irrigation scheme efficiency does not reach 60 percent, indicating more than 40 percent loss of irrigation water. Still worse, the ratio is even less in Sub-Saharan Africa and Central America and the Caribbean at 28 and 26 percent respectively. Further irrigation expansion is certainly impossible without improving the overall water use efficiency. Beyond the inevitable effect of water use efficiency on addressing these challenges, it is also effective to adapt to climate change.

Training goal and objectives

The training presents the main elements of water use efficiency and illustrates related strategies to increase water performance for the improvement of water and food security, while moving towards the achievement of SDG6. The module introduces FAO Mapping System and Services for PRESSurized irrigation (MASSPRES) as a step-wise approach for the mapping of the behaviour of pressurized irrigation systems and the assessment of their hydraulic performance. A specific session focuses on the re-vamped Rapid Appraisal Procedure (RAP) to define its main indicators for the appraisal of irrigation systems at any scale, as well as presenting the computer-based version, under development, to be used for pressurized irrigation system.

Approach

In accordance with above-mentioned objectives, a 3-day administered e-training has been designed. The training is organized around four different sessions every day. Each session begins with a learning module in the form of a virtual class to introduce the subject provided by the trainer, followed by interactive modules to facilitate the interaction and open discussion with trainees. The theoretical contents presented are further illustrated through video materials and interviews with a range of stakeholders, from practitioners, to developers, to beneficiaries. Furthermore, practical sessions are included in the program to introduce a number of management tools and software, employed by professionals worldwide, and walk participants through them. The training will be carried out in English, with the support of live interpretation in French.

IRRIGATION MANAGEMENT & DATA ACQUISITION SYSTEMS

14 DEC

10.00-10.10	Welcome and structure of the course	Presentation	Stefania Giusti (FAO)
10.10-10.15	Introduction – Significance of performance management in modernization processes	Video	Maher Salman (FAO)
Session 1. Irrigation management at different scale			
10.15-10.45	Principles of water use efficiency	Presentation	Miguel Ángel Moreno Hidalgo (UCLM)
10.45-11.00	Q&A session		
11.00-11.15	Showcase intro by modernization initiative in Spain	Video	UCLM, UCO, CEBAS-CSIC
11.15-11.30	Break		
Session 2. Real-time spatiotemporal data acquisition systems: agroclimatic stations as mainstream technologies to estimate crop water requirements			
11.30-11.40	Required components: from the basic requirements to the best option	Presentation	Rocío Ballesteros González (UCLM)
11.40-11.50	Main aspects to consider when establishing a network of agro-climatic stations and data management	Presentation	Rocío Ballesteros González (UCLM)
11.50-12.00	Adaptation to limited available agroclimatic data	Presentation	Rocío Ballesteros González (UCLM)
12.00-12.10	Q&A session		
12.10-12.15	Showcasing video: illustration of the components of data acquisition systems	Video	Rocío Ballesteros González (UCLM)
12.15-12.45	Practice 1: Comparison between Hargreaves and Penman-Monteith ETo values. ETo forecasting	Exercise	Rocío Ballesteros González (UCLM)
12.45-14.00	Lunch break		
Session 3. Irrigation scheduling			
14.00-14.15	Deficit irrigation strategies and main results in real case studies	Presentation	Diego S. Intrigliolo (CEBAS-CSIC)
14.15-14.30	Modelling and context-tailored irrigation schedules	Presentation	Diego S. Intrigliolo (CEBAS-CSIC)
14.30-14.45	Required data acquisition for proper irrigation scheduling	Presentation	Diego S. Intrigliolo (CEBAS-CSIC)

SCHEDULE

14.45-15.00	Use of soil and water status information	<i>Presentation</i>	Diego S. Intrigliolo (CEBAS-CSIC)
15.00-15.10	Q&A session		
15.10-15.15	Scheduling practices	<i>Video</i>	
15.15-15.45	Practice 2. Irrigation scheduling implementation	<i>Exercise</i>	Diego S. Intrigliolo (CEBAS-CSIC)
15.45 -16.00	Break		

Session 4. Data acquisition through remote sensing: from plot to basin scale to improve water use efficiency

16.00-16.10	Concepts of remote sensing	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.10-16.20	Crop classification with remote sensing	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.20-16.30	In-plot remote sensing	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.30-16.40	Q&A session		
16.40-16.55	PAFYC-View tool	<i>Video training</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.55-17.20	Practice 3. Use of remote sensing information for determining irrigation requirements (Webtool PAFYC-View tool)	<i>Exercise</i>	Miguel Ángel Moreno Hidalgo (UCLM)
17.20-17.30	Day wrap-up		

THE RAPID APPRISAL PROCEDURE (RAP) IN PERFORMANCE ASSESSMENT

15 DEC

Session 1. Performance assessment methodologies for system-level appraisals & the RAP

10.00-10.15	The MASSCOTE approach	<i>Video presentation</i>	Maher Salman (FAO)
10.15-10.30	Rapid Appraisal Procedure of MASSPRES and MASSCOTE approach	<i>Presentation</i>	Fethi Lebdi (FAO)
10.30-10.45	Rapid Appraisal Procedure – Water balance	<i>Presentation</i>	Waqas Ahmad (FAO)
10.45-10.00	Information acquisition in data-poor environment	<i>Presentation</i>	Eva Pek (FAO)
11.00-11.10	Q&A session		

