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GENERALIZED REVENUE REQUIREMENT MODEL FOR IRRIGATION & DRAINAGE SERVICES

USAID GOVERNING FOR GROWTH (G4G) IN GEORGIA

15 SEPTEMBER 2016

This publication was produced for review by the United States Agency for International Development. It was prepared by Deloitte Consulting LLP. The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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CONTRACT NUMBER: AID-114-C-14-00007

DELOITTE CONSULTING LLP

USAID | GEORGIA

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WATER RESOURCE MANAGEMENT

IMPROVEMENT COMPONENT: 3600

LANGUAGE: ENGLISH

15 SEPTEMBER 2016

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DATA

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Project Component: Water Resource Management Improvement Component

Practice Area: Water Resource Management

Key Words: Irrigation & Drainage Tariffs, Revenue Requirement Model

ACRONYMS

G4G	Governing for Growth in Georgia
USAID	United States Agency for International Development
GoG	Government of Georgia
MoA	Ministry of Agriculture
GNERC	Georgian National Energy and Water Supply Regulatory Commission
RRM	Revenue Requirement Model
RIA	Regulatory Impact Assessment
GA	Georgian Amelioration
UB	Upper Bound
LB	Lower Bound
RCB	Regulatory Cost Base
WACC	Weighted Average Cost of Capital
PCF	Pricing Conversion Factor
CAF	Cost Allocation Factor
CORR	Cost Correction Factor
FWU	Forecasted Water Usage
CNA	Converted Nominal Allocation
NA	Nominal Allocation
m³	Cubic Meter

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1. EXECUTIVE SUMMARY

In the Strategy for Agricultural Development of Georgia 2015-2020, the Amelioration Sector is mentioned as one of the national strategic priorities. The Amelioration Sector has the potential to become the largest water consumer/user by the end of 2020. According to the Strategy, measures to be undertaken by the Government of Georgia (GoG) aim to support fair and optimal allocation of water resources and improvement of the tariff system. Therefore, the GoG intends to reform the amelioration sector.

The activities related to development of regulatory and legal framework, as well as sector strategy and institutional arrangement, are underway. Governing for Growth (G4G) in Georgia supported the reform process through several activities, such as: developing a draft tariff methodology for irrigation and drainage; conducting a regulatory impact assessment (RIA); developing a revenue requirement model (RRM); conducting capacity building workshops/trainings, and; providing comments/recommendations on the draft Hydro-Amelioration Law that will set the basis for the sector regulation and its institutional arrangement.

The RRM model has been developed to allow Georgian Amelioration (GA) to assess its overall revenue requirement on an irrigation system basis, and determine how much each customer class, served by a particular irrigation system, will utilize.

The RRM has been developed on the basis of hypothetical numbers and assumes that functionalized and classified costs have already been allocated to irrigation & drainage systems. Respectively, the model represents the allocation of the overall cost responsibility among customer classes, design and calculation of rates for particular system.

The model can ensure calculation of rates for each independent irrigation & drainage system, allowing the selection between the upper bound (UB) and lower bound (LB) pricing options. The option for the selection of tariff design is incorporated as well, thus the user of the model will have an opportunity to select the volumetric, area based, or per application rate design.

The RRM is a Microsoft Excel file where the calculations are presented through tables devoted for the calculation of different components of regulatory cost base (RCB) and also for ensuring compliance with the format of data prescribed in draft tariff methodology.

RRM consists of several tables and includes:

TABLE-A	A	Devoted for the selection of system, tariff design, and LB or UB option
TABLE-B	B	Devoted for calculation of RCB components
TABLE-C	C	Devoted for calculation of input data
TABLE-D	D	Devoted for calculation of Customer Group RCB and its components
TABLE-E	E	Devoted for calculation of tariffs

This report aims to describe purpose of each table and its subcomponents, capabilities of the model, and interrelation between the tables.

2. BACKGROUND

G4G developed a draft tariff methodology, and conducted relevant RIA, serving as the basis to facilitate the consultations among the Ministry of Agriculture (MoA), GA and Georgian National Energy and Water Supply Regulatory Commission (GNERC) on general concept of regulatory framework. The consultations on regulatory framework and particularly the review of the draft Law on Hydro Amelioration is ongoing. G4G has been invited as a member of the working group on regulatory framework led by GNERC. The creation of the working group was preceded by a high level informal decision on authorization of GNERC to regulate the irrigation sector.

