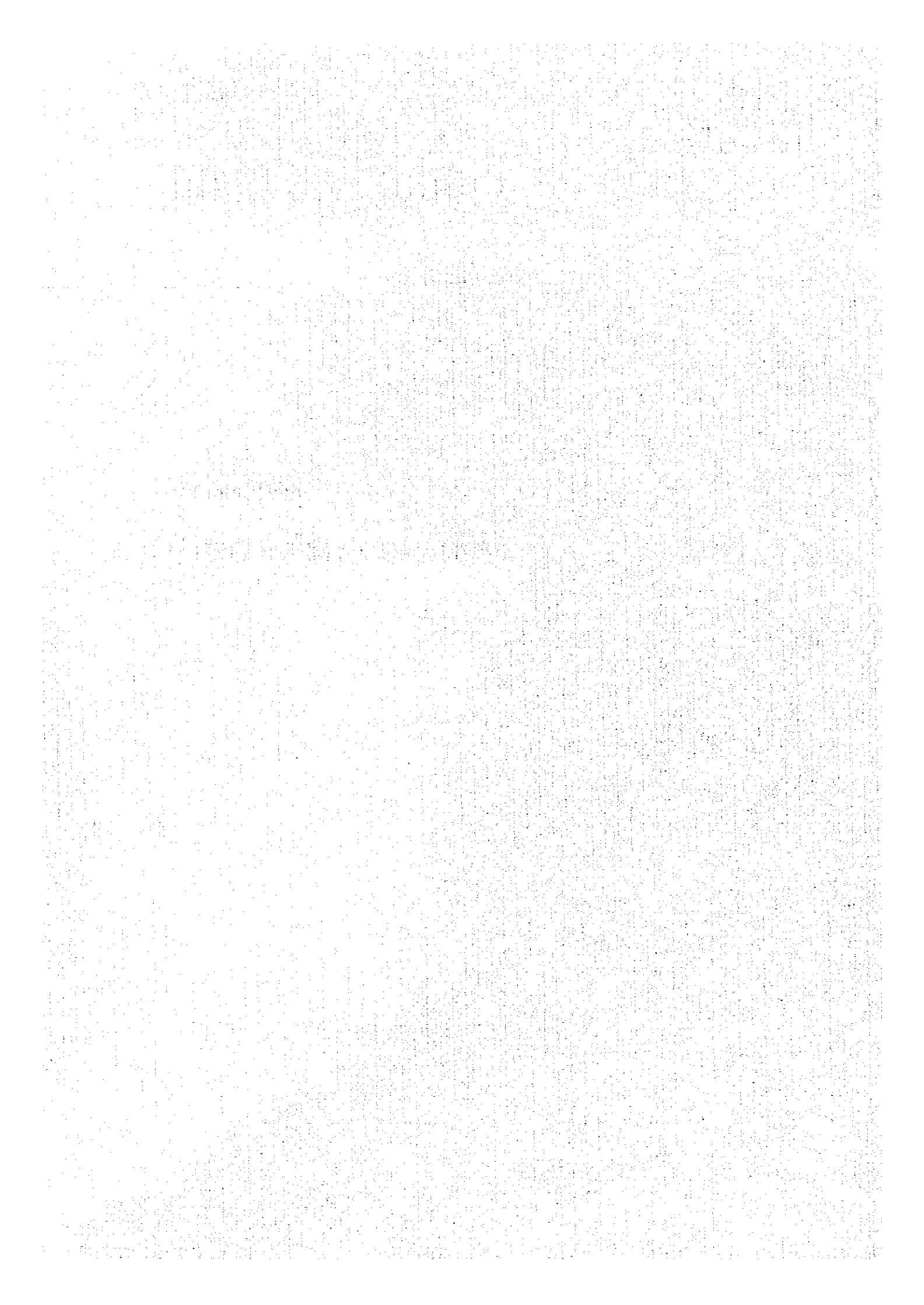


## **APPENDIX F**

### **FARM MANAGEMENT & CREDIT**



## CONTENTS

### LIST OF TABLES

#### Part I Farm Management Of Study Areas

##### 1. Prices

Table F-I-1-1 Farm-Gate Prices of Farm Products ..... F-1

Table F-I-1-2 Prices of Agricultural Inputs and Farm Wages ..... F-1

##### 2. Farm Output

Table F-I-1-3 Farm Output by Crops per Hectare (Without Project) ..... F-2

Table F-I-1-4 Farm Output by Crops per Hectare (With Project) ..... F-3

##### 3. Expenditure

Table F-I-1-5 Expenditure of Farm Management (Without Project)  
by Gravity Irrigation ..... F-5

Table F-I-1-6 Expenditure of Farm Management (With Project)  
by Gravity Irrigation ..... F-6

Table F-I-1-7 Expenditure of Farm Management (Without Project)  
by Pump Irrigation ..... F-7

Table F-I-1-8 Expenditure of Farm Management (With Project)  
by Pump Irrigation ..... F-8

##### 4. Balance of Farm Economy

Table F-I-1-9 Revenues and Expenditure of Farm Management per Hectare  
(Without Project) ..... F-9

Table F-I-1-10 Revenues and Expenditure of Farm Management per Hectare  
(With Project) ..... F-10

##### 5. Planted Area and Production

Table F-I-1-11 Planted Area, Yield and Production by Crops Without Project ..... F-12

Table F-I-1-12 Planted Area, Yield and Production by Crops With Project ..... F-14

## 6. Balance of Farm Economy In Study Area

Table F-I-1-13	Revenues and Expenditure of Farm Management in Study Area (Without Project) .....	F-16
Table F-I-1-14	Revenues and Expenditure of Farm Management in Study Area (With Project) .....	F-18
Table F-I-1-15	Benefits of Farm Management in Study Area .....	F-19

