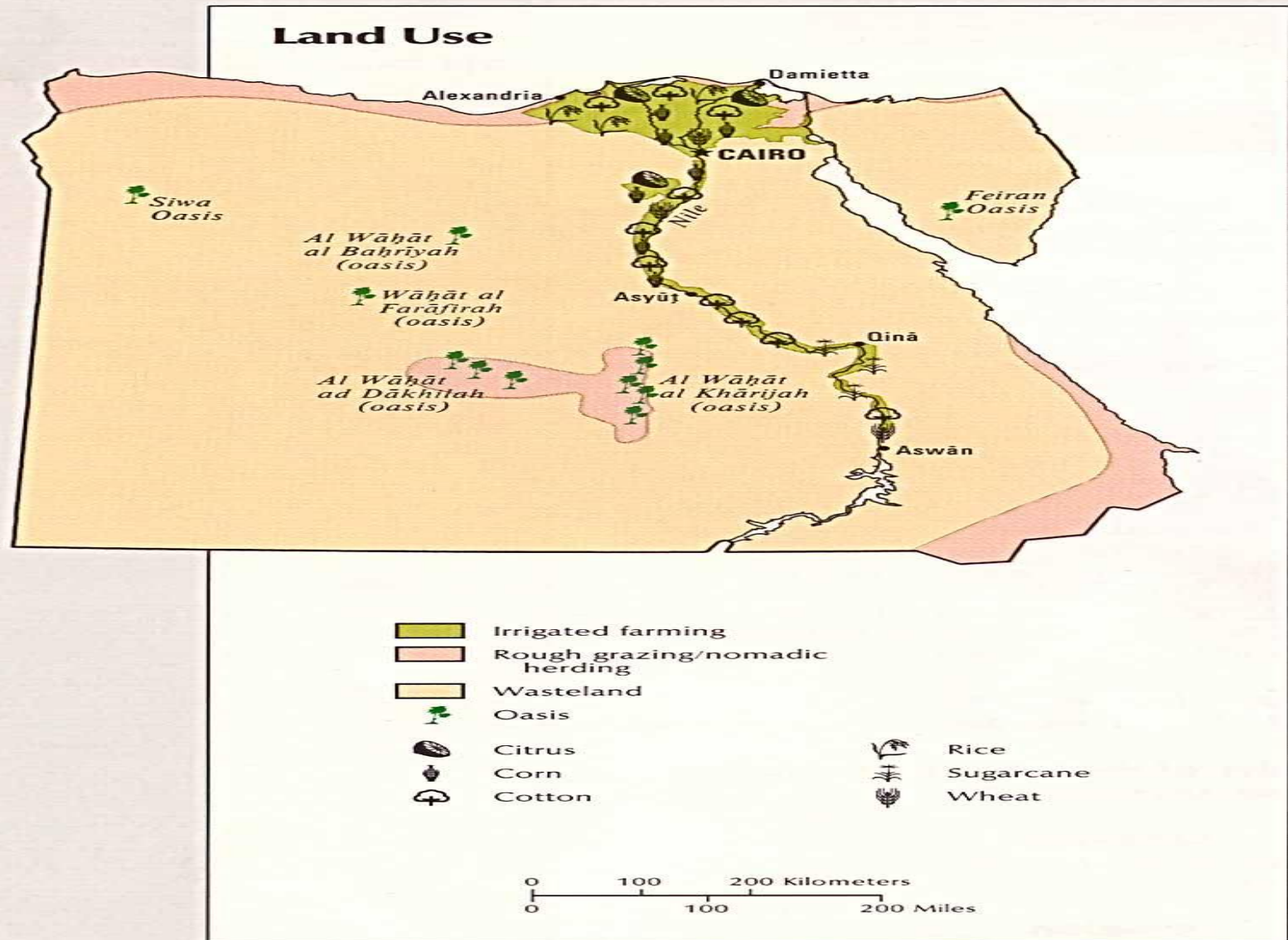


# Coping with water shortages in the Fayoum Irrigation System

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Enhancing efficiency in  
agricultural water use

# Land use in Arab Republic of Egypt



# Fayoum Depression and Governorate

## Geography

Depression that yearly flooded during rainy season

Level at Intake at N +20

Lake Quarun -37

Communities along Boundary that cultivate using receding water

(1 crop)

