Food and Agriculture Organization of the United Nations

CIHEAM IAM BARI

AgWA
Partnership for agricultural water for Africa

Emerging practices from Agricultural Water Management in Africa and the Near East

Thematic Workshop

Theme 2

Water Use Efficiency

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Theme 2:

Water Use Efficiency

PRESENTATION OUTLINE

INTRODUCTION TO METHODOLOGY AND TOOLS

METHODOLOGY AND TOOLS IN ACTION

RESULTS ACHIEVED

COUNTRY EXPERIENCES

STRENGTHS AND WEAKNESSES OF IMPLEMENTATION

DISCUSSION

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INTRODUCTION TO METHODOLOGY AND TOOLS

- The project "GCP/INT/231/SWI: Strengthening Agricultural Water Efficiency and Productivity on the African and Global Level" aims at improving Agricultural Water Management in Burkina Faso, Morocco and Uganda.
- In the three project countries (Uganda, Burkina Faso and Morocco), irrigation schemes are under gravity techniques (Morocco and Uganda) and under upstream water pumping for Burkina Faso. In all the sites, water is conveyed using open channels and applied at farm level using surface irrigation.
- Water resources are developed and managed under water scarcity conditions.
- Therefore, the countries' policy and institutional development are focusing on water use efficiency (WUE), in particular at small scale irrigation systems which become preponderant.

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METHODOLOGY AND TOOLS IN ACTIONS

- In the three countries, the following actions were implemented:

  1) the project recommended to adapt MASSCOTE (FAO's tool "Mapping System and Services for Canal Operation Techniques", applied to large irrigation scheme) to small scale irrigation systems (Water-Downscaled MASSCOTE). WD-MASSCOTE is applied in the field, involving decision makers at irrigation scheme level, experts at international and national levels, the community and end users.

  2) Capacity building and training activities for local stakeholders were developed to achieve:

  (i) local experts, water users' associations (WUA) members and scheme operators aware on WUE concept, tools and operation;
  (ii) to GIS mapping of irrigation and water resources components;
  (iii) rehabilitation plan proposed which is in an ongoing implementation, including energy rehabilitation at pumping station in the case of Burkina Faso/Sourou;

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METHODOLOGY AND TOOLS IN ACTIONS

- CONT.:

  (iv) Measurements (construction of weirs along main and secondary canals in Uganda) and quantification of the water service: efficiency, equity, flexibility, reliability. Trainings on measurements in Morocco, Uganda and Burkina Faso;

  (v) link between WUE and water productivity (WP) components from main and secondary canals to the tertiary and quaternary canals owned by users;

  (vi) RAP (Rapid Appraisal Process) derived from WD-MASSCOTE for a better flexible water service in Uganda;

  (vii) finally, design and implementation of a pressurized irrigation system with solar energy for pumping and conjunctive use of surface water harvesting and underground water in Jordan.

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RESULTS ACHIEVED

- Topographic survey and mapping of canals using to evaluate the initial irrigation system design and its effect on water distribution;
- Survey of existing flow measuring devices (masque modules, gates, …) along the irrigation canals;
- Survey of water leakage along the canals and gates;



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RESULTS ACHIEVED

- Discharge measurements to evaluate the actual operation and management of irrigation systems and its effect of flexibility, reliability and equity of water services;

- Capacity building and trainings for local stakeholders.

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RESULTS ACHIEVED

- Construction of weirs along the main and secondary canals to facilitate flow measurements (Uganda);

- Measurements and evaluation of accuracy: measurements using current meter and the comparison with the measurements obtained by the “modules à masques” (Burkina Faso and Morocco) and the constructed weirs (Uganda);

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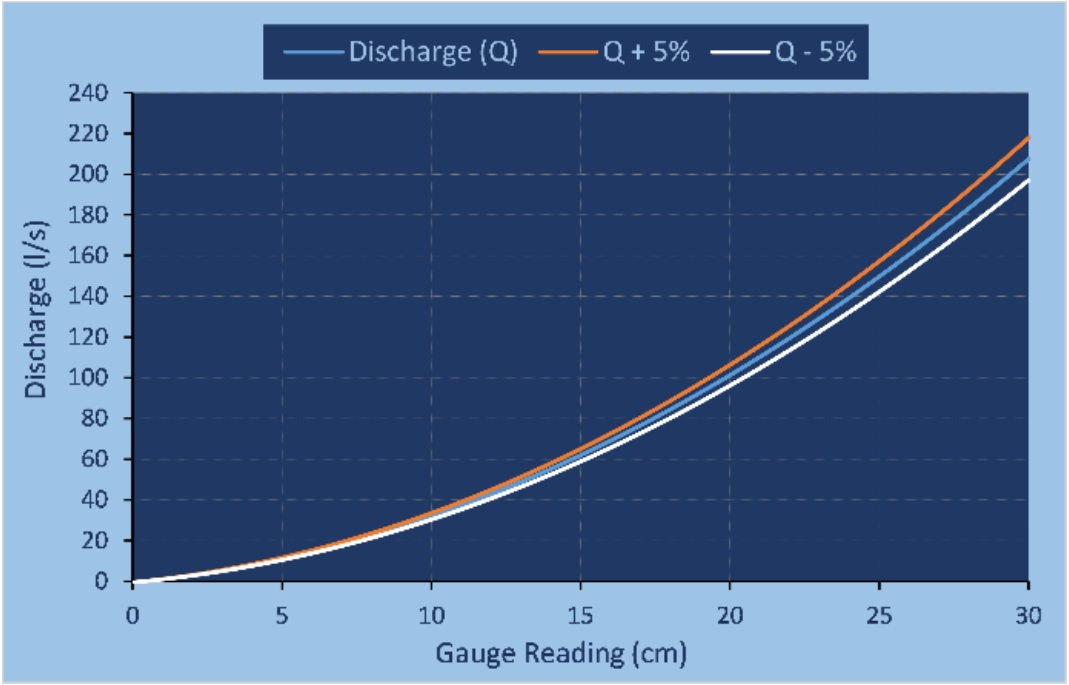
RESULTS ACHIEVED