## 7. Labor Requirement

Table F-I-2-1(1)	Monthly Requirement of Farm Labor Force by Crops (Without Project) .....	F-20
Table F-I-2-1(2)	Monthly Requirement of Farm Labor Force by Crops (Without Project) .....	F-21
Table F-I-2-1(3)	Monthly Requirement of Farm Labor Force by Crops (Without Project) .....	F-22
Table F-I-2-1(4)	Monthly Requirement of Farm Labor Force by Crops (Without Project) .....	F-23
Table F-I-2-2(1)	Monthly Requirement of Farm Labor Force by Crops (With Project) .....	F-24
Table F-I-2-2(2)	Monthly Requirement of Farm Labor Force by Crops (With Project) .....	F-25
Table F-I-2-2(3)	Monthly Requirement of Farm Labor Force by Crops (With Project) .....	F-26
Table F-I-2-2(4)	Monthly Requirement of Farm Labor Force by Crops (With Project) .....	F-27

## 8. Farm Household Economy

Table F-I-3-1(1)	Farm Household Economy Without Project - Petrich .....	F-28
Table F-I-3-1(2)	Farm Household Economy With Project - Petrich. ....	F-28
Table F-I-3-2(1)	Farm Household Economy Without Project - Rositza .....	F-29
Table F-I-3-2(2)	Farm Household Economy With Project - Rositza .....	F-29
Table F-I-3-3(1)	Farm Household Economy Without Project - Sredna Tundja .....	F-30
Table F-I-3-3(2)	Farm Household Economy With Project - Sredna Tundja .....	F-30

## 9. Farm Management of Production Co-Operatives

Table F-I-4-1(1) Farm Management of Production Co-Operatives Without Project - Rositza .....	F-31
Table F-I-4-1(2) Farm Management of Production Co-Operatives With Project - Rositza .....	F-32
Table F-I-4-2(1) Farm Management of Production Co-Operatives Without Project - Sredna Tundja .....	F-33
Table F-I-4-2(2) Farm Management of Production Co-Operatives With Project - Sredna Tundja .....	F-34

## Part II Farm Management of Pilot Project Area

### 1. Prices

Table F-II-1-1 Farm-Gate Prices of Farm Products .....	F-35
Table F-II-1-2 Prices of Farm Inputs and Wages .....	F-35

### 2. Planted Area and Production

Table F-II-2-1 Planted Area, Yield and Production by Crops (Without Project) .....	F-36
Table F-II-2-2 Planted Area, Yield and Production by Crops (With Project) .....	F-36

### 3. Expenditure

Table F-II-2-3(1) Expenditure of Farm Management - Farm Budget (Without Project) .....	F-37
Table F-II-2-3(2) Expenditure of Farm Management - Farm Budget in the Pilot Project Area(Without Project) .....	F-38
Table F-II-2-4(1) Expenditure of Farm Management - Farm Budget (With Project) .....	F-39
Table F-II-2-4(2) Expenditure of Farm Management - Farm Budget in the Pilot Project Area(With Project) .....	F-40

### 4. Balance of Farm Economy

Table F-II-2-5 Revenues and Expenditure of Farm Management in the Pilot Project Area (Without Project) .....	F-41
Table F-II-2-6 Revenues and Expenditure of Farm Management in the Pilot Project Area (With Project) .....	F-41

5. Labor Requirement

Table F-II-3-1(1) Monthly Requirement of Farm Labor Force by Crops  
(Without Project) ..... F-42

Table F-II-3-1(2) Monthly Requirement of Farm Labor Force by Crops  
in the Pilot Project Area (Without Project) ..... F-43

Table F-II-3-2(1) Monthly Requirement of Farm Labor Force by Crops  
(With Project) ..... F-44

Table F-II-3-2(2) Monthly Requirement of Farm Labor Force by Crops  
in the Pilot Project Area (With Project) ..... F-45

6. Farm Household Economy

Table F-II-4-1 Farm Household Economy - Present Private Farm ..... F-46

Table F-II-4-2 Farm Management - Present Agri. Production Co-Operative ..... F-47

7. Farm Management and Economy

Table F-II-5-1 Farm Management and Its Economy by Farm Size  
(With Project) ..... F-48

Table F-II-5-2 Farm Management and Its Economy by Agri. Production  
Co-Operative (With Project) ..... F-49

Table F-II-5-3(1) Cash Flow of Small-Scale Private Farm (With Project). ..... F-50

Table F-II-5-3(2) Cash Flow of Medium-Scale Private Farm (With Project) ..... F-51

8. Farm Mechanization

Table F-II-6-1 Farm Machinery In Nova Zagora Municipality ..... F-52

Table F-II-6-2 Estimation of Farm Machinery by Farm Size in the Pilot Project Area  
(With Project) ..... F-53

Table F-II-6-3 Existing Farm Machinery of Agri. Production Co-Operative  
in Pilot Project Area ..... F-53

## Part I Farm Management of Study Areas

### 1. Prices

Table F-I-1-1 Farm-gate Prices of Farm Products

Crop	Unit: USD/kg		
	Petrich	Rositza	Sredna Tundja
Wheat	0.15	0.14	0.15
Barley	0.15	0.14	0.13
Maize	0.15	0.15	0.15
Sunflower	-	0.09	0.11
Sugar beet	-	0.01	0.01
Tobacco	1.42	-	-
Vegetables	0.15	0.16	0.19
Fruit	0.11	0.08	0.10
Grapes	0.17	0.21	0.18
Melons	0.03	0.03	0.03
Alfalfa	0.02	0.02	0.02
Other crops	0.17	0.15	0.18

Note: Vegetables: a weighted mean of tomato, cucumber, and cabbage

Fruit: represented by peaches

Grapes: represented by wine grapes

Other crops: represented by beans Exchange rate=180.14Lv/USD

Data source: SAPI and farm interview survey

Table F-I-1-2 Prices of Agricultural Inputs and Farm Wages

Inputs	Unit	Price	Unit: USD
			Remarks
<b>SEEDS</b>			
Wheat	kg	0.17	
Barley	kg	0.15	
Maize	kg	0.39	
Sunflower	kg	0.17	
Sugar beet	kg	0.55	
Tobacco	-	-	
Vegetables	10 gr	0.23	tomato and others
Melons	10 gr	0.11	water melons
Alfalfa	10 gr	0.02	
Other crops	kg	0.36	beans
<b>FERTILIZER</b>			
Am. Nitrate	kg	0.12	
<b>CHEMICALS</b>			
Herbicides	100 ml	0.27	
Pesticides	50 ml	0.77	
Insecticides	50 ml	1.13	
Fungicides	400 gr	1.20	
Farm Wages	man-day	1.11	Mini wage: 200 lv

Note: Tobacco seeds are provided to tobacco growers by free of charge.