Flood control and gravity irrigation systems to irrigate alluvial lands

(2 crops)

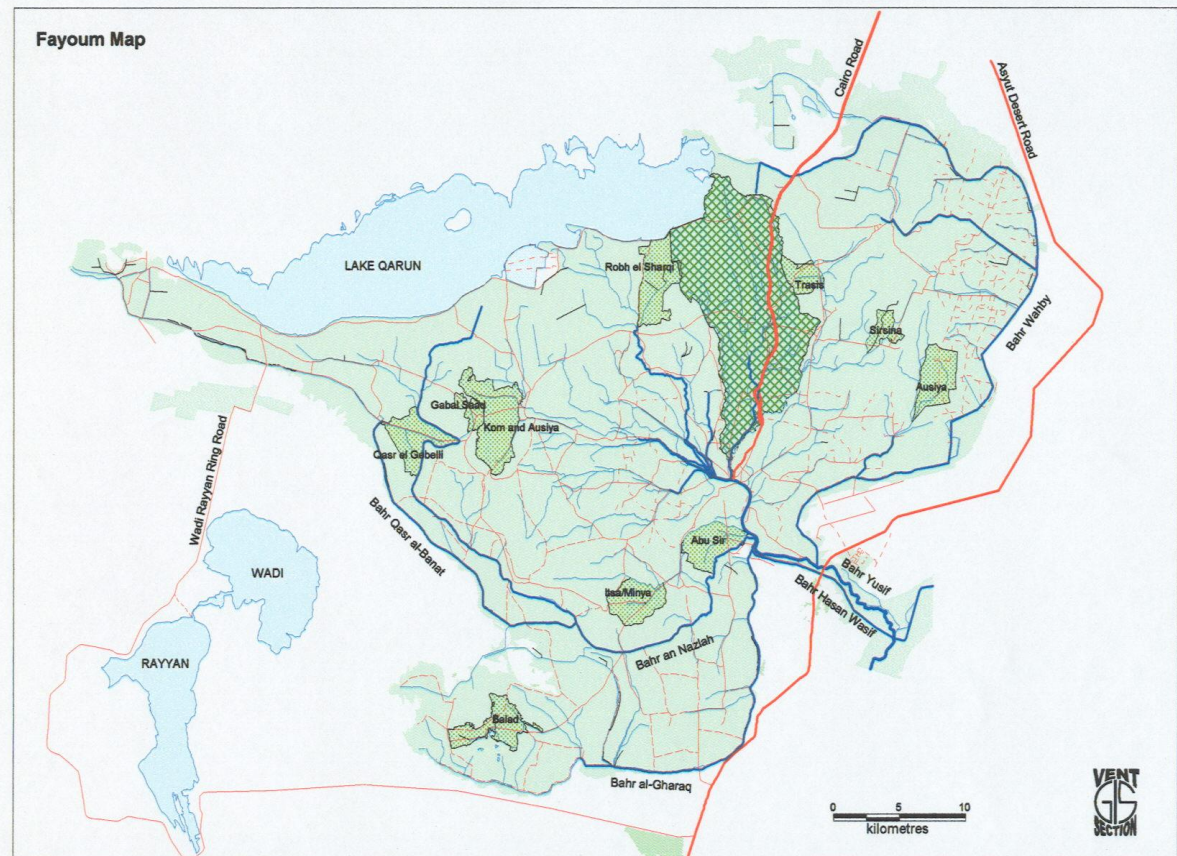
Fayoum Governorate

Political administrative Unit

8 Administrative Districts

8 Water Management

Districts



# Design and Management Fayoum Irrigation System

## Gravity irrigation system old lands

- a. Tertiary system private property managed on communal basis (WUG)
- b. Main, primary and secondary systems public property and managed by FID
- c. Movable gates in intakes head, main and primary canals operated by FID
- d. Fixed gates with proportional distribution inside primary canals (primary and secondary canals till intakes tertiary canals)
- e. Water delivery to tertiary canals where Water Users groups organize rotation system on the basis of proportionality principle (mutarfa)

## Lift pump irrigation system new lands

- a. Commercial farmers install lift pumps and reclaim land along the main canals constructed along the outer boundary of the Fayoum depression
- b. Licensing of pumps with specified lifting capacities by FID