After the approval of the draft Law on Hydro-Amelioration, which is proposed to be submitted to Parliament in Spring of 2017, approval of the tariff methodology and determination of new tariffs will be next on the reform agenda. Respectively, information on revenue requirement is crucial. This is the first step in the rate setting process, which should be performed by GA. Further, a regulator must determine how much of the revenue requirement burden should be shouldered by each of the customer classes and set tariffs for them.

On one hand, in traditional utility rate cases, the first task is to determine the utility's overall revenue requirement, in order to adequately compensate the utility for its services and make it sustainable. On the other hand, the regulator can use this information as a basis to check allocation of overall cost responsibility among rate classes and use it for the rate design.

Respectively, the RRM, which is generalized at the system level, should allow service providers to make a projection on rates, as well as facilitate the clarification of the reality in regard to the extent of existing or required cross subsidization between customer classes.

3. METHODOLOGY

G4G consultancy activities have been carried out in close cooperation with GA’s staff (both financial and technical) between March, 2016 and September, 2016.

G4G consultancy activities.

	Activity	Description
1	Desk review	During the development of the RRM model, formulas and rules prescribed by G4G’s <i>Draft Irrigation Tariff Methodology</i> have been used in the process of developing the RRM.
2	Workshops	The workshops/discussions with both the financial and technical staff of GA intended for capacity building to establish a common understanding of future changes and additionally required regulations for tariff setting and the implementation process.

4. THE REVENUE REQUIREMENT MODEL

Table A is devoted for the selection of the UB or LB pricing option, and for the selection of the tariff design. Inputs for LB and UB come from Table B2 and Table B3.

Table A.

TABLE-A	A	<u>Start with Selection</u>	
		Selection of Amelioration System, Revenue & Tariff Structure	
		Name	Type
		Amelioration System	mtkvvari -jandaris
		Lower Bound or Upper Bound	Upper_Bound
		Tariff Structure	ha_volumetric

Table B and its subcomponents TABLE B1 - TABLE B7 are devoted for the calculation of system RCB components as well as for the allocation of system RCB between the customer groups which consist of:

- Industrial Customer Group;
- Revenue- Water Export Customer Group;
- Aquaculture Customer Group;
- Urban Customer Group RCB;
- Conveyance Water for Other System;
- HPP Water.¹

Table B.1 is the calculation of the LB and UP which later together with regulatory asset base cost (RAB) used in different tables of the RRM for the calculation of the tariffs and allocation of the cost between the customer groups.

Table B.1.

TABLE-B	B	<u>Regulatory Cost Base Components</u>		
TABLE-B.1	B.1	Regulatory Asset Base, Regulatory Cost Base and Weighted Average Cost of Capital		
		Terms	Unit	Note
		Regulatory Asset Base (RAB)	GEL	35,233,928
		Lower Bound (LB) Regulatory Cost Base (RCB)	GEL	4,117,252
		Upper Bound (UB) RCB with Rate of Return on RAB	GEL	6,971,200.58

Table B.2 is devoted to determine weighted average cost of capital (WACC) later used to calculate economic profit of the utility under the UB pricing option.

Table B.2.

TABLE-B.2	B.2	Weighted Average Cost of Capital WACC		
		Terms	Unit	Note
		Weighted Average Cost of Capital WACC		12.47%
		WACC Calc		12.47%
		Debt to Equity ratio (g)		60%
		Cost of debt (%) $r_d = r_{rf} + DP$		10%
		Cost of own capital (%) $r_e = r_{rf} + \beta \times (r_m - r_{rf})$		14%
		Profit tax (%) -T		15.0%
		Risk-free rate (r_{rf})		6.50%
		Debt Premium (DP)		3.50%
		Market risk premium ($r_m - r_{rf}$)		7.25%
		Sectorial risk coefficient (β)		1

¹ In this particular model delivery of the water for power generation through the irrigation channel considered as a non-regulated activity reducing the RCB of irrigation customers

Table B.3 is the most important table for RRM input data. Preliminary functionalized and classified either direct or indirect cost should be entered in the appropriate cell. Additionally, there is an option for consideration of property tax as an input and allocation of the electricity cost either for irrigation purposes or for all customer classes.