Data source: SAPI and farm interview survey

## 2. Farm Output

Table F-I-1-3 Farm Output by Crops per Hectare(Without Project)

1. Petrich Study Area				
Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	2,700	0.15	405.00	non-irrigated
Barley	2,350	0.15	352.50	non-irrigated
Maize	2,750	0.15	412.50	irrigated
Tobacco	1,250	1.42	1,775.00	irrigated
Vegetables	10,000	0.15	1,500.00	irrigated
Fruit	2,750	0.11	302.50	irrigated
Fruit	1,100	0.11	121.00	non-irrigated
Grapes	3,500	0.17	595.00	irrigated
Grapes	1,750	0.17	297.50	non-irrigated
Melons	7,500	0.03	225.00	irrigated
Other crops	1,200	0.17	204.00	irrigated
Alfalfa	2,750	0.02	55.00	irrigated
Alfalfa	1,250	0.02	25.00	non-irrigated

2. Rositza Study Area				
Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	3,000	0.14	420.00	non-irrigated
Barley	2,900	0.14	406.00	non-irrigated
Maize	2,600	0.15	390.00	irrigated
Sunflower	1,200	0.09	108.00	non-irrigated
Sugar beet	15,000	0.01	150.00	non-irrigated
Vegetables	8,000	0.16	1,280.00	irrigated
Fruit	3,750	0.08	300.00	irrigated
Fruit	3,000	0.08	240.00	non-irrigated
Grapes	3,750	0.21	787.50	irrigated
Grapes	3,250	0.21	682.50	non-irrigated
Melons	6,500	0.03	195.00	irrigated
Other crops	880	0.15	132.00	irrigated
Alfalfa	3,000	0.02	60.00	irrigated
Alfalfa	2,500	0.02	50.00	non-irrigated



### 3. Sredna Tundja Study Area

Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	3,100	0.15	465.00	non-irrigated
Barley	3,000	0.13	390.00	non-irrigated
Maize	3,850	0.15	577.50	irrigated
Sugar beet	15,000	0.01	150.00	irrigated
Sunflower	1,000	0.11	110.00	non-irrigated
Vegetables	7,750	0.19	1,472.50	irrigated
Fruit	3,500	0.10	350.00	irrigated
Fruit	3,000	0.10	300.00	non-irrigated
Grapes	3,750	0.18	675.00	irrigated
Grapes	3,500	0.18	630.00	non-irrigated
Melons	6,500	0.03	195.00	irrigated
Other crops	2,910	0.18	523.80	irrigated
Alfalfa	3,000	0.02	60.00	non-irrigated
Alfalfa	2,500	0.02	50.00	irrigated

Table F-I-1-4 Farm Output by Crops per Hectare (With Project)

#### I. Petrich Study Area

Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	3,600	0.15	540.00	irrigated
Barley	2,900	0.15	435.00	irrigated
Maize	3,500	0.15	525.00	irrigated
Tobacco	1,600	1.42	2272.00	irrigated
Vegetables	17,870	0.15	2680.50	irrigated
Fruit	4,500	0.11	495.00	irrigated
Grapes	5,500	0.17	935.00	irrigated
Melons	9,000	0.03	270.00	irrigated
Other crops	1,600	0.17	272.00	irrigated
Alfalfa	3,250	0.02	65.00	irrigated

### 2. Rositza Study Area

Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	3,750	0.14	525.00	irrigated
Wheat	3,400	0.14	476.00	non-irrigated
Barley	3,300	0.14	462.00	irrigated
Barley	3,000	0.14	420.00	non-irrigated
Maize	4,200	0.15	630.00	irrigated
Sunflower	1,750	0.09	157.50	irrigated
Sunflower	1,500	0.09	135.00	non-irrigated
Sugar beet	18,000	0.01	180.00	irrigated
Vegetables	14,000	0.16	2,240.00	irrigated
Fruit	6,000	0.08	480.00	irrigated
Grapes	6,250	0.21	1,312.50	irrigated
Melons	9,000	0.03	270.00	irrigated
Other crops	1,150	0.15	172.50	irrigated
Alfalfa	3,400	0.02	68.00	irrigated

### 3. Sredna Tundja Study Area

Crop	Yield (kg/ha)	Farmgate Price (USD)	Output (USD)	Remarks
Wheat	3,400	0.15	510.00	non-irrigated
Barley	3,150	0.13	409.50	non irrigated
Maize	4,250	0.15	637.50	irrigated
Sunflower	1,650	0.11	181.50	irrigated
Sunflower	1,500	0.11	165.00	non irrigated
Sugar beet	18,000	0.01	180.00	irrigated
Vegetables	13,900	0.19	2,641.00	irrigated
Fruit	6,250	0.10	625.00	irrigated
Grapes	6,500	0.18	1,170.00	irrigated
Melons	9,000	0.03	270.00	irrigated
Other crops	3,900	0.18	702.00	irrigated
Alfalfa	3,750	0.02	75.00	irrigated

### 3. Expenditure

Table F-1-1-5 Expenditure of Farm Management (Without Project)