# Fayoum Case 1:

## Water shortage causes

- Uncontrolled rice cultivation in the centre of Fayoum irrigation system (quota 15.000 ha, actual 100.000)
- Uncontrolled land reclamation along the border of the Fayoum irrigation system
- Winter crops like wheat, maize onions and alfa-alfa (November-April) require less water that system can supply and distribute
- Summer crops like rice, maize and cotton (May-August) require much water that system fails to deliver fairly (design and O&M shortcomings)

## Water management challenges

- Conflicting interests upstream and downstream riparian in Nile River basin
- Conflicting interests between governorates
- Conflicting interests between agricultural, residential and industrial water uses in governorate
- Conflicting interests between farmers growing crops with high water demands (rice and cane) and those forced to grow crops with low demands (sorghum and sunflower)
- Conflicting interest between farmers in up- and downstream reaches of canals (prior appropriation)
- Conflicting interests farmers cultivating old and new lands (summer season)

# Fayoum Case 2:

## Features of water shortage

- In tail reaches of system 80-100% land fallow
- Damaged water distribution systems (fixed weirs) In rice growing areas to manipulate proportional distribution system (illegal)
- Raising water levels at weirs and gates by blocking water flow to downstream (illegal)
- Water stealing rice farmers with syphons from canals during the night time (illegal)
- Taking water from drain by raising the water levels through earthen dams (illegal)
- Pumping water from drains system (illegal)

## Water Agency's attempts to deal with shortage

- Request extra water from Lake Nasser for primary canals where farmers grow rice (maximum discharge reached)
- Request to expand conveyance capacity canals along boundary to deliver extra water to new lands
- Operation rules of the system that are approved by the parliament of the Governorate
- Rice quota distributed to farmers and sanctions against farmers growing rice without quota
- Irrigation police who supervises operation rules/quota at sensitive water distribution points in the primary canals
- Legal cases against offenders of the operation rules

# Regulatory and knowledge instruments for dealing with water shortages

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- Entitlement of old and new water rights
- Develop water accounts frameworks
- Agricultural policy to influence crop planning of farmers
- IWRM policy to distribute scarce water resources between different uses
- IWRM policy to promote controlled reuse of waste water
- Information on existing and potential water supply
- Information on existing uses and value of water
- Review possible water distribution and reuse scenario and estimate costs and benefits
- Support decision making on policies to enhance efficiency in water resources use

# Present demand management policy

## GoE present water demand policy

- a. Area quota system for high demand crops (rice and cane)
- b. Minimize water losses in conveyance and distribution systems (maintenance and lining)
- c. Minimize on-farm water losses (drip, sprinkle irrigation and land leveling)
- d. Controlled reuse of drainage and waste water

## Implementation problems

1. Water agency lacks funds for proper O&M of system
2. Water agency supplies extra water for rice even if planted illegally
3. Enforcement of demand policies very weak since no local constituency
4. Enforcement of operation rules very weak because local elite are main offenders of operation rules
5. Water agency no funds for controlled reuse of drainage water
6. Control and enforcement of pump abstraction licenses new land too weak

**Commercializatio** non-enforcement of rules and regulations

# Future demand management options in FIS

## GoE future water demand policy

- A. Enforce centrally fixed cropping plans on canals/farmers
- B. Economic instruments (water charges, levy on export product with high water demands or price subsidies for high-value export crops with low water demands)
- C1 Negotiated and transparency water distribution
- C2 Improved entitlements through negotiations or markets