Table B.3.

TABLE-B.3	B.3	Operating Expenses, Operating Cost, Depreciation and Allocated Non Direct Cost		
		Terms	Unit	Note
		Operation (Amelioration Services) - OC	GEL 126,000	
		Current Maintenance	GEL 27,262	
		Minor (Surface) Maintenance	GEL 37,500	
		Periodic Restorative	GEL 42,570	
		Emergency Restorative	GEL -	
		Electricity	GEL 2,400	
		Electricity for Pumping	GEL -	P_all
		General & Administrative (G&A)	GEL 237,975	
		RAB	GEL 15,399,547	
		Depreciation	GEL 504,877	
		Rehab.	GEL 237,975	
		Property Tax	GEL 153,995	YES

Table B.4 is devoted for the assigning pricing conversion factor (PCF) to different customer groups and calculation. This can be done through scrolling the data list embedded in the appropriate cell. Factor range is from 0 to 5 and these are indicative numbers from the draft *Tariff Methodology*. PCF in this table is used as an input for the calculation of the cost allocation factors (CAF).

Table B.4.

TABLE-B.4	B.4	Pricing Conversion And Cost Allocation Factors		
		Terms	Unit	Note
		Pricing Conversion Factor for irrigation customer group - Irrigation PCF		1 Indicative number from Tariff methodology
		Pricing Conversion Factor for industrial customer group - Technical Water PCF		4 Indicative number from Tariff methodology
		Pricing Conversion Factor for water export customer group - Water Export PCF		2 Indicative number from Tariff methodology
		Pricing Conversion Factor for Aquaculture customer group - Aquaculture Water		Indicative number from Tariff methodology
		Pricing Conversion Factor for Urban water customer group - Urban Water PCF		Indicative number from Tariff methodology
		Pricing Conversion Factor - Conveyance Water for Other System		2
		HPP Water		- Not put more then 0
		Cost Allocation factor for Irrigation Customer Group - (cgCAF ir)		38%
		Cost Allocation factor industrial Customer Group - (cgCAF ind)		3%
		Cost Allocation factor for Water Export Group - cgCAFi we		59%
		Cost Allocation factor Aquaculture Customer Group - cgCAFi aqua		0%
		Cost Allocation factor for Urban Customer Group - cgCAF ur		0% GEL 0.00
		Cost Allocation Factor - Conveyance Water for Other System		0%

Table B.5 is devoted for the allocation irrigation system initial RCB between customer groups. RCB is initially allocated with the main purpose to later be corrected with the cost correction factor (CORR).

Due to the fact that draft methodology initially considers the componentized tariff under UB and LB pricing options, the table below ensures the possibility for the allocation of cost between the tariff components. It can be done by scrolling the data list in the appropriate cell (yellow highlight).

Table B.5.

TABLE-B.5	B.5	Regulatory Cost Base Initial Allocation Between the customer groups and allocation between parts of tariff		
		Customer Groups	RCB Initial Allocation	Note
		Irrigation Customer Group	899,082	
		Industrial Customer Group	83,127	
		Water Export Customer Group	1,397,733	
		Aquaculture Customer Group	-	
		Urban Water Customer Group	-	
		Water Conveyance- Customer Group	-	
		RCB allocation between Part A ₂ and Part B		
		Tariff Components	Unit	Note
		Part A ₂	80%	
		Part B	20%	

Table B.6 is devoted for CORR input, calculation of the RCB correction factors and indication of factual RCB allocated to each customer group. If delivery of water through the proposed irrigation system is not to be regulated, Table B.6.2, allows reduction of irrigation customer group RCB by the amount written in the cells highlighted. The main purpose of Table-B.6.1 - Table-B.6.4 is to serve as intermediary input for the Table D and Table E.

Table B.6.

