

Jordan Valley Authority
Cost/Tarriff Model

Final Meeting

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FORWARD

Collaborative Approaches for Resolving Water Issues



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Introduction

On 13 August 1998, JVA secretary-general Dr. Dureid Mahasneh, senior JVA staff from Amman and the valley, the WAJ Director of Subscribers, and FORWARD team members gathered in Amman for the final policy/planning workshop for the irrigation water cost/tariff model.

The purpose of the workshop was to:

- update the JVA secretary-general and staff on changes occurring since the interim meeting in April;
- review and assess current costs, including capital costs and revenues;
- review the model's policy and planning uses;
- consider performance measures;
- discuss model training and transfer to JVA; and
- discuss the scoping mission for the Financial Accounting System (FAS).

In his opening remarks, Dr. Mahasneh welcomed the participants and asked his staff to engage in workshop sessions, particularly the discussion on the scoping mission for the FAS. Dr. Mahasneh restated the importance and need for a new financial system that would enable JVA to realize its fiscal autonomy. He emphasized the need to use the model for future planning scenarios and tariff restructuring. In asking his staff whether the water tariff charged to the farmers was fair, Dr. Mahasneh triggered a discussion which demonstrated the importance of FORWARD's planning and policy tools for JVA.

Review of the Interim Workshop and Changes to the Model

FORWARD thanked JVA staff for their attendance and full cooperation through the course of the model development. A review of the April workshop followed, focusing on:

- **Model Overview** — A presentation of the model cost and revenue centers, capabilities and uses, water quality zones within the model, and layout of the water system.
- **Basis of Water Use Forecast and Water Balance** — An overview of the cropping patterns and their water requirements and the seasonal water balance of JVA irrigation system, including water transfer at Deir Alla node.
- **Preliminary Operation and Maintenance (O&M) Costs** — In April, FORWARD presented the cost centers and identified the O&M costs at different levels of the

system. Upon the minister's request, FORWARD added the capital cost component, but did not present it at the April meeting.

The FORWARD team discussed the following changes to the model that had taken place since the April workshop:

- **Cost Allocation** — In the April workshop, JVA staff asked FORWARD to review the allocation of O&M costs between water and non-water activities. Cost allocation of items related to temporary labor, maintenance of roads and other infrastructure services were reviewed with JVA staff, and data updates were entered into the model.
- **Wadi Water Rights** — JVA and FORWARD agreed to consider the wadi water rights as part of JVA delivered water, since JVA incurs some costs in maintaining its sources and systems. As such, the real unit cost of water should include that quantity, but JVA does not bill farmers who have such rights. It is an issue of whether water rights are a government expense for the national benefit or should be a JVA expense as a utility operating the system. FORWARD addressed this issue in the model, stating that JVA could define their unit costs with or without water rights until this issue is addressed at the policy level.
- **Deir Alla Transfer** — During the April workshop, JVA and FORWARD reviewed the issue of Deir Alla transfer costs. Issues related to additional costs that JVA incur to operate KAC and supply sources (North Conveyor and Wadi Arab Dam) were raised. In the model, a separate sheet for Deir Alla transfer was designed. Deir Alla sheets include cost of services and other considerations such as lost opportunities of Kufrnaja Wadi. JVA could add other expenses to the sheet in the future.
- **Capital Costs** — The Minister of Water and Irrigation asked FORWARD to include the capital cost component of JVA projects over the last 20 years, and FORWARD re-designed the cost center sheets to reflect this. Now, the capital cost component would be activated or deactivated based on JVA desire to look into cost recovery of capital expenditure.
- **Inclusion of Mujib Project in the Forecasts** — JVA awarded the construction of the Mujib integrated water system. It is anticipated that after a three-year construction period, within the timeframe of the model forecast, the system will be operating and generating revenues. FORWARD included the projects anticipated costs and revenues in the model for planning forecasts.