Unit: USD/ha

Crop	Variable Costs										Fixed Costs				Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total	Grand Total			
Wheat	51.00	30.00	10.80	112.80	11.77	4.30	220.67	0.00	27.75	10.00	37.75	258.42			
Barley	30.00	30.00	10.80	113.20	11.77	3.90	199.67	0.00	27.75	10.00	37.75	237.42			
Maize	9.80	36.00	14.00	108.80	44.40	6.40	219.40	28.20	44.40	9.50	82.10	301.50			
Sunflower	0.85	0.00	10.80	56.40	7.80	1.60	77.45	0.00	0.00	10.00	10.00	87.45			
Sugar beet	2.20	0.00	10.80	33.90	58.80	2.10	107.80	0.00	0.00	10.00	10.00	117.80			
Tobacco	0.00	176.00	82.00	72.80	459.50	26.30	816.60	32.00	83.27	1.00	116.27	932.87			
Vegetables	46.00	45.00	10.80	5.00	277.60	13.00	397.40	33.30	0.00	1.00	34.30	451.70			
Fruit-orchard	0.00	0.00	12.00	48.50	84.40	4.30	149.20	20.00	0.00	10.00	30.00	179.20			
Grapes-vineyard	0.00	12.00	12.00	48.50	57.70	3.90	134.10	14.20	0.00	7.50	21.70	155.80			
Melons	22.00	9.00	5.40	5.00	97.70	4.00	143.10	21.30	0.00	1.00	22.30	165.40			
Other crops	28.80	9.00	5.40	5.00	46.60	4.00	98.80	14.20	0.00	1.00	15.20	114.00			
Alfalfa	5.00	0.00	0.00	8.10	16.65	0.00	29.75	20.00	0.00	0.00	20.00	49.75			

Note: Vegetables, melons and other crops are estimated at private farm level. Irrigation system: gravity method

Data source: SAPI and farm interview survey

Table F-I-1-6 Expenditure of Farm Management (With Project)

Crop	Variable Costs										Fixed Costs				Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total	Grand Total			
Wheat	51.00	35.00	15.30	126.90	12.10	4.80	245.10	5.00	27.75	10.00	42.75	287.85			
Barley	30.00	35.00	15.30	126.90	12.10	4.50	223.80	5.00	27.75	10.00	42.75	266.55			
Maize	11.80	62.00	14.00	123.30	49.95	10.40	271.45	28.20	44.40	9.50	82.10	353.55			
Sunflower	0.85	9.00	10.80	56.40	7.80	1.80	86.65	11.70	0.00	10.00	21.70	108.35			
Sugar beet	2.20	0.00	10.80	33.90	71.00	2.30	120.20	30.00	0.00	10.00	40.00	160.20			
Tobacco	0.00	176.00	82.00	72.80	466.20	24.60	821.60	32.00	83.27	1.00	116.27	937.87			
Vegetables	46.00	58.00	10.80	5.00	306.40	21.30	447.50	33.30	0.00	1.00	34.30	481.80			
Fruit-orchard	0.00	9.00	12.00	48.50	126.60	5.90	202.00	20.00	0.00	10.00	30.00	232.00			
Grapes-vineyard	0.00	18.00	12.00	48.50	73.30	4.50	156.30	14.20	0.00	7.50	21.70	178.00			
Melons	22.00	18.00	10.8	5.00	115.40	5.00	176.20	21.30	0.00	1.00	22.30	198.50			
Other crops	28.80	18.00	10.8	5.00	58.80	3.00	124.40	14.20	0.00	1.00	15.20	159.60			
Alfalfa	5.00	0.00	0.00	8.10	21.10	0.00	34.20	20.00	0.00	0.00	20.00	54.20			

Note: Vegetables, melons and other crops are estimated at private farm level. Irrigation system: gravity method

Data source: SAPI and farm interview survey

Table F-1-1-7 Expenditure of Farm Management (Without Project)

Crop	Variable Costs										Fixed Costs			Sub-Total Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total			
Wheat	51.00	30.00	10.80	112.80	11.77	4.30	220.67	0.00	27.75	10.00	37.75	258.42		
Barley	30.00	30.00	10.80	113.20	11.77	3.90	199.67	0.00	27.75	10.00	37.75	237.42		
Maize	9.80	36.00	14.00	108.80	44.40	6.40	219.40	32.20	44.40	9.50	86.10	305.50		
Sunflower	0.85	0.00	10.80	56.40	7.80	1.60	77.45	0.00	0.00	10.00	10.00	87.45		
Sugar beet	2.20	0.00	10.80	33.90	58.80	2.10	107.80	0.00	0.00	10.00	10.00	117.80		
Tobacco	0.00	176.00	82.00	72.80	459.50	26.30	816.60	33.70	83.27	1.00	117.97	934.57		
Vegetables	46.00	45.00	10.80	5.00	277.60	13.00	397.40	37.50	0.00	1.00	38.50	435.90		
Fruit-orchard	0.00	0.00	12.00	48.50	84.40	4.30	149.20	22.50	0.00	10.00	32.50	181.70		
Grapes-vineyard	0.00	12.00	12.00	48.50	57.70	3.90	134.10	15.00	0.00	7.50	22.50	156.60		
Melons	22.00	9.00	5.40	5.00	97.70	4.00	143.10	22.50	0.00	1.00	23.50	166.60		
Other crops	28.80	9.00	5.40	5.00	46.60	4.00	98.80	15.00	0.00	1.00	16.00	114.80		
Alfalfa	5.00	0.00	0.00	8.10	16.65	0.00	29.75	22.50	0.00	0.00	22.50	52.25		

Note: Vegetables, melons and other crops are estimated at private farm level. Irrigation system: pumping method

Data source: SAPI and farm interview survey

Table F-1-1-8 Expenditure of Farm Management (With Project)