TABLE-B.6	B.6	Type of Activity Indication and Revenues from Non Regulated Activity		
		1 Customer Groups	Revenue from Non-Regulated Activity	Note
		Industrial Customer Group	FALSE	
		Revenue- Water Export Customer Group	FALSE	
		Aquaculture Customer Group	GEL 0	
		Urban Customer Group RCB	FALSE	
		Conveyance Water for Other System	FALSE	
		HPP Water	GEL 100,000	
		Other Non-Regulated Customer Group	GEL 0	
		2 Customer Groups	Consider to Reduce Irrigation RCB "Yes"/"No"	Note(Revenue from non-regulated activity)/Manual Input
		Industrial Customer Group	NO	50000
		Revenue- Water Export Customer Group	NO	50000
		Aquaculture Customer Group	NO	50000
		Urban Customer Group RCB	NO	50000
		Conveyance Water for Other System	NO	50000
		HPP Water	YES	100000
		Other Non-Regulated Customer Group	NO	100000
		3 Revenue Source	Type of Activity	Note
		Revenue From Irrigation Customer Group	Regulated	
		Revenue From Industrial Customer Group	Regulated	
		Revenue From Water Export	Regulated	
		Revenue from Aquaculture Customer Group	Non-Regulated	
		Revenue from Urban Water Customer Group	Non-Regulated	
		Revenue from Conveyance Water for Other System	Regulated	
		HPP Water	Non-Regulated	
		Revenue from Non Regulated Activity	Non-Regulated	
		4 Revenue from Customer Groups	Factual RCB	Note
		Revenue - Irrigation Customer Group	GEL 799,082	
		Revenue - Industrial Customer Group	GEL 83,127	
		Revenue - Water Export Customer Group	GEL 665,160	
		Revenue - Aquaculture Customer Group	FALSE	
		Revenue - Urban Customer Group RCB	FALSE	
		Conveyance Water for other system	GEL 0	
		HPP Water	GEL 100,000	
		Revenue from other Non-Regulated Activity (Non Scheme related Activity)	GEL 0	

Table B.7, is done for the determination of the factors reducing RCB of Irrigation customer group.

Table B.7.

TABLE-B.7	B.7	The factors reducing Revenue Requirement for Irrigation Customers		
		Customer Groups	RCB Correction factors	Notes
		Industrial-Contribution to Correction	1.00	
		Water Export-Contribution to correction	1.00	
		Aquaculture - Contribution to correction	1.00	
		Urban Water contribution to correction	0.00	
		Conveyance Water for Other System	1.00	
		HPP Water	0.11	
		Other Nonregulated Activity contribution to correction	0.00	
		Lower Bound-Remaining RCB	FALSE	
		Upper Bound-Remaining RCB	1.0	
		Reduced RCB of Irrigation	GEL 899,082	

Table C and its subcomponents Table C.1-Table C.4 are devoted for technical system parameters and demand input, as well for fitting data on technical parameters to formulas incorporated in the cells of other tables devoted for calculation of customer group RCB and customer group tariffs.

Table C.1 is devoted for the inputs of average irrigation norm and command area, water demand of each customer group and system losses.

Table C.1.

TABLE-C.1	C.1	Average irrigation Norm & Command Area, water demand and system losses		
		Technical Parameters	Amount	Measurement Unit
		Averaged Irrigation Norm per hectare (ha)	700	m ³ /ha
		Command Area	353	ha
		Contracted area	653	ha
		Water Abstraction	74,821,000	m ³
		Irrigation Water	18,990,000	m ³
		Technical Water	4,401,000	m ³
		Water Transfer - Water Export	37,000,000	m ³
		Aquaculture Water	-	m ³
		Urban Water	-	m ³
		Conveyance Water for Other System	-	m ³
		HPP Water	-	m ³
		Water Losses /System Average	0.13	-

Table C.2 is devoted for the input of contracted area with the breakdown to crops and supports the input of 9 different types of crops together with required rates of application m³ and required number of application per cultivated area. After the input cells are filled, the calculation is done to determine forecasted water usage (FWU) and total numbers of application required. The said is later used for calculation of converted nominal allocations (CAN), cost allocation between the customer groups and calculation of tariffs for irrigation customers.

Table C.2.