SCHEDULE

11.00-11.10	Video training – Innovative tools for data acquisition: deployed SCADA system	<i>Video</i>	Eva Pek (FAO)
11.10-11.20	Innovative tools for data acquisition: The concept of SSIV technology	<i>Video interview</i>	Salvador Peña-Haro (Photrack AG)
11.20-11.30	Innovative tools for data acquisition: SSIV technology in use	<i>Demo video</i>	Eva Pek (FAO)
11.30-11.45	Break		

Session 2. Management appraisal

11.45-12.00	RAP management appraisal	<i>Presentation</i>	Eva Pek (FAO)
12.00-12.15	Life-cycle cost analysis of irrigation assets	<i>Video presentation</i>	Akhter Ali (FAO)
12.15-12.30	Q&A session		

Session 3. Water service

12.30-12.45	Rapid Appraisal Procedure – Water service appraisal	<i>Presentation</i>	Eva Pek (FAO)
12.45-13.00	Performance indicators of water service in irrigation	<i>Presentation</i>	Fethi Lebdi (FAO)
13.00-13.15	Practice: remote technologies in service of performance and condition assessment	<i>Video presentation</i>	Waqas Ahmad (FAO)
13.15-13.20	Innovation toolbox to improve WUE: the Water Retainer technology	<i>Video interview</i>	Richard Vattay (Water and Soil Limited)
13.20-13.30	Agriculture, the cause and driver of water resource degradation – How water quality monitoring help minimizing impacts	<i>Video interview</i>	Prof. Issam Bashour (American University of Beirut)
13.30-14.30	Lunch break		

Session 4. Towards informed decision-making in irrigation development

14.30-14.45	Turning performance assessment into development pathways	<i>Presentation</i>	Maher Salman (FAO)
14.45-15.15	Software tool for RAP	<i>Demo video</i>	Waqas Ahmad, Kornel Kalman, and Eva Pek (FAO)
15.15-15.30	Q&A session		
15.30-15.45	Day wrap-up		

ASSESSING IRRIGATION PERFORMANCE AT FARM AND SYSTEM LEVEL

16 DEC

Session 1. System level efficiency of pressurized irrigation systems – Learning about pumps

10.00-10.15	Pumping systems	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
10.15-10.30	Pumps control, from valves to frequency speed drives	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
10.30-10.45	Pumping systems regulation	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
10.45-11.00	Q&A session		
11.00-11.15	Training/showcasing video	<i>Video</i>	Miguel Ángel Moreno Hidalgo (UCLM)
11.15-11.30	Break		

Session 2. System level efficiency of pressurized irrigation systems – Learning about energy component

11.30-11.50	Pumping systems and energy efficiency	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
11.50-12.10	Water abstraction – Strategies to minimize energy consumption	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
12.10-12.20	Q&A session		
12.20-12.30	The experience from the enterprise perspective	<i>Video</i>	
12.30-13.00	Practice 1. Energy saving in pumping stations using MAEEB software		Miguel Ángel Moreno Hidalgo (UCLM)
13.00-14.00	Lunch break		

Session 3. Farm-level efficiency of irrigation system – Learning about on-farm irrigation systems

14.00-14.15	Sprinkler irrigation: types, design, assessment, implementation and operation	<i>Presentation</i>	Juan Antonio Rodríguez Diaz (UCO)
14.15-14.30	Drip irrigation: types, design, assessment, implementation, and operation	<i>Presentation</i>	Juan Antonio Rodríguez Diaz (UCO)
14.30-14.45	Precision irrigation techniques: remote sensing and high-tech irrigation systems. The pilot areas in PRECIRIEGO project	<i>Presentation + video</i>	UCLM, CEBAS-CSIC

SCHEDULE

14.45-15.00	Factors influencing the selection of an irrigation system. Physical constraints and tradeoffs	<i>Presentation</i>	Juan Antonio Rodríguez Diaz (UCO)
15.00-15.10	Q&A session		
15.10-15.30	Practice 2. Design and analysis of irrigation systems	<i>Exercise</i>	UCO
15.30-15.45	Break		
Session 4. Use of drones as an emerging technology in in-plot data acquisition			
15.45-16.00	Fields of drone application in production monitoring	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.00-16.15	Critical aspect of drones – Advantages and limits in their application	<i>Presentation</i>	Miguel Ángel Moreno Hidalgo (UCLM)
16.15-16.25	Q&A session		
16.25-16.30	Showcasing/Training Video: present the technology development and application	<i>Video</i>	UCLM
16.30-16.45	Presentation of the post-assessment survey		
16.45-17.00	Day wrap-up		



The Building Forward Better Initiative

Conflict and fragility are at the core of some of the biggest challenges today – they are able to hinder development progress and reverse any development gains. Environmental factors are rarely, if ever, the sole cause of conflicts and vulnerability. However, the exploitation of natural resources and related environmental stresses can be implicated in all phases of the conflict cycle from contributing to the outbreak and perpetuation of violence to undermining prospects for peace.

A fundamental problem in fragile contexts is the loss of human capital. Without the contribution of knowledgeable professionals, the re-building process becomes even more complicated. Local capacities should be at the base of any re-building planning and investments, as they provide access to local knowledge and information and can guarantee the sustainability of the program in the long-term.

Indeed, effective institutions are central to address both the “capacity deficit” and “legitimacy deficit” faced in fragile contexts. Recognizing the importance to invest in human capital, the “Building Forward Better” Initiative of FAO promotes a blended training methodology, composed of administered and self-administered online and face-to-face training, addressing a series of topics in the domain of natural resources management.

The Initiative aims to reduce the knowledge gap and strengthen national institutions to enhance agricultural productivity, improve food security and, ultimately, contribute to peaceful societies for sustainable development

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