Unit: USD/ha

Crop	Variable Costs										Fixed Costs			Sub-Total Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total			
Wheat	51.00	35.00	15.30	126.90	12.10	4.80	245.10	5.60	27.75	10.00	43.35	288.45		
Barley	30.00	35.00	15.30	126.90	12.10	4.50	223.80	5.60	27.75	10.00	43.35	267.15		
Maize	9.80	62.00	14.00	123.30	49.95	10.40	269.45	32.20	44.40	9.50	86.10	355.55		
Sunflower	0.85	9.00	10.80	56.40	7.80	1.80	86.65	13.00	0.00	10.00	23.00	109.65		
Sugar beet	2.20	0.00	10.80	33.90	71.00	2.30	120.20	33.70	0.00	10.00	43.70	163.90		
Tobacco	0.00	176.00	82.00	72.80	466.20	24.60	821.60	33.70	83.27	1.00	117.97	939.57		
Vegetables	46.00	58.00	10.80	5.00	306.40	21.30	447.50	37.50	0.00	1.00	38.50	486.00		
Fruit-orchard	0.00	9.00	12.00	48.50	126.60	5.90	202.00	22.50	0.00	10.00	32.50	234.50		
Grapes-vineyard	0.00	18.00	12.00	48.50	73.30	4.50	156.30	15.00	0.00	7.50	22.50	178.80		
Melons	22.00	18.00	10.8	5.00	115.40	5.00	176.20	22.50	0.00	1.00	23.50	199.70		
Other crops	28.80	18.00	10.8	5.00	128.80	5.00	196.40	15.00	0.00	1.00	16.00	212.40		
Alfalfa	5.00	0.00	0.00	8.10	21.10	0.00	34.20	22.50	0.00	0.00	22.50	56.70		

Note: Vegetables, melons and other crops are estimated at private farm level. Irrigation system: pumping method

Data source: SAPI and farm interview survey

#### 4. Balance of Farm Economy

Table F-1-1-9 Revenues and Expenditure of Farm Management per Hectare (Without Project)

1. Petrich Study Area						Unit: USD	
Crop	Revenues	Expenditure			Return	Profitability (%)	
		Variable Costs	Fixed Costs	Sub-Total			
Wheat (non-irrig)	405	250	38	288	117	41%	
Barley (non-irrig)	353	230	38	268	85	32%	
Maize (irrigated)	413	230	86	316	97	31%	
Tobacco (irrig)	1,775	817	118	935	840	90%	
Vegetables (irrig)	1,500	490	39	529	971	183%	
Fruit (irrig)	303	199	33	232	70	30%	
Fruit (non-irrig)	121	105	10	115	6	5%	
Grapes (irrig)	595	161	23	184	411	223%	
Grapes (non-irrig)	298	102	8	110	188	170%	
Melons (irrig)	225	143	24	167	58	35%	
Other crops (irrig)	204	113	16	129	75	58%	
Alfalfa (irrig)	55	30	23	53	2	4%	
Alfalfa (non-irrig)	25	27	0	27	-2	-7%	

2. Rositza Study Area						Unit: USD	
Crop	Revenues	Expenditure			Return	Profitability (%)	
		Variable Costs	Fixed Costs	Sub-Total			
Wheat (non-irrig)	420	228	38	265	155	58%	
Barley (non-irrig)	406	208	38	246	160	65%	
Maize (irrig)	390	223	86	309	81	26%	
Sunflower(non-irri)	108	77	8	85	23	27%	
Sugar beet(non-irri)	150	111	12	123	27	22%	
Vegetables (irrig)	1,280	417	34	451	829	184%	
Fruit (irrig)	300	127	33	160	140	88%	
Fruit (non-irrig)	240	101	10	111	130	117%	
Grapes (irrig)	788	154	23	177	611	345%	
Grapes (non-irrig)	683	126	8	134	549	410%	
Melons (irrig)	195	134	21	155	40	26%	
Other crops (irrig)	132	96	21	117	15	13%	
Alfalfa (irrig)	60	30	23	53	7	13%	
Alfalfa (non-irrig)	50	27	0	27	23	85%	

## 3. Sredna Tundja Study Area

Unit: USD

Crop	Revenues	Expenditure			Return	Profitability (%)
		Variable Costs	Fixed Costs	Sub-Total		
Wheat (non-irrig)	465	188	38	226	239	106%
Barley (non-irrig)	390	160	38	198	192	97%
Maize (irrig)	578	204	54	258	319	124%
Maize (non-irrig)	263	200	25	225	38	17%
Sugar beet (irrig)	150	104	10	114	36	32%
Sunflower(non-irrig)	110	72	10	82	28	35%
Vegetables (irrig)	1,473	383	39	422	1,051	249%
Fruit (irrig)	350	181	33	214	136	64%
Fruit (non-irrig)	300	143	33	176	124	70%
Grapes (irrig)	675	127	23	150	525	349%
Grapes (non-irrig)	630	104	23	127	503	396%
Melons (irrig)	195	153	24	177	18	10%
Other crops (irrig)	524	88	16	104	420	403%
Alfalfa (irrig)	60	30	23	53	7	13%
Alfalfa (non-irrig)	50	27	0	27	23	85%

Table F-I-1-10 Revenues and Expenditure of Farm Management per Hectare (With Project)

## I. Petrich Study Area

Unit: USD

Crop	Revenues	Expenditure			Return	Profitability (%)
		Variable Costs	Fixed Costs	Sub-Total		
Wheat (irrig)	540	277	43	320	220	69%
Barley (irrig)	435	258	43	301	134	45%
Maize (irrig)	525	285	82	367	158	43%
Tobacco (irrig)	2,272	822	116	938	1,334	142%
Vegetables (irrig)	2,625	547	34	581	2,044	352%
Fruit (irrig)	506	262	30	292	214	73%
Grapes (irrig)	1,020	185	22	207	813	392%
Melons (irrig)	270	176	22	198	72	36%
Other crops (irrig)	265	141	15	156	109	70%
Alfalfa (irrig)	65	34	20	54	11	20%



## 2. Rositza Study Area

Unit: USD

Crop	Revenues	Expenditure			Return	Profitability (%)
		Variable Costs	Fixed Costs	Sub-Total		
Wheat (irrig)	525	252	43	295	230	78%
Wheat (non-irrig)	476	240	38	278	198	71%
Barley (irrig)	462	233	43	276	186	67%
Barley (non-irrig)	420	221	38	260	160	62%
Maize (irrig)	630	276	82	358	272	76%
Sunflower (irrig)	158	87	22	109	49	45%
Sunflower(non-irri)	135	83	10	93	42	46%
Sugar beet (irrig)	180	124	19	143	37	26%
Vegetables (irrig)	2,240	466	34	500	1,741	348%
Fruit (irrig)	480	167	31	197	283	144%
Grapes (irrig)	1,213	177	21	198	1,015	512%
Melons (irrig)	270	165	21	186	84	45%
Other crops (irrig)	173	120	21	141	32	23%
Alfalfa (irrig)	68	34	20	54	14	25%