C.2 <i>Crops, crop water requirement and number of applications</i>			
<i>Crop</i>	<i>Ha cultivated</i>	<i>If the crop distribution known assumption below shall be removed</i>	<i>Notes</i>
Tomato	300		0.05 ha
Cucumber	800		0.12 ha
Eggplant	300		0.08 ha
Onions	650		0.10 ha
Carlic	300		0.05 ha
Potato	457		0.07 ha
Pepper	550		0.08 ha
Maize	1,800		0.27 ha
Wheat	1,200		0.18 ha
Total Area Planned to Serve	6,557		

<i>Rates of Application</i>			
<i>Crop</i>	<i>Rates of Application m³</i>	<i>Required Number of application per cultivated area</i>	<i>Notes</i>
Tomato	400		12 m ³
Cucumber	400		13 m ³
Eggplant	500		15 m ³
Onions	600		8 m ³
Carlic	600		8 m ³
Potato	500		4 m ³
Pepper	400		15 m ³
Maize	458		6 m ³
Wheat	800		6 m ³

<i>Required volume of irrigation water and number of applications</i>			
<i>Crop</i>	<i>Volume</i>	<i>Total Number of Required Applications per Crop</i>	<i>Notes</i>
Tomato	1,440,000		3600 m ³
Cucumber	4,160,000		10400 m ³
Eggplant	3,750,000		7500 m ³
Onions	3,120,000		5200 m ³
Carlic	1,440,000		2400 m ³
Potato	914,000		1828 m ³
Pepper	3,300,000		8250 m ³
Maize	4,945,400		10890 m ³
Wheat	5,760,000		7200 m ³
Sum	28,830,400		57,178 m³

Table C.3 is devoted for the input of FWU and nominal allocation (NA) of the customer groups with the exemption on the irrigation customer group, which is calculated on the basis of the previous subcomponents of Table C. If the sum of customer groups NA exceeds system overall capacity, the “Exceedance of Capacity” will appear in the last row and the cell will be colored in red. The inputs generated by this table are used for cost allocation and tariff calculation.

Table C.3.

C.3 <i>Nominal Allocation, Forecasted Water Usage and Converted Nominal Allocation</i>			
<i>Name</i>	<i>abbreviation</i>	<i>Volume</i>	<i>Notes</i>
Nominal Allocation Irrigation Customer Group	NA I	59,500,000	
Forecasted Irrigation Water Usage	FIWU Irrigation	45,899,000	
Nominal Allocation to Industrial Customer Group	NA In	5,501,250	Assumption - NA is 25% more then the FIWU
Industrial Customer Group Forecasted Water Usage	FIWU Industrial	4,401,000	
Nominal Allocation to Water Export Group	NA we	46,250,000	Assumption - NA is 25% more then the FIWU
Water Export Group Forecasted Water Usage	FIWU water export	37,000,000	
Nominal Allocation Aquaculture	NA a	-	Assumption - NA is 25% more then the FIWU
Forecasted Aquaculture use	FIWU aquaculture	-	
Nominal Allocation Urban	NA u	-	Assumption - NA is 25% more then the FIWU
Forecasted Urban Use	FIWU u	-	
Nominal Allocation -water conveyance customer group	NA wc	-	Assumption - NA is 25% more then the FIWU
Forecasted water conveyance	FIWU water Conveyance	-	
Nominal Allocation HPP	NA hpp	-	Assumption - NA is 25% more then the FIWU
Forecasted HPP use	FIWU hpp	-	

Table C.4 is devoted for the calculation of the converted nominal allocation (CAN) of customer groups. Share in the sum of the CAN system is the main input to determine cost allocation factors between the customer groups

Table C.4.

C.4 <i>Converted Nominal Allocation</i>			
<i>Name</i>	<i>Abbreviation</i>	<i>Volume m³</i>	<i>Notes</i>
Converted Nominal Allocation-Irrigation	CAFI*NA Irr	59,500,000	
Converted Nominal Allocation-Technical Water	CAFI*NA In	5,501,250	
Converted Nominal Allocation-Water Export	CAFI*NA we	92,500,000	
Converted Nominal Allocation -Aquaculture	CAFI*Na a	-	
Converted Nominal Allocation - Urban	CAFI*NA u	-	
Converted Nominal Allocation - Conveyance of water	CAFI*Nacw	-	
Converted Nominal Allocation -Total	CNA tot	157,501,250	HPP water excluded from total CNA

Table D is fully devoted for the calculation of customer group RCB and its components with the consideration of the CORR. Depending on the pricing option UB or LB, active cells for calculation become green.

