

Modernization Strategy for Irrigation Management

Case Study
Taoyuan Irrigation System – Taiwan

2010/10/12

Presentation

-  Objectives
-  Project description
-  The MASSCOTE approach
-  Performance of RAP
-  Modernization schemes
-  Conclusion & Suggestion

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Objectives

- Realize the performance and the applicability of MASSCOTE in Taiwan
- Figure out the adjustment practices for future application

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Project Description



- 17 Irrigation Associations are obligated to help the Government carry out the irrigation undertakings.
- Around 380,000 ha (44% of total arable land) serviced by the Irrigation Associations (IAs).
- TaoYuan IA was selected due to data availability and corporate willingness.

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Project Description

Study Area TaoYuan Irrigation Association



- Established in 1930.
- Irrigation Area : 24,597 ha
- No. of Members : 108,006
- No. of Working Stations : 13
- No. of Irrigation Groups : 340

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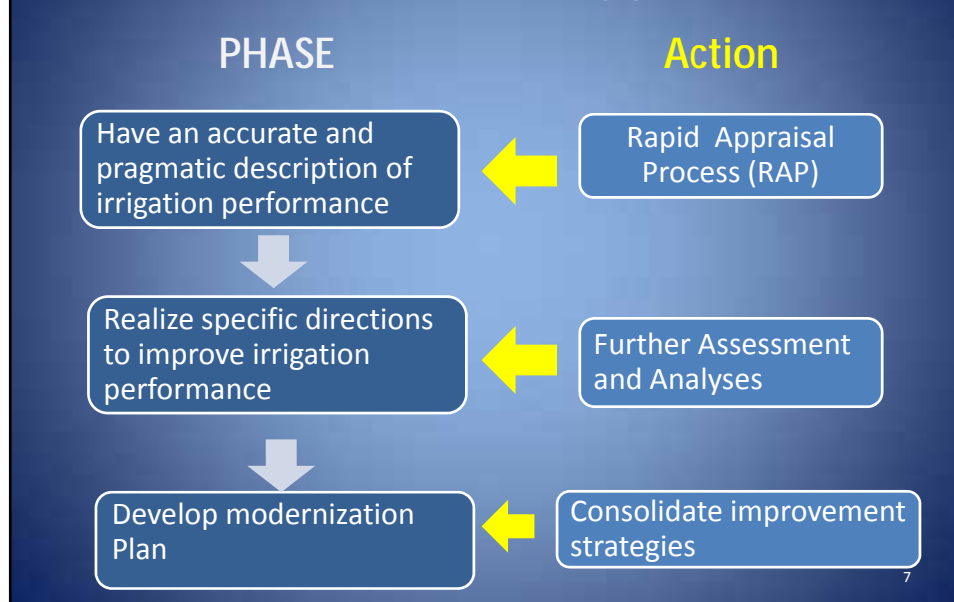
Project Description



- Irrigation System :
 - Leading canal : 25 km
 - Main canal : 86 km
 - Branches : 447 km
 - Distributaries : 2207 km
 - Total length : 2740 km
- Weirs : 346
- Pounds : 286

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The MASSCOTE Approach



Performance of RAP

External indicator

Productivity of land

$$= \frac{\text{Total agriculture production}}{\text{Command Area}} = \frac{77,633,153 \text{ USD}}{24,597 \text{ ha}}$$

$$= 3,156 \text{ USD/ha}$$

Productivity of water

$$= \frac{\text{Total agriculture production}}{\text{Evapotranspiration of irrigated field}} = \frac{77,633,153 \text{ USD}}{277 \times 10^6 \text{ m}^3}$$