## 3. Sredna Tundja Study Area

Unit: USD

Crop	Revenues	Expenditure			Return	Profitability (%)
		Variable Costs	Fixed Costs	Sub-Total		
Wheat (non-irrig)	510	198	38	236	274	116%
Barley (non-irrig)	410	170	38	208	202	97%
Maize (irrig)	638	252	83	335	303	90%
Sunflower (irrig)	182	81	22	103	79	77%
Sunflower(non-irri)	165	77	22	99	66	67%
Sugar beet (irrig)	180	116	41	157	23	14%
Vegetables (irrig)	2,641	291	34	325	2,316	713%
Fruit (irrig)	625	238	31	268	357	133%
Grapes (irrig)	1,170	146	21	168	1,002	598%
Melons (irrig)	270	188	21	209	61	29%
Other crops (irrig)	702	110	21	131	571	436%
Alfalfa (irrig)	75	34	20	54	21	38%

## 5. Planted Area and Production

Table F-I-1-11 Planted Area, Yield and Production by Crops Without Project

Study Area: Petrich

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (non-irri)	550	2,700	1,485,000	0.15	222,750
Barley (non-irri)	990	2,350	2,326,500	0.15	348,975
Maize (irri)	1,485	2,750	4,083,750	0.15	612,563
Tobacco (irri)	1,320	1,250	1,650,000	1.42	2,343,000
Vegetables(irri)	1,430	10,000	14,300,000	0.15	2,145,000
Fruit (irri)	124	2,750	341,000	0.11	37,510
Fruit (non-irri)	371	1,100	408,100	0.11	44,891
Grapes (irri)	234	3,500	819,000	0.17	139,230
Grapes(non-irri)	701	1,750	1,226,750	0.17	208,548
Melons (irri)	330	7,500	2,475,000	0.03	74,250
Other crops(irri)	1,375	1,200	1,650,000	0.17	280,500
Alfalfa (irri)	41	2,750	112,750	0.02	2,255
Alfalfa (non-irri)	124	1,250	155,000	0.02	3,100
Pasture	715	0	0	0	0
Unplanted area	990	0	0	0	0
On-farm roads	220	0	0	0	0
<b>Total</b>	<b>11,000</b>		<b>31,032,850</b>		<b>6,462,571</b>

Study Area: Rositza

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (non-irri)	12,587	3,000	37,761,000	0.14	5,286,540
Barley (non-irri)	5,538	2,900	16,060,200	0.14	2,248,428
Maize (irri)	9,315	2,600	24,219,000	0.15	3,632,850
Sunflower(non)	8,307	1,200	9,968,400	0.09	897,156
Sugar beet(non)	503	15,000	7,545,000	0.01	75,450
Vegetables(irri)	2,266	8,000	18,128,000	0.16	2,900,480
Fruit (irri)	378	3,750	1,417,500	0.08	113,400
Fruit (non-irri)	1,133	3,000	3,399,000	0.08	271,920
Grapes (irri)	315	3,750	1,181,250	0.21	248,063
Grapes(non-irri)	944	3,250	3,068,000	0.21	644,280
Melons (irri)	755	6,500	4,907,500	0.03	147,225
Other crops(irri)	1,259	880	1,107,920	0.15	166,188
Alfalfa (irri)	629	3,000	1,887,000	0.02	37,740
Alfalfa (non-irri)	1,888	2,500	4,720,000	0.02	94,400
Pasture	1,007	0	0	0	0
Unplanted area	2,517	0	0	0	0
On-farm roads	1,007	0	0	0	0
<b>Total</b>	<b>50,348</b>		<b>135,369,770</b>		<b>16,764,120</b>

## Study Area: Sredna Tundja

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (non-irri)	31,517	3,100	97,702,700	0.15	14,655,405
Barley (non-irri)	17,088	3,000	51,264,000	0.13	6,664,320
Maize (irri)	5,696	3,850	21,929,600	0.15	3,289,440
Maize (non-irri)	3,797	1,750	6,644,750	0.15	996,713
Sugar beet (irri)	120	15,000	1,800,000	0.01	18,000
Sunflower (non)	14,240	1,000	14,240,000	0.11	1,566,400
Vegetables(irri)	3,820	7,750	29,605,000	0.19	5,624,950
Fruit (irri)	1,424	3,500	4,984,000	0.10	498,400
Fruit (non-irri)	2,468	3,000	7,404,000	0.10	740,400
Grapes (irri)	949	3,750	3,558,750	0.18	640,575
Grapes(non-irri)	3,797	3,500	13,289,500	0.18	2,392,110
Melons (irri)	949	6,500	6,168,500	0.03	185,055
Other crops	1,519	2,910	4,420,290	0.18	795,652
Alfalfa (irri)	950	3,000	2,850,000	0.02	57,000
Alfalfa (non-irri)	1,804	2,500	4,510,000	0.02	90,200
Pasture	949	0	0	0	0
Unplanted area	1,946	0	0	0	0
On-farm roads	1,899	0	0	0	0
<b>Total</b>	<b>94,932</b>		<b>270,371,090</b>		<b>38,214,620</b>

Table F-I-1-12 Planted Area, Yield and Production by Crops With Project

## Study Area: Petrich

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (irri)	385	3,600	1,386,000	0.15	207,900
Barley (irri)	825	2,900	2,392,500	0.15	358,875
Maize (irri)	1,155	3,500	4,042,500	0.15	606,375
Tobacco (irri)	2,200	1,600	3,520,000	1.42	4,998,400
Vegetables (irri)	3,135	17,870	56,022,450	0.15	8,403,368
Fruit (irri)	495	4,500	2,227,500	0.11	245,025
Grapes (irri)	825	5,500	4,537,500	0.17	771,375
Melons (irri)	330	9,000	2,970,000	0.03	89,100
Other crops (irri)	1,265	1,600	2,024,000	0.17	344,080
Alfalfa (irri)	440	3,250	1,430,000	0.02	28,600
Pasture	275	0	0	0	0
Unplanted area	330	0	0	0	0
On-farm roads	220	0	0	0	0
<b>Total</b>	<b>11,880</b>		<b>80,552,450</b>		<b>16,053,098</b>