- Daily recordings of discharges in all canals to evaluate the water balance in the irrigation system and to propose more flexible water service (Uganda);



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RESULTS ACHIEVED

- GIS mapping of irrigation and water resources components;

- Collection of water service data and surveys to establish a database of irrigation systems and farmers, and current management rules;

- Data collection on O&M, contracts with power company, power outages and their impacts on irrigation through interviews with technicians and farmers (Burkina Faso);

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STRENGTHS AND WEAKNESSES OF IMPLEMENTATION

- **Strengthens (What Worked well?)**

  (i) Water Appraisal tools (MASSCOTE) downscaled are strong approaches to identify gaps and to formulate plans for rehabilitation or modernization;

  (ii) Measurements demonstrate that the community can handle arbitration for better efficiency and equity of water service ad can identify solutions for WUE;

  (iii) Capacity building for small scale and in remote areas integrated water resources management through solar energy (case of Jordan), conjunctive use of surface water harvesting and underground water, irrigation multi-uses (livestock watering) and community involvement in Jordan, Burkina Faso, Morocco and Uganda;

  (iv) Community involvement and capacity building for technicians and operators from the administration, the community and WUA is the pillar to identify feasible solutions in the field;

  (v) the success story in the field involving the community for better WUE: arbitration for better water service and equity of distribution, quantification of losses and raising awareness for water saving, accountability of users and administration, reliable water service for better water productivity at farm level,

  (vi) influence the Ministries of Agriculture on WUE National Policy.

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STRENGTHS AND WEAKNESSES OF IMPLEMENTATION

- **Weakness (What worked wrong?)**

  (i) WD-MASSCOTE is an approach to identify gaps on WUE but needs quantification tools (like models of hydraulic flows) to move from qualitative diagnosis to quantification of the action needed for rehabilitation or modernization of irrigation schemes;

  (ii) Measurements are crucial and chronological series of water levels and discharges on the main and secondary canals are missing and therefore any improvement on the water management and water service needs to be better performed in the future;

  (iii) capacity building (in particular for water measurements) of administrative technicians and of end users, is big issue in order to perform and ensure an efficient and reliable water service;

  (iv) lack of a link approach by irrigation scheme managers and WUA for WUE tasks in the canals and WP at farm level (the end users modify the level of spillways between secondary canals and their tertiary canals in order to fill the gaps of water level at secondary canals);

  (v) technical gaps from the design can't be corrected unless big budgets are available from the governments (ex. Problem of calibration of secondary canals in Burkina Faso);

  (vi) solar energy for irrigation could be used for trade with the grid and; (vii) solar power could be used for over exploitation of groundwater.

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LESSONS LEARNED AND PERSPECTIVES

- **What should be improved?**

  (i) Design has a big impact on the operation and management. Community has to be involved from the design in order to understand that any modification in the irrigation scheme has an impact on others and to be accountable for that;

  (ii) Measurement and recording of water service are pillars for any management and WUE operation. It has to be planned with the design. Water losses are big (water pumped or released then diverted directly to the drainage system without its use);

  (iii) Absence of regulation within the irrigation systems is the cause of inequity, low efficiency, lack of water flexibility and water losses downstream. It is a necessary component for WUE. Modernization of these irrigation schemes to improved open channel flow systems orto move to under pressure systems is a perspective;

  (iv) Water scarcity is a trigger to WUE policy at national level, and pilot projects like SDC/FAO/AgWA demonstrations in the field convinced the authorities and national decision makers. As an example in Uganda, the Ministry of Agriculture is planning to strengthen the institutional system in Mubuku in order to save water and extend the irrigation scheme in part through WUE results;

LESSONS LEARNED AND PERSPECTIVES

- **What should be improved ? – CONT**

(v) Capacity building is a continuous process to sustain the WUE results and;

(vi) scaling up of this pilot approach and methodology for WUE in small scale irrigation is now based on tangible results and experience;

(vi) Excellent picture to scale up on the autonomy of community with solar energy, surface water harvesting and the conjunctive use with groundwater, irrigation and multi-use of water (fodder crops, livestock watering, …etc.) and community training for operation and maintenance, at small scale and in remote areas.

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PARTNERS IN IMPLEMENTATION

- FAO/AgWA
- Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB), ITALY
- Sourou Valley Development Authority (AMVS), BURKINA FASO
- Environmental and Agricultural Research Institute (INERA), BURKINA FASO
- Ministry of Agriculture, BURKINA FASO
- International Institute for Water and Environmental Engineering (2iE), BURKINA FASO
- Haouz Regional Agricultural Development Office (ORMVAH), MOROCCO
- National Agricultural Research Organization (NARO), UGANDA
- Ministry of Agriculture, UGANDA

THANK YOU !