$$= 0.28 \text{ USD/m}^3$$

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Performance of RAP

External indicator **Productivity of Land(3,156 USD/ha)**



- High yield of crops : 4.76 tons/ha
- High rice support price program

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Performance of RAP

External indicator **Productivity of water(0.28 USD/m³)**



- Unit economic value of crop is not so high : \$ 0.6/Kg

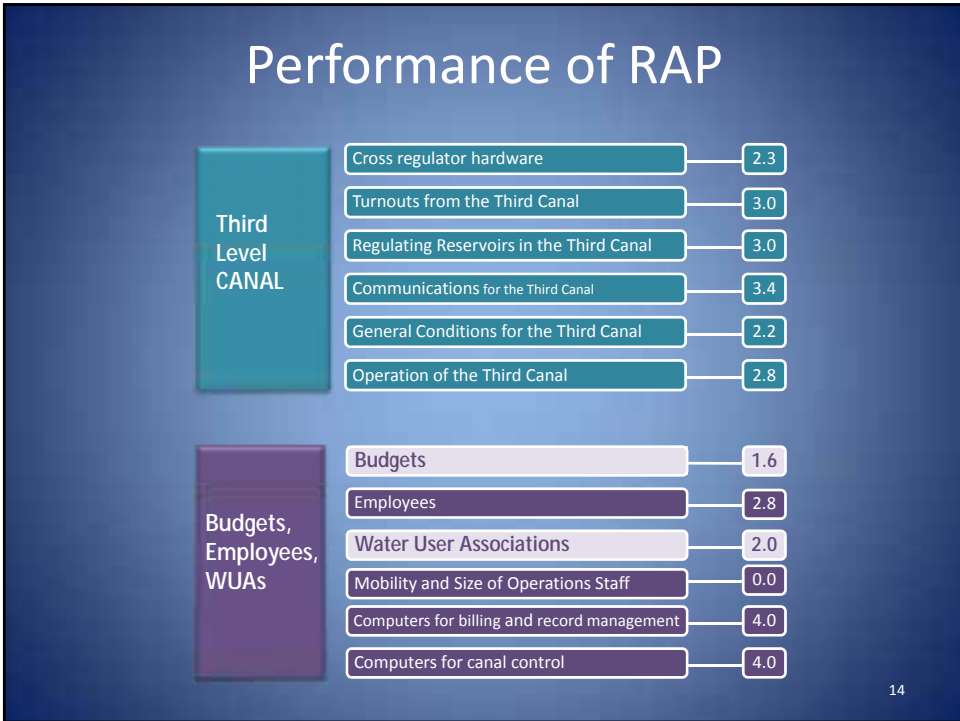
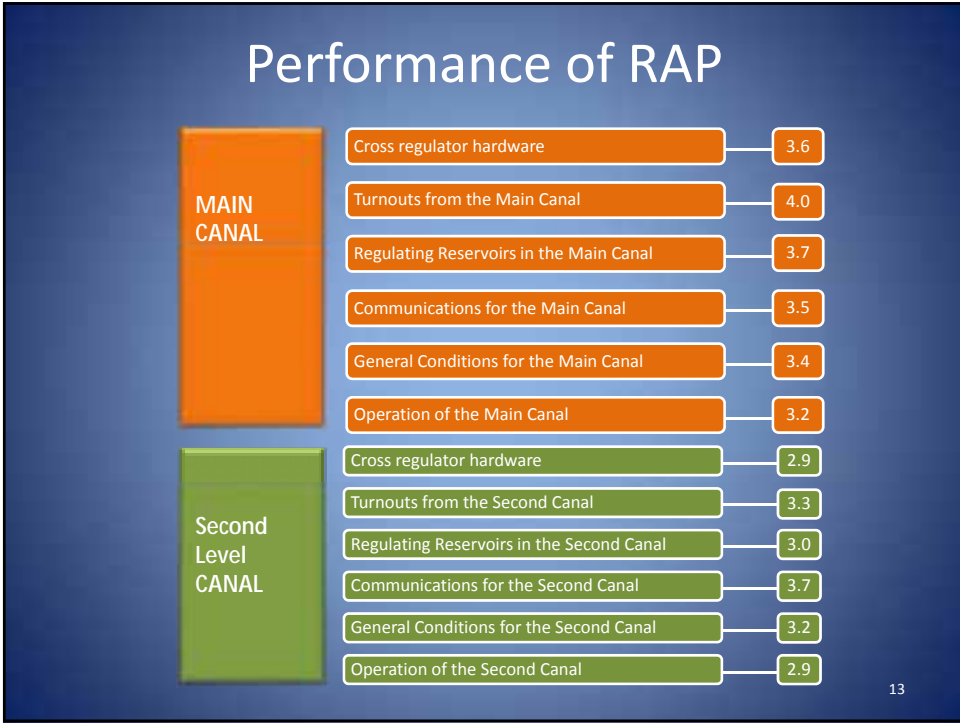
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Performance of RAP