## (Virtual) water balances

- Balance of import and export of virtual water through agricultural crops

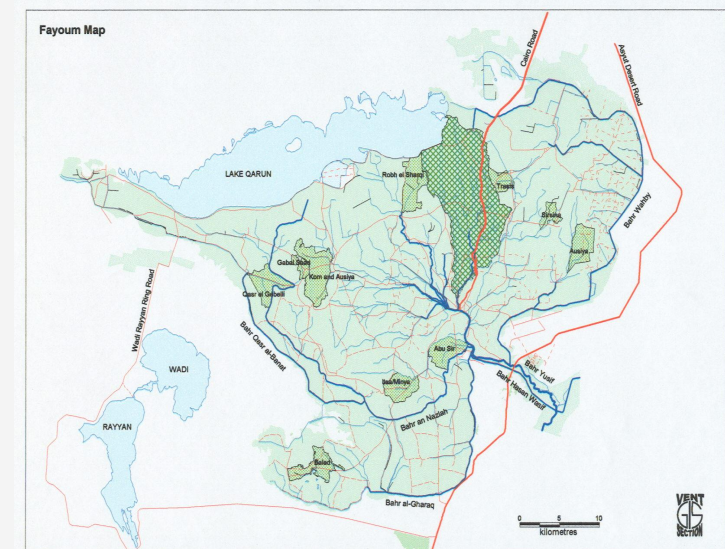
1ha rice = 18.000 m<sup>3</sup> water = 6 tons paddy = Euro 3000  
(1m<sup>3</sup>=Euro 0.16.6)

1ha cotton = 6.000 m<sup>3</sup> water = 1.5 tons of cotton= Euro 2000  
(1m<sup>3</sup>=Euro 0.20)

By exporting 4.5 ton cotton and importing 6 ton of rice the country earns Euro 3000 compared to growing rice for own consumption uses same amount of water

