

Annex 6
Lessons learnt from the
previous RAP

**A RAPID APPRAISAL PROCEDURE
TO ASSESS THE PERFORMANCE
OF IRRIGATION SYSTEMS:**

**LESSONS FROM A FAO REGIONAL
IRRIGATION MODERNIZATION
AND MANAGEMENT TRAINING
PROGRAMME IN ASIA**

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The need for a massive re-training of
engineers and managers in irrigation
agencies, consulting firms and
Irrigation Service Providers in Asia

- farmers aspire to improved socio-economic well-being, evolve toward more commercial forms of agriculture and face the challenges of globalization
 - water resources management is moving towards integrated water resources management in the river basins, and competition for water from other sectors is intensifying
- =>knowledge and ways and means to design, manage and operate irrigation systems economically for good performance and adequate service to farmers

Why...

- i/ evaluation of the performance of the introduction on modern water control and management practices
lack of knowledge of proper options a main reason for the mitigated success of irrigation modernization projects
- ii/ the disappointing performance of irrigation management transfer and participatory irrigation management projects
failure of these reforms to improve service to farmers
- iii/ lack of attention to operation, design and other technical aspects of irrigation systems
technology matters, after all
- iv/ problems with OFWM projects
the need to address all levels within the systems

An appraisal of initial conditions
and performance of the systems to
be transferred or improved

For:

- a definition of the service to be provided both by the irrigation service provider to water users associations (WUAs) and by WUAs to their members
- ways and means to achieve these service goals and improve them in the future
- a better design and strategic planning of physical and management improvements

FAO's Regional Training Program
on Irrigation Modernization,
management improvement and
benchmarking

- disseminating modern concepts of service-oriented management of irrigation systems
- promoting the adoption of effective irrigation modernization strategies in support of agricultural modernization, improvement of water productivity and integrated water resources management

Modernization

- "Irrigation modernization is a process of technical and managerial upgrading (as opposed to mere rehabilitation) of irrigation schemes with the objective to improve resource utilization (labor, water, economics, environmental) and water delivery service to farms."

Since 2000

- training materials and detailed curricula
- specific tools for the appraisal of irrigation systems for benchmarking and the development of appropriate modernization plans for irrigation systems:

Rapid Appraisal Procedure

- website: www.watercontrol.org
- first training workshop in Thailand in 2000
- Vietnam, Philippines, Nepal, Thailand, Indonesia, Malaysia, Turkmenistan, Pakistan, India (Andhra Pradesh), Afghanistan

• Thailand

the Royal Irrigation Department of Thailand is using the tools and methodologies introduced by the Program for the appraisal of projects, and has included the training workshops in its regular training program.

• Vietnam

the World Bank-funded Vietnam Water Resources Assistance Project has a large irrigation modernization component based on the concepts introduced through training at project preparation stage

• Malaysia

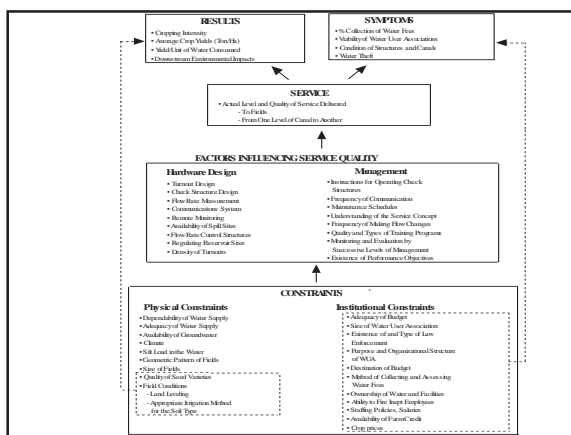
DID has included the training program and its tools in its Quality and Modernization Strategies and national benchmarking programme: proposals for modernization of the systems have to be submitted to decision makers based on modernization plans developed by managers following their training and the appraisal of their systems with the RAP

• Andhra Pradesh

a core team for training and appraisal of large systems, with inputs into water policy review and water visioning process

The Rapid Appraisal Procedure (RAP)