Assessment of Current Costs

FORWARD presented the model's revised cost estimates of discrete cost centers. Cost centers and their related 1997 costs were presented for each system component including KAC, pumping stations, primary sources, and the secondary irrigation system. The unit cost of major supply sources as part of the primary system were also identified

and presented. The overall JVA unit cost from alternate perspectives of billed, delivered, or produced water quantities was discussed in the workshop. There was general agreement on how FORWARD defined these terms. The total cost of service was separated between O&M and debt service costs.

The capital cost component includes international loans but not local funds, because they carry no debt service. Certain costs appeared higher than others because the model reflected actual payments, and some loans carried grace periods. The latter may have had no payments at all during 1997.

The most expensive sources in JVA are the Wadi Arab Dam and the North Conveyor. Pumping constitutes the major cost for both resources. The figures also show that Karameh Dam has a major capital cost component with a zero O&M cost, since it was not operated.

Assessment of Current Revenues

The model results of irrigation water revenues were also presented. JVA revenues in 1997 totaled JD 2.432 million. This includes the collection of 1997 bills and of previous outstanding farmers' debts. It is assumed that 67% of the bills are collected. The unit revenue per cubic meter of water is 16 fils in 1997 and 15 fils in 1996. If all the bills are collected, last year's potential revenues could total JD 3.212 million.

Potential revenues from the supply of water to Deir Alla intake in 1997 are JD 1.65 million.

Transfer At Deir Alla

The FORWARD team presented the estimated cost of service and possible pricing of JVA water to WAJ at the Deir Alla transfer to Amman. FORWARD worked with the minister and JVA staff to assign the sources of supply to Amman. As a result, the costs of the North Conveyor and Wadi Arab sources were shown in the Deir Alla sheet. Other costs considered in the Deir Alla sheet are the O&M of the conveyance using portions of the KAC.

JVA proposed that other considerations be reflected in a possible transfer water price at Deir Alla, such as:

- lost sale of irrigation water from the Kufranja Wadi due to WAJ wastewater discharges;
- additional KAC operating costs in supplying the right quality and water level at the transfer point;
- the cost of incremental capacity in Wadi Arab and North Conveyor; and
- cost differences in water quality that JVA receives from WAJ.

WAJ representative, Kamal Zoubi, expressed concern over the narrow assignment of the most expensive sources of supply in the north to WAJ and suggested that all of the sources be included in the calculation. There was some discussion on how the current methodology was developed, which reflected the position of the minister and JVA staff that the Wadi Arab project would not have been developed if the diversion at Deir Alla had not occurred, and that the water arrangement with the Israelis would mainly provide water to Amman to meet its municipal demands.

Dr. Mahasneh explained that as WAJ moved toward working with an outside contractor, it was necessary to account for all water transported by the system. It was not possible to show free water in the system; costs had to be allocated to each part of the supply. As discussed during the peace talks, the water served a national purpose of meeting a deficiency of drinking water in cities, and thus the cost should be accounted for accordingly.

FORWARD's team further explained that this scenario of Deir Alla pricing was only an initial presentation of information and a modeling tool to begin the negotiations between JVA and WAJ on a possible price of water at Deir Alla. It was apparent that there are still many outstanding issues that need to be resolved.

Water Quality Zones

FORWARD first discussed the definition of four types of water qualities within the JVA system for pricing purposes, termed Qualities 1,2,3 and 4. This water quality categorization indicates quality degradation:

- Quality 1 represents freshwater in KAC and other water sources that are not mixed with treated wastewater.
- Quality 2 is mixed KAC water and King Talal Water Reservoir(KTR).
- Quality 3 is KTR water used unmixed in some stage offices in the valley.
- Quality 4 is water stored in Karameh Dam and mixed with KAC water to supply the new irrigation areas in the southern parts of the valley. Water qualities would be priced differently based on their impacts.