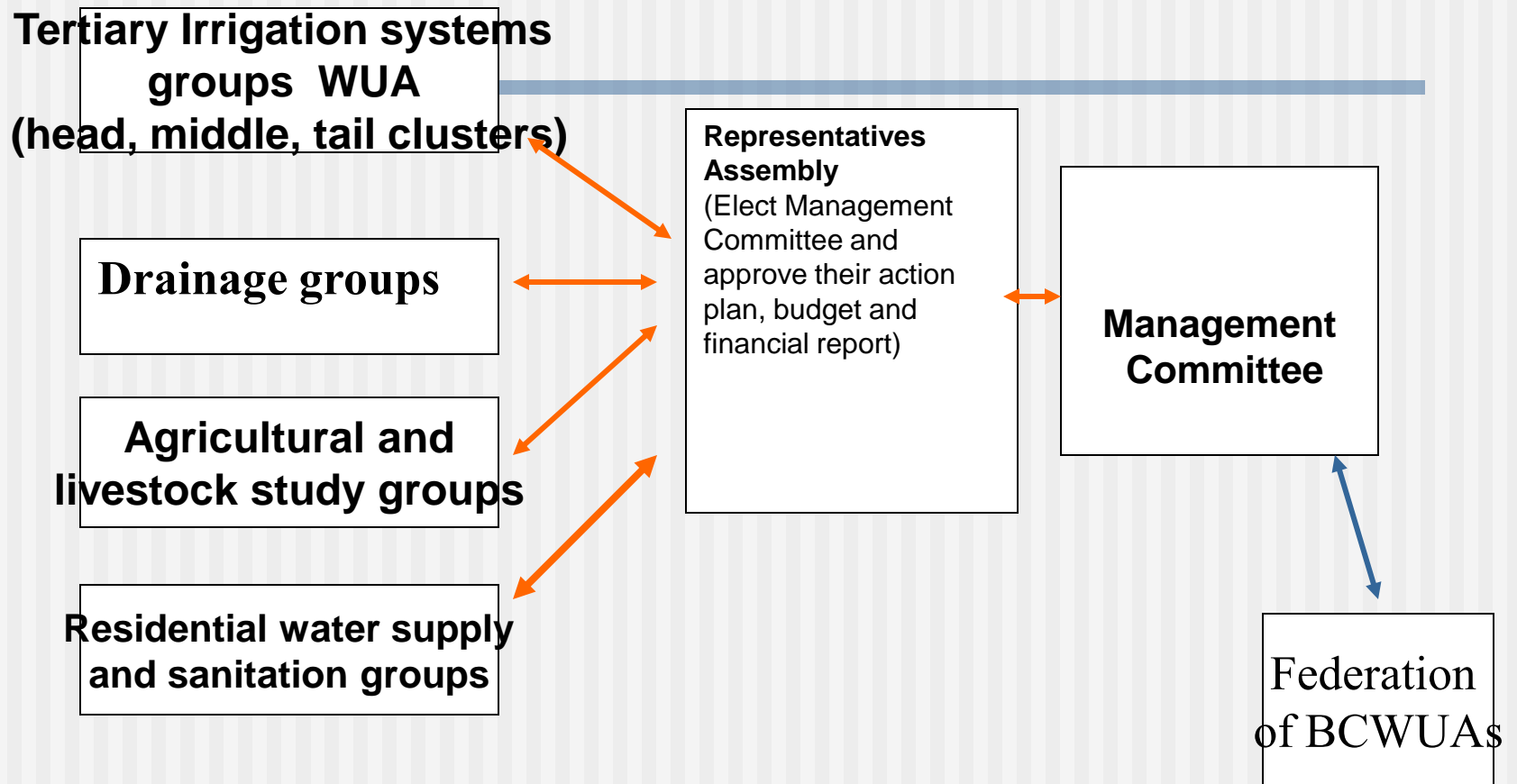
# Piloting Water Users Organizations

- Improve IWRM governance system
- Promote public-voluntary sector partnerships
- Promote social change in use water resources through dialogues (micro-meso-macro)
- Enhance social ownership and control of demand management and water quality policies