Table D.

TABLE-D	D	Calculation of Customer Group Regulatory Cost Base and Its Components			
		<i>mtkveri-jandaris</i>			
	1	Calculation of Tariffs for Irrigation Customer Group RCB			
		Return on RAB	GEL 427,861	Irrigation Customer Group RCB	GEL 799,080
		OPEX - Operating Expenses	GEL 147,229	Return on RAB	GEL 418,811
		OC - Operating Cost	GEL 58,805	OPEX - Operating Expenses	GEL 130,854
		D - Depreciation	GEL 190,730	OC - Operating Cost	GEL 52,265
		ANC - Allocated Non-Direct Cost	GEL 89,901	D - Depreciation	GEL 169,516
		CORR	GEL 0	ANC - Allocated Non-Direct Cost	GEL 79,902
				CORR	GEL 100,000
	2	Technical Water RCB	GEL 39,558	Technical Water RCB	GEL 83,127
		OPEX	GEL 13,613	Return on RAB	GEL 43,565
		OC	GEL 5,437	OPEX	GEL 13,613
		D	GEL 17,634	OC	GEL 5,437
		ANC	GEL 8,312	D	GEL 17,634
				ANC	GEL 8,312
	3	Water Export RCB	GEL 665,161	Water Export RCB	GEL 1,397,733
		OPEX	GEL 228,886	Return on RAB	GEL 712,573
		OC	GEL 91,423	OPEX	GEL 228,886
		D	GEL 296,512	OC	GEL 91,423
		ANC	GEL 139,762	D	GEL 296,512
				ANC	GEL 139,762
	4	Aquaculture RCB	GEL 0	Aquaculture RCB	GEL 0
		OPEX	GEL 0	Return on RAB	GEL 0
		OC	GEL 0	OPEX	GEL 0
		D	GEL 0	OC	GEL 0
		ANC	GEL 0	D	GEL 0
				ANC	GEL 0
		Urban RCB	GEL 0	Urban RCB	GEL 0
		OPEX	GEL 0	Return on RAB	GEL 0
		OC	GEL 0	OPEX	GEL 0
		D	GEL 0	OC	GEL 0
		ANC	GEL 0	D	GEL 0
				ANC	GEL 0
		Water Conveyance RCB	GEL 0	Water Conveyance RCB	GEL 0
		OPEX	GEL 0	Return on RAB	GEL 0
		OC	GEL 0	OPEX	GEL 0
		D	GEL 0	OC	GEL 0
		ANC	GEL 0	D	GEL 0
				ANC	GEL 0

Table E is fully devoted for the calculation of customer group tariffs per application, per ha and volumetric for irrigation, while for other customers only the volumetric design of tariff can be considered. Tariffs are calculated based on three components, and for both UB and LB pricing options.

Table E.