Suheil Wahsheh from JVA expressed concern over the use of the term "freshwater," saying a careful definition of the quality category needed to be applied. FORWARD's team responded that the quality categories represented geographic zones within JVA where the quality was nearly the same, pointing out that the quality was generally highest in the north and poorest in the south. Zafer Alam said that some stages, such as Stage 9, may get three different water qualities during the year. The FORWARD team said that the model was designed, if fed the appropriate data, to consider these issues.

Policy/Planning Scenarios and Performance Measures

Six different major planning and policy scenarios were presented to illustrate the model's use in this area. It was emphasized that these scenarios did not represent policy recommendations, but were examples of a range of possible uses of the model to illustrate its output.

The first scenario addressed a "No Action" future whereby costs increase over time but nothing is done to change the tariff. This showed poor financial performance with respect to covering operation and maintenance costs (Scenario 1a) and very poor financial performance covering both O&M and capital costs (Scenario 1b). The next scenario (2a) dealt with attaining 100% O&M cost recovery simply by increasing the current tariff structure by over 130% and taking no other efficiency measures. It was agreed that none of these initial scenarios was desirable. The discussion then turned to planning scenarios of what could be done to address these financial performance issues.

The next scenario (2b) showed how the potential irrigation tariff increase could be dampened by 50% if the bill from WAJ for the Deir Alla transfer of supplies were collected. The next scenario (2c) showed that by collecting from WAJ, improving irrigation billing collection efficiency from 67% to 90%, and by cutting staff salaries by 20%, JVA could avoid an irrigation tariff increase altogether and still attain 100% O&M cost recovery.

Scenario 3 illustrated what would happen if JVA collected from WAJ, but placed the remaining needed tariff increase (to attain 100% O&M cost recovery) only on a summer tariff, in order to promote winter water use for leaching and use of surplus winter supplies.

Scenarios 4, 5 and 6 provided an indication of several possibilities for JVA water quality pricing (also assuming 100% collection of WAJ bills). Scenario 4 reflected pricing subsidies for low quality (Q4) irrigation water that would be covered only through increased charges for high quality (Q1) water, i.e., JVA internalization of the subsidy.

Scenario 5 reflected two increasing subsidies of lower quality (Q3 and Q4) water with a minor portion borne internally and recovery of a water quality impact fee of about 900,000 dinars from the WAJ through the Deir Alla pricing.

Scenario 6 illustrated both an increased subsidy by JVA and WAJ so that all three categories of degraded irrigation supplies (Q2, Q3, and Q4) received some degree of pricing break.

The FORWARD team discussed the model's ability to assess anywhere from one common tariff that is applicable year-around and doesn't distinguish between qualities and usage levels, up to ten different usage blocks, two seasonal tariffs, and four water qualities, giving a total potential of 80 different charges (10 x 2 x 4) in a more

complicated tariff system. However, they cautioned that while the model could assess such a wide range of possibilities, it was impractical to implement too many tariffs. The group then discussed the administrative complexity of keeping track of seasonal and quality aspects of water sale. Some farmers in the system could see different prices every few months as seasons, water quality, and usage levels varied. This would make for difficult customer relations, public education on the price of water, confused pricing signals, and difficult budget planning for the farmer.

The secretary-general said that a simple task force should be set up to study a possible tariff structure. He saw a need for a legal study on the possible impacts of any admission that JVA might be distributing low quality water. In the future, as farmers become more sophisticated, he thought they might use such information as a basis for suing the government for production losses. Dr. Mahasneh stated that the whole question of quality should not be brought up in the tariff context without further scientific and legal study.

User's Manual and Model Transfer

The FORWARD team discussed the pending finalization of the user's manual and training for model operators and other JVA staff. It was agreed that FORWARD would arrange the time and participation for the training. There was some discussion on the need to create a defined planning function within JVA that is close to decision-makers.

The requirement that the model be updated on a regular basis in order to maintain its effectiveness as a planning tool for JVA means that coordination between various sections and directorates in JVA and the ministry will be necessary. It was determined that the team responsible for updating the model should have access to information at JVA and MWI, financial management skills, and knowledge of utilities.