- Developed by the Irrigation Training and Research Centre (California Polytechnic University) for a research programme financed by the World Bank on the evaluation of impact on performance of irrigation systems of the introduction of modern control and management practices in irrigation
- Adopted for FAO's training programme
- Further developed to be more user-friendly, focus on water balance, produce IPTRID benchmarking indicators
- Adopted as one of the three tools of the World Bank's holistic benchmarking method
- available in English, Spanish, Thai, Indonesian, Vietnamese, Russian, Chinese



Primary / Sub Indicator	Ranking Criteria	W
Actual water delivery service to individual ownership units (e.g., field or farm)		
Measurement of volumes to the individual units (0-4)	4 - Excellent measurement and control devices, properly operated and recorded. 3 - Reasonable measurement and control devices, average operation. 2 - Useful but poor measurement of volumes and flow rates. 1 - Reasonable measurement of flow rates, but not of volumes. 0 - No measurement of volumes or flows.	1
Flexibility to the individual units (0-4)	4 - Unlimited frequency, rate, and duration, but arranged by users within a few days. 3 - Fixed frequency, rate, or duration, but arranged. 2 - Dictated rotation, but it approximately matches the crop needs. 1 - Rotation deliveries, but on a somewhat uncertain schedule. 0 - No established rules.	2
Reliability to the individual units (0-4)	4 - Water always arrives with the frequency, rate, and duration promised. Volume is known. 3 - Very reliable in rate and duration, but occasionally there are a few days of delay. Volume is known. 2 - Water arrives about when it is needed and in the correct amounts. Volume is unknown. 1 - Volume is unknown, and deliveries are fairly unreliable, but less than 50% of the time. 0 - Unreliable frequency, rate, duration, more than 50% of the time, and volume delivered is unknown.	4
Apparent equity to individual units (0-4)	4 - All fields throughout the project and within tertiary units receive the same type of water delivery service. 3 - Areas of the project receive the same amounts of water, but within an area the service is somewhat inequitable. 2 - Areas of the project receive somewhat different amounts (unintentionally), but within an area it is equitable.	4

The RAP Excel sheet



Objectives of RAP

- Provide a basis for making specific recommendations for modernization and improvement of water delivery service
- Provide a baseline for comparison of future performance after modernization
- Benchmarking for comparison against other irrigation projects

RAP Outputs

- External indicators
 - Examine inputs and outputs of the whole project
- Internal indicators
 - Examine processes and hardware within the project
- IPTRID Benchmark indicators
 - Mostly external indicators

External Indicators

- Ratios or percentages comparing project inputs and outputs to describe performance
- Expressions of forms of efficiencies related to budgets, water, yields, etc.
- Do not provide insight in how to improve performance

Example External Indicators

$$\frac{\text{Water Required}}{\text{Total Water Available}}$$
$$\frac{\text{Crop Yield}}{\text{Irrigation Water Delivered to the Fields}}$$

Internal Indicators

- Identify key factors related to water control throughout a project.
- Define level of water delivery service provided to users.
- Examine specific hardware and management techniques and processes used in the control and distribution of water.

Benchmarking

- a systematic process for achieving continued improvement in the irrigation sector through comparisons with relevant and achievable internal or external goals, norms, and standards
- Goal: to improve the performance within an irrigation scheme by measuring its performance against its peers and its own mission and objectives
- the benchmarking process should be a continuous series of measurement, analysis, and changes to improve the performance of the schemes

For benchmarking to go beyond measurement and analysis, on to the implementation of changes and improvement stages

- significant acceptance by project personnel
- identification of weaknesses and potential changes
- knowledge of options for change