## Study Area: Rositza

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (irri)	2,517	3,750	9,438,750	0.14	1,321,425
Wheat (non-irri)	12,587	3,400	42,795,800	0.14	5,991,412
Barley (irri)	1,208	3,300	3,986,400	0.14	558,096
Barley (non-irri)	4,833	3,000	14,499,000	0.14	2,029,860
Maize (irri)	5,286	4,200	22,201,200	0.15	3,330,180
Sunflower (irri)	2,517	1,750	4,404,750	0.09	396,428
Sunflower (non-irri)	5,035	1,750	8,811,250	0.09	793,013
Sugar beet (irri)	1,259	18,000	22,662,000	0.01	226,620
Vegetables (irri)	2,266	14,500	32,857,000	0.16	5,257,120
Fruit (irri)	1,259	5,000	6,295,000	0.08	503,600
Grapes (irri)	3,524	6,500	22,906,000	0.21	4,810,260
Melons (irri)	1,007	9,000	9,063,000	0.03	271,890
Other crops (irri)	2,014	1,500	3,021,000	0.15	453,150
Alfalfa (irri)	1,007	3,400	3,423,800	0.02	68,476
Pasture	1,510	0	0	0	0
Unplanted area	1,510	0	0	0	0
On-farm roads	1,007	0	0	0	0
<b>Total</b>	<b>50,346</b>		<b>206,364,950</b>		<b>26,011,529</b>

Study Area: Sredna Tundja

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount (USD)
Wheat (non-irri)	31,280	3,400	106,352,000	0.15	15,952,800
Barley (non-irri)	16,138	3,150	50,834,700	0.13	6,608,511
Maize (irri)	12,341	4,250	52,449,250	0.15	7,867,388
Sunflower (irri)	949	1,650	1,565,850	0.11	172,244
Sunflower (non-irri)	11,392	1,500	17,088,000	0.11	1,879,680
Sugar beet (irri)	949	18,000	17,082,000	0.01	170,820
Vegetables (irri)	2,848	13,900	39,587,200	0.19	7,521,568
Fruit (irri)	1,899	6,250	11,868,750	0.10	1,186,875
Grapes (irri)	2,848	6,500	18,512,000	0.18	3,332,160
Melons (irri)	949	9,000	8,541,000	0.03	256,230
Other crops (irri)	4,747	3,900	18,513,300	0.18	3,332,394
Alfalfa (irri)	2,848	3,750	10,680,000	0.02	213,600
Pasture	1,899	0	0	0	0
Unplanted area	1,946	0	0	0	0
On-farm roads	1,899	0	0	0	0
<b>Total</b>	<b>94,932</b>		<b>353,074,050</b>		<b>48,494,269</b>

## 6. Balance of Farm Economy in Study Area

Table F-I-1-13 Revenues and Expenditure of Farm Management in Study Area  
Without Project

Study Area: Petrich

Crop	Planted Area (ha)	Revenues	Expenditure	Return (USD)
		Production	Production	
		Amount (USD)	Costs (USD)	
Wheat (non-irri)	550	222,750	158,400	64,350
Barley (non-irri)	990	348,975	265,320	83,655
Maize (irri)	1,485	612,563	469,260	143,303
Tobacco (irri)	1,320	2,343,000	1,234,200	1,108,800
Vegetables(irri)	1,430	2,145,000	756,470	1,388,530
Fruit (irri)	124	37,510	28,768	8,742
Fruit (non-irri)	371	44,891	42,665	2,226
Grapes (irri)	234	139,230	43,056	96,174
Grapes(non-irri)	701	208,548	77,110	131,438
Melons (irri)	330	74,250	55,110	19,140
Other crops(irri)	1,375	280,500	177,375	103,125
Alfalfa (irri)	41	2,255	2,173	82
Alfalfa (non-irri)	124	3,100	3,348	-248
<b>Total</b>	<b>9,075</b>	<b>6,462,572</b>	<b>3,313,255</b>	<b>3,149,317</b>

Study Area: Rositza

Crop	Planted Area (ha)	Revenues	Expenditure	Return (USD)
		Production	Production	
		Amount (USD)	Costs (USD)	
Wheat (non-irri)	12,587	5,286,540	3,335,555	1,950,985
Barley (non-irri)	5,538	2,248,428	1,362,348	886,080
Maize (irri)	9,315	3,632,850	2,878,335	754,515
Sunflower(non)	8,307	897,156	706,095	191,061
Sugar beet(non)	503	75,450	61,869	13,581
Vegetables(irri)	2,266	2,900,480	1,021,966	1,878,514
Fruit (irri)	378	113,400	60,480	52,920
Fruit (non-irri)	1,133	271,920	125,763	146,157
Grapes (irri)	315	248,063	55,755	192,308
Grapes(non-irri)	944	644,280	126,496	517,784
Melons (irri)	755	147,225	117,025	30,200
Other crops(irri)	1,259	166,188	147,303	18,885
Alfalfa (irri)	629	37,740	33,337	4,403
Alfalfa (non-irri)	1,888	94,400	50,976	43,424
<b>Total</b>	<b>45,817</b>	<b>16,764,120</b>	<b>10,083,303</b>	<b>6,680,817</b>