Financial Accounting System

The FORWARD FAS scoping team defined a financial accounting system and described the current FAS program. The presentation focused on the different aspects of the design mission including data gathering, interviews with stakeholders, and developing local cost information for implementing various approaches in a new system. This information is summarized in a workplan for the design and implementation of the new FAS. The FAS scoping team leader, Heather Bailey, emphasized that the limited purpose of the present mission was to develop the scope of services and workplan, not to begin actual design of a new FAS. There were three phases to a FAS process: defining the scope of services, and cost and design issues; design of the FAS; and, implementation.

Several questions were asked about what financial data JVA staff needed or were missing. It became clear that the accounting data that are routinely used for decision-making in JVA are insufficient. This was the type of information that JVA would need to

make full use of the new financial model, and such data would make it possible to develop water pricing to recover actual costs.

The secretary-general spoke at length on the need for an improved financial data system and the future of operating JVA as an autonomous business. One JVA staff member said it would be difficult to change over to new forms and requirements and that a new system should build on what is already in place. Dr. Mahasneh said that the current system was not producing enough data about what was really going on in the valley. He asked his staff for their opinions on whether the Authority's water was over-priced or under-priced, and got mixed responses. Dr. Mahasneh summarized that because of the lack of good basic financial data, it was obvious that they currently didn't know what the proper charges should be, and that the new FAS effort should be strongly supported. Dr. Mahasneh said it was time to look at the system as a whole, and get back to the broader vision of JVA's role rather than the restricted role of supplying agriculture.

The workshop then concluded with FORWARD thanking Dr Mahasneh. The secretary-general then thanked the FORWARD team for their past and current quality efforts to assist JVA.

Annex A List of Participants

H.E. Dr. Dureid Mahasneh	Secretary-General JVA
Zafer Alem	Deputy Secretary-General JVA
Dia Madani	FORWARD Coordinator of JVA
Mohammed Habashneh	Assistant Secretary-General for O&M
Avedis Serpekian	Assistant Secretary-General for Rift Valley Development
Bilal Bashir	Assistant Secretary-General for Environment and Technology Transfer
Tayseer Massalha	Director of Central Operation and Maintenance
Mohanad Qudah	Assistant Secretary-General for Irrigation Projects
Suhail Wahsheh	Secretary-General Advisor
Shaker Bakheet	Financial Director
Farouk Kanan	Director of the Southern Ghors
Mohammed Saymeh	Irrigation Directorate
Kamal Zoubi	WAJ Director of Subscribers
Ibrahim Alkum	WAJ Model Operator
Samir Dweiri	FORWARD
Maha Khatib	FORWARD
Ahmed Azzam	FORWARD
Heather Bailey	FORWARD
John Folk-Williams	FORWARD