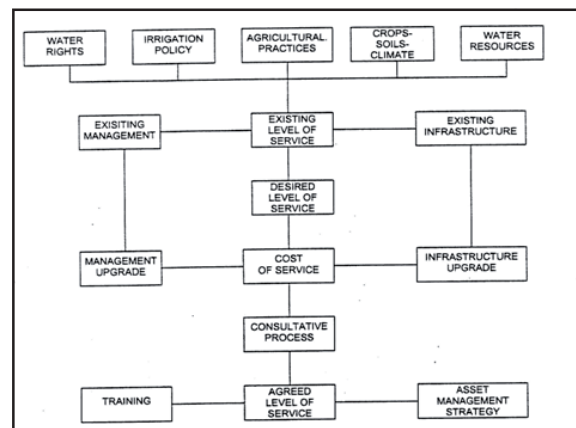
- The RAP is incorporated into the training program that integrally involves local management and operation and maintenance staff.
- Staff:
 - learn the concepts of modernization and service orientation
 - are provided with a toolbox of options
 - evaluate their own project with the RAP

At the end of the training

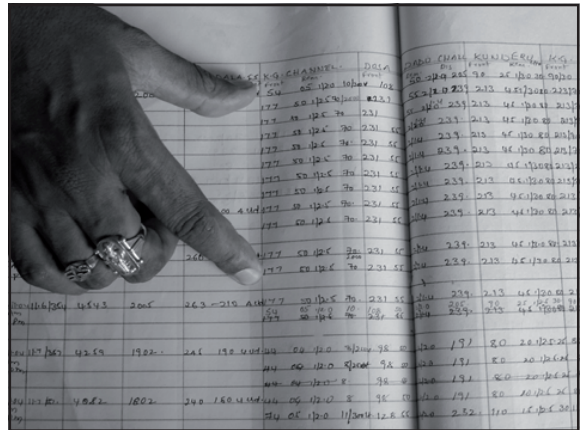
- internal and external indicators are developed for the project and compared with other projects
- local staff develop a modernization strategy and a priority list for changes in software and hardware based on the internal process and service indicators (which appraise all factors that affect system performance and service delivery in a systematic and standardized manner)
- to improve specific characteristics of service delivery at specific levels and address constraints
- to achieve improvement objectives, defined by the external performance indicators.

The plans

- Very short term with very limited budget
- Short term with limited budget
- Medium term with more substantial budget
- Software and hardware
- Step-wise approach
- All actions justified by improvement in service



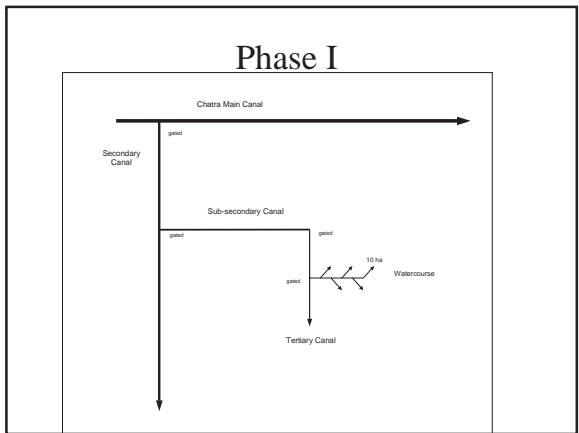
The appraised systems

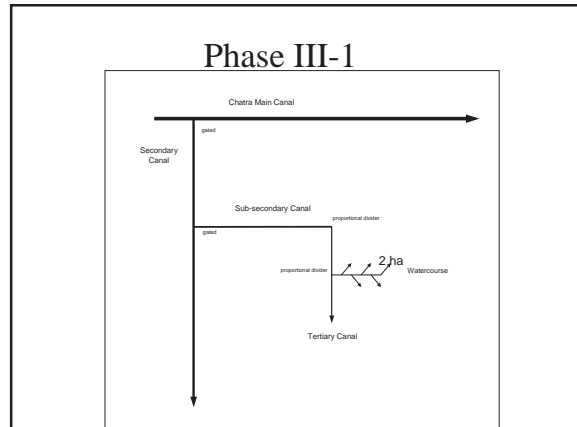
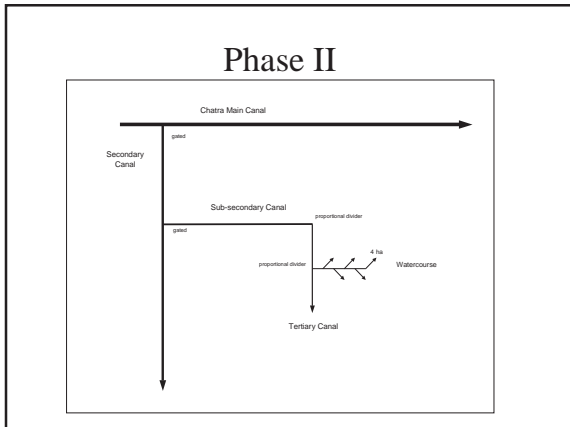