Internal indicator

SERVICE
and
SOCIAL
ORDER

<u>Actual</u> Water Delivery Service to Individual Ownership Units	3.0
<u>Stated</u> Water Delivery Service to Individual Ownership Units	3.1
<u>Actual</u> Water Delivery Service at the most downstream point in the system operated by a paid employee	2.7
<u>Stated</u> Water Delivery Service at the most downstream point in the system operated by a paid employee	3.2
<u>Actual</u> Water Delivery Service by the Main Canals to the Second Level Canals	2.8
<u>Stated</u> Water Delivery Service by the Main Canals to the Second Level Canals	3.3
Social "Order" in the Canal System operated by paid employees	



Performance of RAP

Internal indicator: Budgets

Budgets	1.6
What percentage of the total project O&M is collected from water users?	0.0
Adequacy of the actual dollars and in-kind services that is available to sustain O&M.	4.0
Adequacy of spending on modernization of the water delivery operation/structures	0.0

1. The water fee is subsidized by the government.
2. The spending on modernization is low because the irrigation system is well-developed.

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Performance of RAP

Internal indicator: WUAs

Water User Associations	2.0
Percentage of all project users who have a functional, formal unit that participates in water distribution	0.0
Actual ability of influence real-time water deliveries to WUA.	3.0
Ability to rely on effective outside help for enforcement of its rules	3.0
Legal basis for the WUAs	4.0
Financial strength of WUAs	3.0

1. There are 340 WUAs (Working Groups), most members of WUA are volunteers.
2. The main objective of WUA is to operate, maintain and repair the neighbor farm ditches.

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MODERNIZATION SCHEMES

SERVICE
& SOCIAL
ORDER

More investment on the member education and the concept propaganda to prevent unauthorized outlets and implicit operation.

MAIN
CANAL

Setting up automatic monitors at the key spill points.

Second
Level
CANAL

Increase the typical change in water surface elevations across an off-take.

Third
Level
CANAL

Renovate the canal floor and banks to prevent seepage.

Budgets,
Employees,
WUAs

Assess the composition of WUA members and funds spending.

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Conclusion & Suggestion

- To complete the whole MASSCOTE approach procedure, some shortages of data must be investigated.

- **The BOD and COD of drainage** for Project office question
- **Flow rate of the regulators and off-takes** for System sensitivity
- **Water fee collected from water users** for Budgets
- **Composition of WUA members** for WUA

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Conclusion & Suggestion

- Suggestions of indicator adjustment

The index of Mobility and Size of Operations Staff

$$= \frac{\text{Turnouts}}{\text{The staff}} \Rightarrow \frac{\text{Turnouts}}{\text{Farm irrigators}}$$

The overall efficiency of water : water required / water supplied

$$= \frac{\text{ET} - \text{effective rainfall}}{\text{Surface irrigation water}} \Rightarrow \frac{\text{ET} - \text{effective rainfall} \times \text{coefficient}}{\text{Surface irrigation water}}$$

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Thanks for Your Attention

Crystal – Appreciation



(Assigned from – The Promise of Life, Water Knows)

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