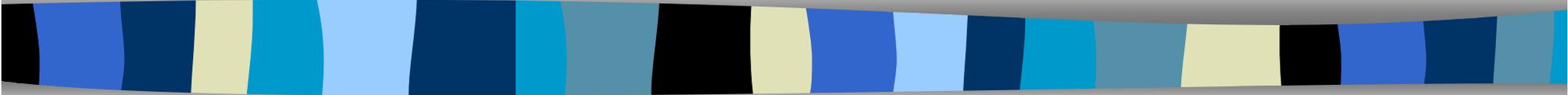
Tony Bagwell

FORWARD

Raed Daoud

FORWARD

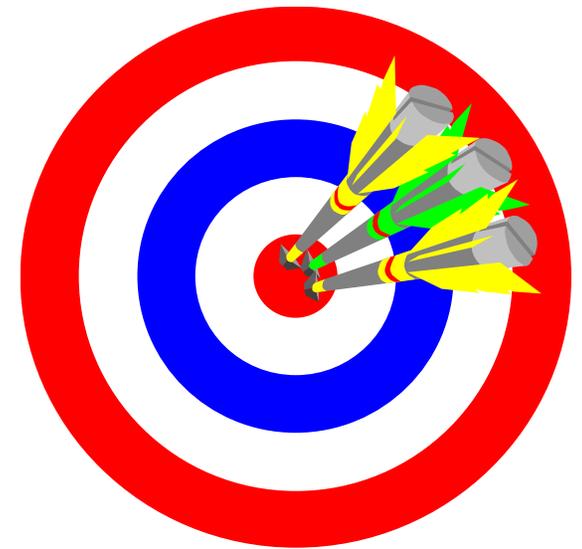
Final Policy and Planning Workshop



*Jordan Valley Authority
Cost/Tariff Model*

Goals of the Final Workshop

- Update Staff on Changes since April Workshop
- Review Current Revenues & Costs
- Review Model's Uses for Planning and Policy Purposes
- Discuss Model Training and Transfer
- Discuss Financial Accounting System Design Mission



Review of the April Workshop

- Model Overview
- Basis of Water Use Forecast & Water Balance
- Cost Centers & Preliminary O&M Costs
- Changes since Previous Meeting
 - ✓ Costs Allocation
 - ✓ Water Rights
 - ✓ Deir Alla Transfer
 - ✓ Capital Costs



Unit Cost by Supply Sources for 1997 (fils/m³)

<u>Source</u>	<u>O&M</u>	<u>Cap</u>	<u>Tot al</u>	<u>Source</u>	<u>O&M</u>	<u>Cap</u>	<u>Tot al</u>
Yarmuk	1	0	1	Karama h	0	26	26
N.Conv eyor	18	0	18	Shuieb	2	0	2
Mukhei ba	1	0	1	Kafrein	6	6	12
Wadi Arab	16	30	46	Hasa, etc.	5	1	6
KTR	4	21	25	Wadi Araba	5	0	5



Cost by System Component

	<u>1997 Cost (mill.JD)</u>		
<u>Item</u>	<u>O&M</u>	<u>Capital</u>	<u>Total</u>
Sources	2.002	3.807	5.809
KAC	0.653	0.532	1.185
Pumping	0.680	0.308	0.988
<u>Secondary</u>	<u>1.899</u>	<u>2.676</u>	<u>4.575</u>
Total	5.235	7.322	12.557



O&M Costs

<u>Item</u>	<u>1996</u>	<u>1997</u>
O&M Costs (mill.JD)	4.713	5.235
<u>Water Billed (mcm)</u>	197.825	191.168
<u>Unit O&M Cost of Billed Water (fils/m³)</u>	0.024	0.027
<u>Water Delivered (mcm)</u>	216.487	204.135
<u>Unit O&M Cost of Delivered Water (fils/m³)</u>	0.022	0.026
<u>Water Available (mcm)</u>	298.584	342.396
<u>Unit O&M Cost of Produced Water (fils/m³)</u>	0.016	0.015



Total O&M + Capital Costs

<u>Item</u>	<u>1996</u>	<u>1997</u>
Total Costs (mill.JD)	12.174	12.557
<u>Water Billed (mcm)</u>	197.825	191.168
Unit Cost of Billed Water (fils/m ³)	0.062	0.066
<u>Water Delivered (mcm)</u>	216.487	204.135
Unit Cost of Delivered Water (fils/m ³)	0.056	0.062
<u>Water Available (mcm)</u>	298.584	342.396
Unit Cost of Produced Water (fils/m ³)	0.041	0.037



Revenues from JVA Subscribers

<u>Item</u>	<u>1996</u>	<u>1997</u>
Revenue (mill.JD)	2.405	2.432
Water Billed (mcm)	197.825	191.168
Unit Revenue of Billed Water (fils/m ³)	.012	.013
Billing Collection	67%	67%