Internal indicators

Internal Indicator	Gated System Stage I (Group A)	Proportional Flow Stage III – Phase I (Group B)	Undeveloped Area Stage III (Group C)
Actual service to individual fields	0.9	1.8	1.3
Actual service to most downstream point operated by a paid employee (tertiary canal level)	0.5	1.4	1.2
Actual service by main canal to secondary canals	1.7	2.6	0.9
Overall Index of cross regulators in third level canals	1.7	2.2	1.1

Plan before workshop

- Another phase of command area development Phase III-2 using the same concept of structured design in the undeveloped area

- ### Issues
- **FUNDING**
 - Irrigation Service Fee (ISF) collection rate is very low (1)
 - The official O&M budget is inadequate and the timing of release is delayed (3)
 - The role of cost sharing of rehabilitation with WUG/WUC/WUCCC (9)
 - **CHATRA MAIN CANAL**
 - Water delivery service is not equitable from main canal to secondary canals (2)
 - Operating rules for the cross regulators in the main canal (5)
 - Operation of the hydropower station is done by a separate agency (10)
 - **POOR LEVEL OF SERVICE (4)**
 - The quality of service at all levels of the canal system needs significant improvement
 - **CHAOS**
 - Care and protection of all canals (vandalism, cattle, etc.) (7)
 - Illegal diversions and field outlets that do not match the layout of fields (8)
 - **WATER SUPPLY (6)**
 - During the winter and spring seasons the water supply is reduced by 50-70%
 - **COMMUNICATION (9)**
 - Ineffective or unclear communication between secondary canals and Headworks
 - The decision making process and coordination between water users and DOI

- ### New Water Management Strategies
- to transform SMIP into a service-orientated organization with a re-configured strategy of managing its surface water and groundwater resources.**
- Winter/Spring – better matching of available water supplies and demand through crop diversification, crop planning, and improved water supply forecasting, among others
 - Increase the equity at the tailend of the Chatra Main Canal by better control and monitoring of flows into the secondary canals
 - Drainage re-circulation at the secondary canals. (Ones that are close together)
 - Conjunctive use as a supplementary supply in areas not served by canals

First Stage Action Items (2004)

- Chatra Main Canal – new operating rules for constant water level control at each cross regulator and training staff for implementation
- Maintenance – there are various structures such as siphons, control gates, aqueducts, etc., that require immediate repair or replacement.
- Communication – the communication difficulties among operators and key control points, especially along the main canal, will be solved by purchasing new equipment and closer coordination with WUG operators and laborers.
- Meaningful information for operations and planning (e.g., flow rate into main canal, flow rate into the secondary canals, sensitivity analysis of cross regulators, monitoring drainage flows including both timing and locations)
- Care and protection of structures with cooperation from WUG, WUC, WUCCC

Remarks on the plan

- achievable steps that the SMIP managers, engineers, and operational staff can implement very quickly with a minimum of investment
- recommendations target the operation of the Chatra Main Canal because improving the quality of service further downstream in the system is only possible once equity is established with the secondary canals that serve the Undeveloped areas.
- this new approach, centered on restoring order to the main and secondary canals, is intended lay a foundation for future participatory management of SMIP.