Calculation of Tariffs						
TABLE E	E	Calculation of Tariffs				
Calculation of Tariffs per m ³ , per ha and per application for different customer groups without a commercial return						
Tariff Part #	Irrigation without Return on RAB	Per ha	Per Application of Crop	Per cm	Per 1000 cm	
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total		Cucumber			
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total	GEL 34.73		GEL 4.10	GEL 0.001	GEL 4.96
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)	GEL 20.23		GEL 1.84	GEL 0.001	GEL 2.68
Crop	Number of application per cultivated area	FTWU % age	Calculated M3 per application cm		Cost per application (Lower Bound)	
Tomato	3000	3%	826		FALSE	
Cucumber	15400	14%	826		FALSE	
Eggplant	7500	13%	1,032		FALSE	
Onions	5300	11%	1,238		FALSE	
Cauli	2400	3%	1,238		FALSE	
Potato	1828	3%	1,032		FALSE	
Pepper	826	11%	826		FALSE	
Maize	10800	17%	945		FALSE	
Wheat	7200	20%	1,651		FALSE	
SUM	87,174					
Technical water without Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			GEL 0.00		GEL 4.48
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			GEL 0.003		GEL 2.74
Water Export without Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			GEL 0.0099		GEL 9.32
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			GEL 0.0055		GEL 5.17
Aquaculture water without Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!
Urban water without Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!
Water Conveyance without Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!
Calculation of Tariffs per m ³ , per ha and per application for different customer groups with a commercial return						
Tariff Part #	Irrigation with Return on RAB	Per ha	Per Application of Crop	Per cm	Per 1000 cm	
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total		Cucumber			
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total	GEL 48		GEL 5.81	GEL 0.001	GEL 7.62
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)	GEL 13		GEL 1.54	GEL 0.001	GEL 4.48
Crop	Number of application per cultivated area	FTWU % age	Calculated M3 per application cm		Cost per application (Upper Bound)	
Tomato	3000	3%	826		GEL 11.09	
Cucumber	15400	14%	826		GEL 11.09	
Eggplant	7500	13%	1,032		GEL 13.84	
Onions	5300	11%	1,238		GEL 16.68	
Cauli	2400	3%	1,238		GEL 16.68	
Potato	1828	3%	1,032		GEL 13.84	
Pepper	826	11%	826		GEL 11.09	
Maize	10800	17%	945		GEL 12.68	
Wheat	7200	20%	1,651		GEL 22.17	
SUM	112,134					
Technical water with Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			GEL 0.007937		GEL 7.52
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			GEL 0.007621		GEL 4.48
Water Export with Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			GEL 0.0099		GEL 9.32
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			GEL 0.0055		GEL 5.17
Aquaculture with Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!
Urban with Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!
Water Conveyance with Return on RAB						
PART 1	Part A1=(RAB*WACC)+cgCAF/NA total	Per ha	Per cm		Per 1000 cm	
PART 2	Part A1=(RAB*WACC)+cgCAF/NA total			#DIV/0!		#DIV/0!
PART 3	Part B = (B1+D1+OPEX - ssDC+ssD+ssANC+ssCNL+ssCORR)/cgCAF/22%/IPWJ (ha-T)			#DIV/0!		#DIV/0!

Table F is intended for the improvement of results visualization and enabling the use of results for control numbers and inputs for analysis.

Table F.

TABLE E.1		E.1 Customer Group Revenues and Tariff Calculation for the Planned Service, Nominal Allocation (NA), Per Application and Scheme Command Area (SCA)	
IRRIGATION			
		Per 1000 m²	PROJECTION - REVENUE FROM DELIVERY
Tariff for Planned Service		GEL 14.3	GEL 683,416
Part A		GEL 12	
Part A1		GEL 7	
Part A2		GEL 5	
Part B		GEL 3	
For NA remaining part		GEL 12	PROJECTION - REVENUE FROM NA REMAINING PART
Part A		GEL 12	GEL 163,225
Part A1		GEL 7	
Part A2		GEL 5	
		Per ha	PROJECTION - REVENUE FROM DELIVERY
Tariff for Planned Service		GEL 98.1	GEL 643,364
Part A		GEL 80	
Part A1		GEL 49	
Part A2		GEL 31	
Part B		GEL 18	
For SCA remaining part		GEL 80.1	PROJECTION - REVENUE FROM SCA REMAINING PART
Part A		GEL 80	GEL 155,718
Part A1		GEL 49	
Part A2		GEL 31	
CROP AREA & APPLICATION/ha		GEL PER APPLICATION	PROJECTION - REVENUE FROM DELIVERY
Tomato-300 ha	12 application/ha	GEL	GEL 0
Cucumber-800 ha	13 application/ha	GEL	GEL 0
Eggplant-500 ha	15 application/ha	GEL	GEL 0
Onions-650 ha	8 application/ha	GEL	GEL 0
Carlic-300 ha	8 application/ha	GEL	GEL 0
Potato-457 ha	4 application/ha	GEL	GEL 0
Pepper-550 ha	15 application/ha	GEL	GEL 0
Maze-1800 ha	6 application/ha	GEL	GEL 0
Wheat-1200 ha	6 application/ha	GEL	GEL 0
Tariff for Planned Service		Cucumber -- Per Application of crop	
		GEL 11	
Part A		GEL 9	
Part A1		GEL 5.81	
Part A2		GEL 3.64	
Part B		GEL 1.68	

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