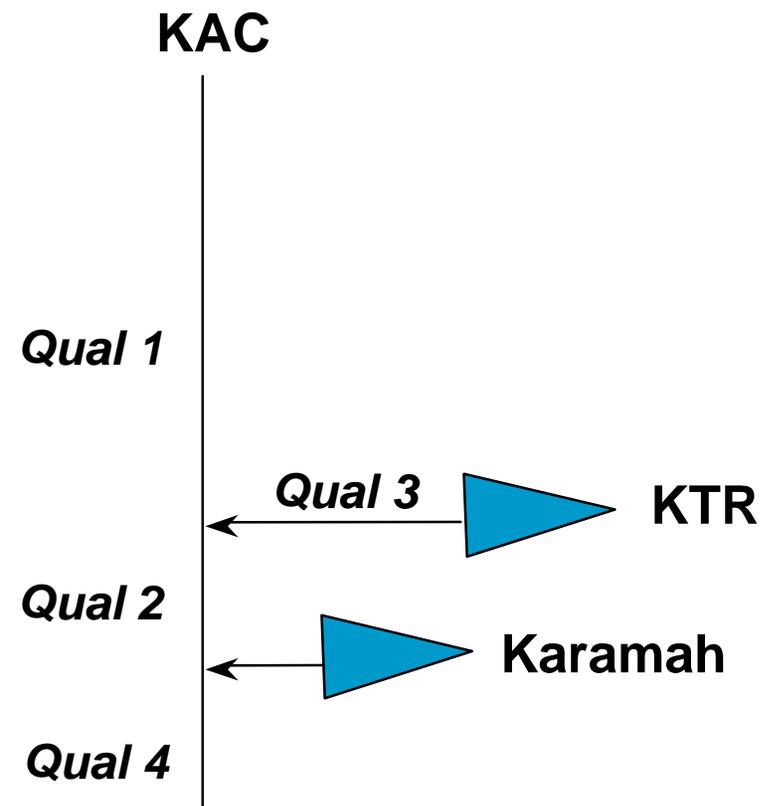


Transfer at Deir Alla

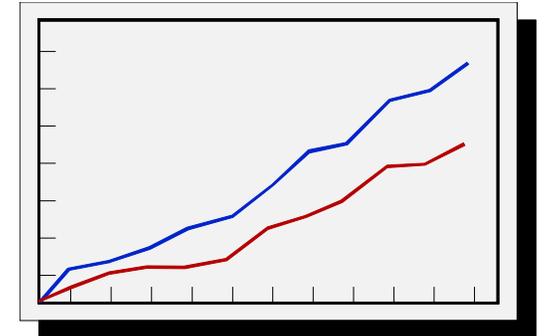
<u>Item</u>	<u>Cost</u>
Cost of Service (mill. JD)	
Supply Sources	1.107
KAC portion	0.307
Subtotal	<hr/> 1.414
Other Considerations (mill. JD)	
Wadi Arab Incremental Capacity	0.526
North Conveyer Incremental Capacity	0.431
Additional KAC Operations	0.051
Kufranja Lost Revenue	0.120
Cost of Difference in Water Quality	-
Subtotal	<hr/> 1.128
Annual Cost (mill. JD)	<hr/> <hr/> 2.542
Water Transfer (mcm)	38.616
Possible Price	0.066

Defined Qualities of Water

- Quality 1
 - ✓ Freshwater
- Quality 2
 - ✓ Mixed Fresh and KTR Water
- Quality 3
 - ✓ KTR Water
- Quality 4
 - ✓ Below Karamah



Planning and Policy Scenarios



Financial Performance

- ✓ Scenarios 1a&b - No Action (with & without capital costs)
- ✓ Scenario 2a,b&c - Increase Financial Performance

Seasonal Considerations

- ✓ Scenario 3 - Recover increase only through summer tariff

Quality Considerations

- ✓ Scenario 4 - Raise Quals 1 & 2; keep Qual 3 the same; lower Qual 4
- ✓ Scenario 5 - Raise Qual 1; keep Qual 2 the same; lower Quals 3 & 4