Summary findings

- high level of chaos (difference between stated policies and actual policies)
- high level of anarchy (subversion of policies) varies from system to system
- Recent investments following standard standards or investment strategies (command area development) have poor results in terms of performance, control and service.

discipline and institutional issues , but many of the problems can be traced to:

- Problems in initial design;
- Exporting of design concepts outside of their area of validity;
- Difficulty to control and operate the systems;
- Layouts with confused hierarchies;
- Serious flaws in operation strategies and instructions to staff;
- Inconsistencies between operating rules at various levels;
- Inconsistencies between operating rules and farmers' requirements;
- Changes in farmers' requirements not reflected by changes in system policies;
- Poor quality of water delivery service to farms;
- Lack of flexibility at all levels;
- Staffing policies;
- Poor training of staff at all level, in particular, poor understanding of unsteady flow hydraulics.

- Standard project improvement projects, as reflected in pre-training proposals, usually fail to address these issues.
- Modernization proposals for the irrigation systems that were appraised, prior to the training workshops, usually failed to establish a linkage between system-level objectives and proposals and stated objectives for the introduction of improved or innovative irrigation technologies at farm level, or between new performance objectives and proposed reform of the management and institutional setup.

Plans prepared by the trainees differ very significantly from their plans prior to the workshop.

- new technical options
- balanced investment in upgrading the capacity of management and farmers and in infrastructure, in infrastructure, communication and mobility for operation staff
- planned investment in infrastructure focuses much more on control and measurement as a priority
- Priority: changes in instructions to field staff for operation of control structures
- changes in internal organization
- improved procedures for ordering of deliveries
- an initial focus on restoring and improving water level control in the upper levels of the systems as prerequisites for further improvements and investments in the lower levels.
- the remote monitoring of spills, drains, and flow-rates at major offtakes as a basis for the establishment of feedback mechanisms, as well as for a better understanding of the water balance of the systems.

The challenge

- Asian large surface irrigation systems suffer from a legacy of poor design, degraded infrastructure and poor management and stagnation in the face of rapid transformations of agriculture and pressure on their water supply.

- The challenge is to transform these systems from supply driven to demand-driven responsive systems, improve their financial, environmental, technical and service performance to significantly increase control, reliability, equity and flexibility

- Financing all this would require considerable investments while rice prices are expected to remain low in the medium term and present financing arrangements do not cover operation and maintenance costs, let alone investments in upgrading of management capacity and infrastructure.
- It is imperative that increased attention should be paid to the quality and type of investment.

The main lesson from the FAO Regional Modernization Training Program is a paradox

- this challenge is both under-estimated and over-estimated

Under-estimated

- there has been in the recent past excessive reliance in policy reform, institutional reform, improved control technology, improved management, economic incentives and instruments or on-farm water management as measures which would single-handedly deliver improved performance or service.
- The detailed appraisal of the irrigation systems which were investigated through the Regional Training Program indicates that a complex and articulated mix of changes in all these fields would be in fact required;
- the actual performance of the systems, particularly in terms of service delivery, is frequently over-estimated.

Over-estimated

- there exists a considerable potential for significantly improving system performance and service with the adoption of simple and low-cost measures, provided that:
 - an increased focus on all details of operation, management and design is adopted
 - planners and managers are aware of better options that are now available, through training and capacity building.

- when irrigation planners and managers are presented with these options which they were not aware of and when, furthermore, they work together in developing proposals based on a detailed appraisal of the systems, they embrace them

far-ranging and comprehensive reform or substantial investment will be needed.

- but it is possible to initiate a process of transformational change with immediate benefits to farmers, in terms of service, and managers, in terms of ease of operation
- this will allow the necessary reform agenda and investment programs to be:
 - more strategically focused,
 - achievable in a realistic step-wise approach,
 - more easily implemented,
 - acceptable to the various stakeholders
 - able to adapt to rapidly changing circumstances.

The Rapid Appraisal Procedure and benchmarking

- It has been argued that the RAP cannot be considered as performance benchmarking on the ground that it focuses on planning investment in modernization of water control infrastructure, requires well-trained and experienced engineers, does not lend itself to regular application on a large number of schemes and does not use comparison, over time and between schemes, as the basis for identifying performance gaps and planning improvements.