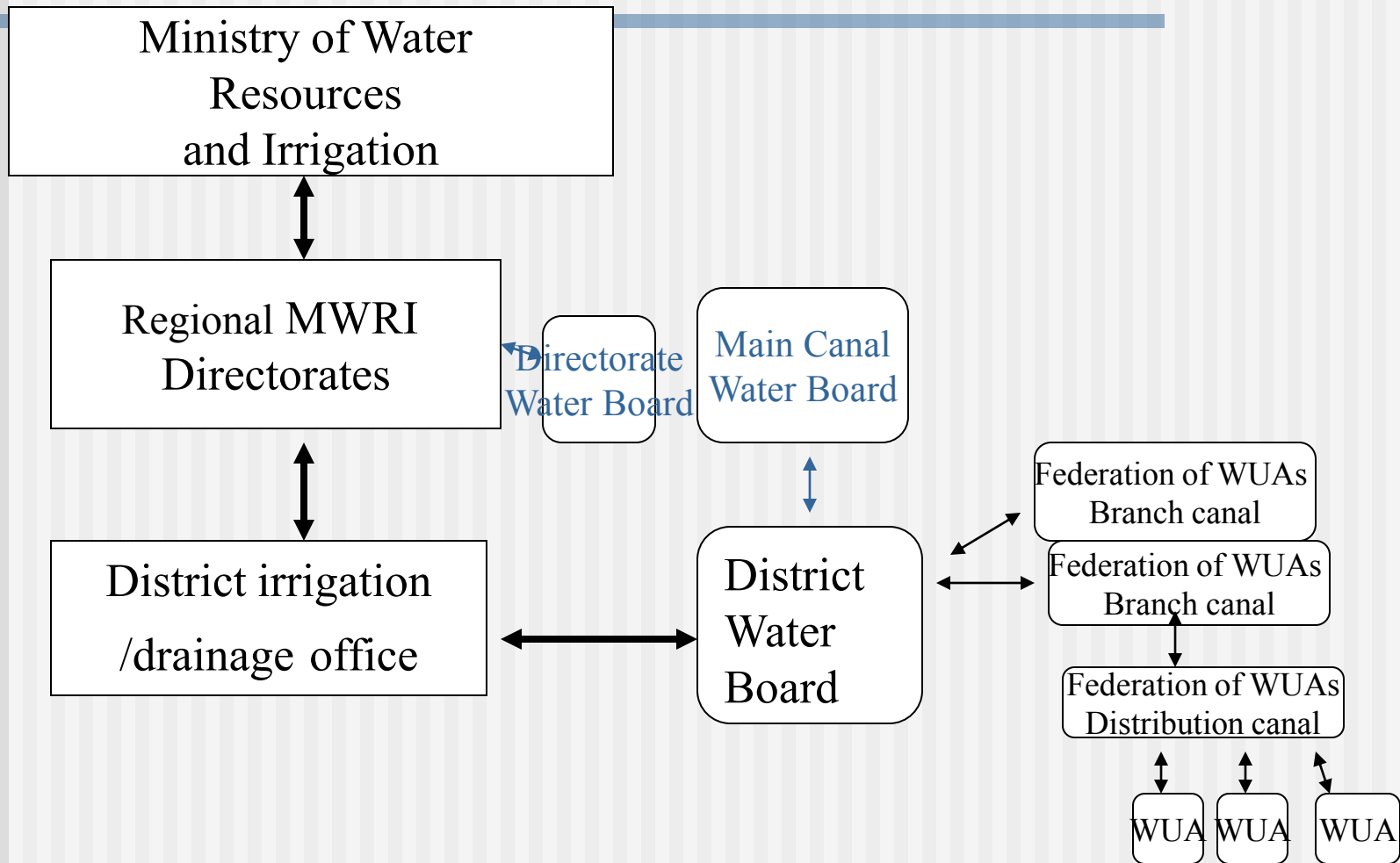




# Organization Model for Branch Canal Water Users Association



# Water Administration



# Joint WA-WUO management of gravity system with proportional distribution

## Maintenance

- Annual WUO priority setting repairs
- ID-WUO consultation priorities, design and funding options
- ID major repairs and WUO minor repairs
- Repairs during closure period
- WUO ownership of repairs

## Operation

- ID divides water between primary canals based on last years volumes and complain management
- Local elite and WUO complain about tail end problems
- ID and WUO agree, supervise and enforce jointly Operation Rules of primary and secondary public canals

# Administrative arrangements of WA-WUO partnership

## WUOs Internal regulations:

- Aims and activities of organization, organization structure, representation principles, decision making modalities including for conflict resolution
- WUO control WA through Governorate parliament
- Mandate of WA to monitor and supervise WUO

## Partnership

### •Tasks and responsibility matrix

O&M functions, activities and responsibilities of parties

### •Memorandum of Understanding

Agreement on planning, implementation and M&E procedures of joint O&M activities, and mandates of District Engineer and WUOs in joint management of public owned canals

## Water Administration

- Governorate level (water supply/irrigation/drainage/Advisory services) focus on organizational functions (supervision by Governorate parliament)
- Decentralization of operational functions to District Engineer and WUO to enable application of participatory approaches

# Multi-actors' ideas on coping with water shortages (1)

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## Agriculturalists

- Coordinated crop planning at branch canal level
- 10 or 15 days estimation of crop water demands and adjustment of supply
- Test water saving cultivation and water management techniques
- Controlled reuse of drainage water to limit salinity problem

## Economists

- Specify the groups and individual water entitlements
- Charge water fees for delivered/used water to cover maintenance costs
- Create institution/regulations for exchange, rent and sell water rights
- Water users in tertiary units with the highest production value per M<sup>3</sup> of water can pay highest price

# Multi-actors' ideas on coping with water shortages (2)

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## Commercial farmers

- Water rights directorate need to be increased
- Water agency improves operation and maintenance of water courses and structures
- Water agency invests in construction and management reuse pumping station
- No restrictions on farmers for crop planning and no water charges

## Subsistence farmers

- Fair and proportional water distribution system
- No water charges and no restrictions on cropping plan other than proportional water duty (10080 minutes/150ha=67 minutes/ha)
- Exchange of water rights for rice cultivation within informal groups
- Water agency stops giving privileges to influential water users/commercial farmers
- Offenders of operation rules pay for repairs of structures and compensate downstream farmers

# Multi-actors' ideas on coping with water shortages (3)

## Civil engineers

- Clear operation rules and enforcement on offenders through sanctions (irrigation police)
- Clear quota rules and enforcement on offenders through sanctions
- No involvement of local politicians (wasta) in water distribution policies
- Controlled reuse of drainage water to limit salinity problem

## Social scientists

- Water users need to be organized and have legitimized leaders (WUO)
- Other stakeholders involved in a Public-Private-Voluntary sector partnership
- Stakeholders develop jointly a diagnosis and a strategy to cope with seasonal water distribution problems
- Joint action plan developed for pilot area where the strategy is tested
- Participatory monitoring and evaluation system that enable jointed learning of all stakeholders.

# Group work on potential alliances for DM options

Options/ Actors	Impose cropping plan on canal/ farmers	Use water charges and develop water market	Improve water entitlement systems
Agricultural engineer			
Economist			
Commercial farmer			
Subsistence farmer			
Civil engineer			
Social scientist			