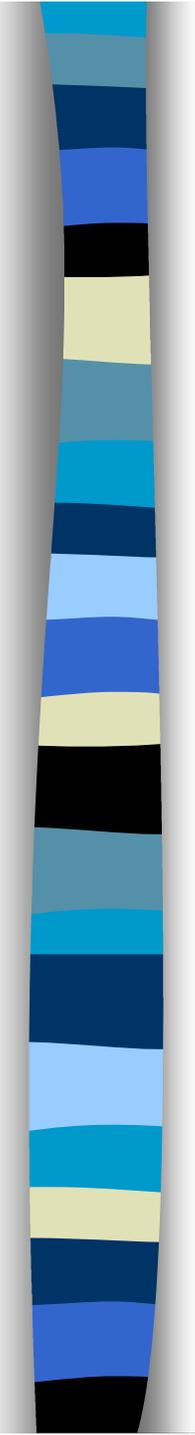
Scenario 1a - “No Action” with O&M Costs Only

<u>Item</u>	<u>1997</u>	<u>2000</u>
Net Income (mill.JD)	-2.802	-3.953
% of Cost Recovery	46.5%	40.6%



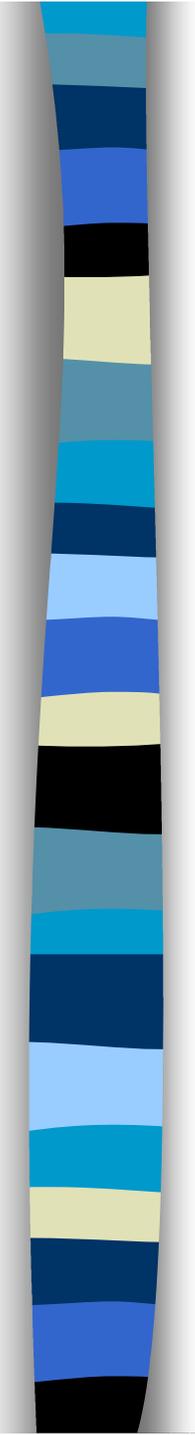
Scenario 1b - “No Action” with O&M plus Capital Costs

<u>Item</u>	<u>1997</u>	<u>2000</u>
Net Income (mill.JD)	-10.125	-15.948
%of Cost Recovery	19.4%	14.5%



Scenario 2a - Same Structure but Increase Financial Performance thru Tariff Increases

	<u>100% O&M Cost Recovery</u>	
<u>Tariff (fils/m³)</u>	<u>1998</u>	<u>2000</u>
0-1,000 m ³	18	21
1,001-2,000 m ³	28	32
2,001-3,000 m ³	35	40
> 3,000 m ³	81	93
Percent Increase	13 1%	15%



Scenario 2b - Same Structure but Increase Financial Performance thru Improved WAJ Collections

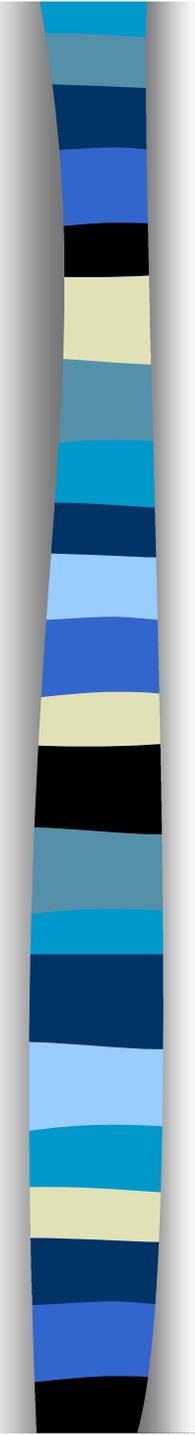
100% O&M Cost Recovery

<u>Tariff (fils/m³)</u>	<u>1998</u>	<u>2000</u>
0-1,000 m ³	12	13
1,001-2,000 m ³	18	19
2,001-3,000 m ³	23	24
> 3,000 m ³	54	56
Percent Increase	54%	3%

Scenario 2c - Same Structure but Increase Financial Performance thru Improved Overall Collections and 20% Staff Cut