The RAP:

- uses comparison over time and between schemes
- assesses all processes of management and operation as well as hardware
- can be and is applied over a large number of schemes (Thailand, Vietnam, Malaysia)
- can be a useful and critical component of a national benchmarking program aiming at improvement of sectoral performance if used at the inception of the program, when systems managers develop their strategic plans or system upgrading plans, or to evaluate the impact of improvement projects, as is the case in Malaysia.

The RAP requires well-trained and experienced engineers

- Any significant improvement in the sector's performance in Asia will require well-trained and experienced planners, designers, managers and operators.
- FAO and national irrigation agencies in Thailand, Malaysia and Andhra Pradesh, introduce the RAP within a training program where trainees appraise their own systems with the support of a team of expert appraisers and trainers from the central office.
- Support from a core team of expert appraisers and trainers, who are also external to the system, is essential for quality control of the Rapid Appraisal Procedure.

The RAP and management

- The benchmarking process will only be applied where managers "embrace the goal of pursuing best management practices within a service oriented management system" and this implies a focus on the quality and cost-effectiveness of service delivery (Malano, 2004).
- This is the most original feature and central message of the Rapid Appraisal Procedure.
- By concentrating on service interfaces between the different levels, the RAP facilitates taking into account the objectives and concerns of the operators at all levels, from the upper level managers, to the Water Users Associations which may exist in the system, to the farmers who receive service from them.

Focus on control infrastructure

- in the perspective of service delivery, control, operating rules, and management responsiveness.
- poor selection and operation of the systems' control structures play a decisive role in system service performance.
- decisions on control structures (their maintenance, their operation, their replacement) are therefore critical management decisions
- poor decisions on infrastructure or sterile investment programmes that will not yield desired performance or service improvements are simply poor management decisions.

Asset serviceability

- “the serviceability of an asset (that is, its ability to perform its function) is often assumed to be directly related to its condition. But this can be a misleading assumption. In practice, assets very often continue to perform their function quite satisfactorily even though their condition is significantly deteriorated. On the other hand there are frequent instances when an asset which is generally in excellent condition is rendered unserviceable by a very minor fault. It is the serviceability therefore which dictates the urgency of the work needed to restore the asset to its fully functional state” (IIS-ODA, 1995).
- Asset surveys assessing the condition and serviceability of structures are focused on the asset's condition and needs for repairs or maintenance.

An asset can be brand new and perform poorly because of:

- poor design (a Rominj gate for instance or a measuring flume which is too wide)
 - any decision that does not lead to the replacement with a different design (Rominj gate) or modification (measuring flume) of the asset will be a poor asset management decision
- poor operation
 - Not changing instructions to the operators will not lead to an improved serviceability of the asset

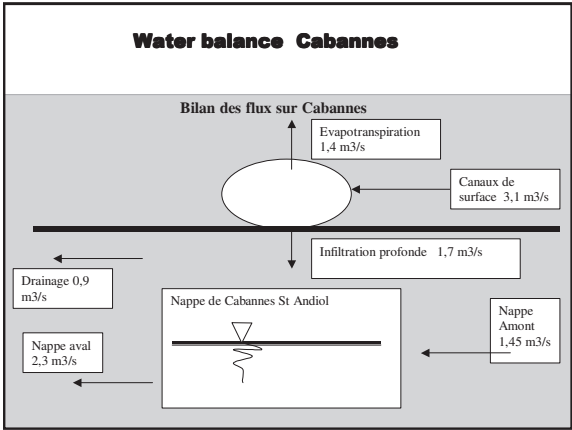
The RAP and serviceability

- design and operation problems are significant in the systems
- focus on quality of control with and interactions between control structures, and on actual operation of these structures
- The RAP: a useful and critical addition to asset management methods which focus on asset serviceability as

Future development of the tool

- developing additional indicators to better address:
 - drainage and water disposal services
 - the multiple roles provided by the irrigation systems.

THANK YOU FOR YOUR
ATTENTION



CONCLUSION (1981)

Surface irrigation maintained in upstream part to allow groundwater recharge

Modernization in downstream part with drip irrigation supplied by pumping from groundwater