100% O&M Cost Recovery

<u>Tariff (fils/m³)</u>	<u>1998</u>	<u>2000</u>
0-1,000 m ³	8	8
1,001-2,000 m ³	12	12
2,001-3,000 m ³	15	15
> 3,000 m ³	35	35
Percent Increase	0%	0%



Scenario 3 - Raise Additional Revenue only with Summer Tariff and WAJ Collections

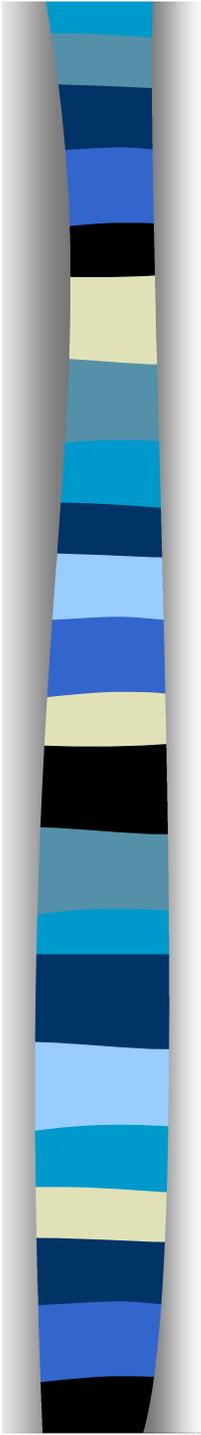
100% O&M Cost Recovery

<u>Tariff (fils/m³)</u>	<u>1998</u>	<u>2000</u>
0-1,000 m ³	14	15
1,001-2,000 m ³	21	22
2,001-3,000 m ³	27	28
> 3,000 m ³	62	65
Percent Increase	78.4	4.6%



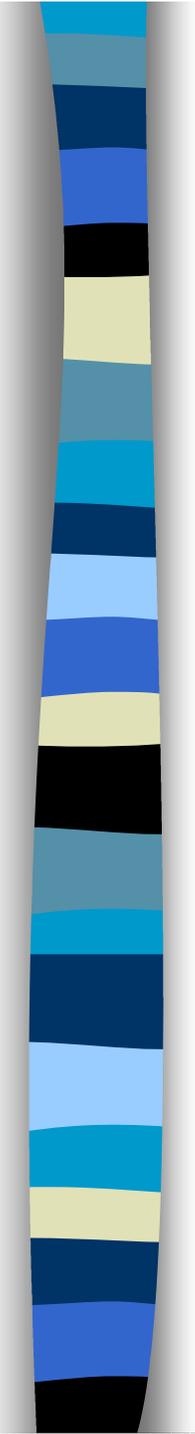
Scenario 4 (JVA subsidy) - Raise Q1&2; Q3 same; Lower Q4

Item	Quality Tariff (fils/m ³) for Year 2000			
	1	2	3	4
0-1,000 m ³				
1,001-2,000 m ³				
2,001-3,000 m ³				
> 3,000 m ³				



Scenario 5 (WAJ subsidy) - Raise Q1; Q2 same; Lower Q3 & 4

Item	Quality Tariff (fils/m ³) for Year 2000			
	1	2	3	4
0-1,000 m ³				
1,001-2,000 m ³				
2,001-3,000 m ³				
> 3,000 m ³				



Scenario 6 (joint subsidy) - Raise Q1, lower Q2, 3 & 4

Item	Quality Tariff (fils/m ³) for Year 2000			
	1	2	3	4
0-1,000 m ³				
1,001-2,000 m ³				
2,001-3,000 m ³				
> 3,000 m ³				

Training & Transfer Issues

- Users Manual
- Staff Training
 - ✓ Scheduling
 - ✓ Attendance
- Transfer of the Model
 - ✓ Planning Capability within JVA
 - ✓ Organizational Location
 - ✓ Use/Upkeep of the Model and Sustainability