Study Area: Sredna Tundja

Crop	Planted Area (ha)	Revenues	Expenditure	Return
		Production	Production	
		Amount (USD)	Costs (USD)	(USD)
Wheat (non-irri)	31,517	14,655,405	7,122,842	7,532,563
Barley (non-irri)	17,088	6,664,320	3,383,424	3,280,896
Maize (irri)	5,696	3,289,440	1,469,568	1,819,872
Maize (non-irri)	3,797	996,713	854,325	142,388
Sugar beet (irri)	120	18,000	13,680	4,320
Sunflower (non)	14,240	1,566,400	1,167,680	398,720
Vegetables(irri)	3,820	5,624,950	1,612,040	4,012,910
Fruit (irri)	1,424	489,400	304,736	184,664
Fruit (non-irri)	2,468	740,400	434,368	306,032
Grapes (irri)	949	640,575	142,350	498,225
Grapes(non-irri)	3,797	2,392,110	482,219	1,909,891
Melons (irri)	949	185,055	167,973	17,082
Other crops (irri)	1,519	795,652	157,976	637,676
Alfalfa (irri)	950	5,700	50,350	-44,650
Alfalfa (non-irri)	1,804	90,200	48,708	41,492
<b>Total</b>	<b>90,138</b>	<b>38,154,320</b>	<b>17,412,239</b>	<b>20,742,081</b>

Table F-I-I-14 Revenues and Expenditure of Farm Management in Study Area

With Project

Study Area: Petrich

Crop	Planted Area (ha)	Revenues	Expenditure	Return
		Production	Production	
		Amount (USD)	Costs (USD)	(USD)
Wheat (irri)	385	207,900	123,200	84,700
Barley (irri)	825	358,875	248,325	110,550
Maize (irri)	1,155	606,375	423,885	182,490
Tobacco (irri)	2,200	4,998,400	2,063,600	2,934,800
Vegetables (irri)	3,135	8,403,368	1,821,435	6,581,933
Fruit (irri)	495	245,025	144,540	100,485
Grapes (irri)	825	771,375	170,775	600,600
Melons (irri)	330	89,100	65,340	23,760
Other crops (irri)	1,265	344,080	197,340	146,740
Alfalfa (irri)	440	28,600	23,760	4,840
<b>Total</b>	<b>11,055</b>	<b>16,053,098</b>	<b>5,282,200</b>	<b>10,770,898</b>

Study Area: Rositza

Crop	Planted Area (ha)	Revenues	Expenditure	Return
		Production	Production	
		Amount (USD)	Costs (USD)	(USD)
Wheat (irri)	2,517	1,321,425	742,515	578,910
Wheat (non-irri)	12,587	5,991,412	3,499,186	2,492,226
Barley (irri)	1,208	558,096	333,408	224,688
Barley (non-irri)	4,833	2,029,860	1,256,580	773,280
Maize (irri)	5,286	3,330,180	1,892,388	1,437,792
Sunflower (irri)	2,517	396,428	274,353	122,075
Sunflower (non-irri)	5,035	793,013	468,255	324,758
Sugar beet (irri)	1,259	226,620	180,037	46,583
Vegetables (irri)	2,266	5,257,120	1,133,000	4,124,120
Fruit (irri)	1,259	503,600	248,023	255,577
Grapes (irri)	3,524	4,810,260	697,752	4,112,508
Melons (irri)	1,007	271,890	187,302	84,588
Other crops (irri)	2,014	453,150	283,974	169,176
Alfalfa (irri)	1,007	68,476	54,378	14,098
<b>Total</b>	<b>46,319</b>	<b>26,011,530</b>	<b>11,251,151</b>	<b>14,760,379</b>



Study Area: Sredna Tundja

Crop	Planted Area (ha)	Revenues	Expenditure	Return
		Production	Production	
		Amount (USD)	Costs (USD)	(USD)
Wheat (non-irri)	31,280	15,952,800	7,382,080	8,570,720
Barley (non-irri)	16,138	6,608,511	3,356,704	3,251,807
Maize (irri)	12,341	7,867,388	4,134,235	3,733,153
Sunflower (irri)	949	172,244	97,747	74,497
Sunflower(non-irri)	11,392	1,879,680	1,127,808	751,872
Sugar beet (irri)	949	170,820	148,993	21,827
Vegetables (irri)	2,848	7,521,568	925,600	6,595,968
Fruit (irri)	1,899	1,186,875	508,932	677,943
Grapes (irri)	2,848	3,332,160	478,464	2,853,696
Melons (irri)	949	256,230	198,341	57,889
Other crops (irri)	4,747	3,332,394	621,857	2,710,537
Alfalfa (irri)	2,848	213,600	153,792	59,808
<b>Total</b>	<b>89,188</b>	<b>48,494,270</b>	<b>19,134,553</b>	<b>29,359,717</b>

F-I-1-15 Benefits of Farm Management in Study Area

Study Area	Unit: USD			Remarks
	Without Project	With Project	Incremental Benef	
Petrich	3,149,317	10,770,898	7,621,581	
Rositza	6,680,817	14,760,379	8,079,562	
Sredna Tundja	20,742,081	29,359,717	8,617,636	

## 7. Labor Requirement

Table F-1-2-1(1) Monthly Requirement of Farm Labor Force by Crops  
Without Project

Crop	Unit: Man-Day/decare												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0.00	0.01	0.25	0.18	0.03	0.08	0.17	0.06	0.19	0.04	0.05	0.00	1.06
Barley*	0.00	0.01	0.25	0.18	0.03	0.08	0.17	0.06	0.19	0.04	0.05	0.00	1.06
Maize	0.00	0.00	0.20	2.60	0.20	0.30	0.10	0.10	0.50	0.00	0.00	0.00	4.00
Sunflower*	0.00	0.00	0.20	0.10	0.10	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.70
Sugar beet*	0.00	1.00	0.80	0.30	0.40	0.10	0.10	0.10	2.50	0.00	0.00	0.00	5.30
Tobacco	0.00	7.00	2.60	0.80	1.20	6.20	6.00	8.40	8.60	0.60	0.00	0.00	41.40
Vegetables	0.00	0.00	1.40	2.50	3.00	1.90	7.00	4.50	1.10	3.60	0.00	0.00	25.00
Fruit-orchard	0.00	0.10	0.10	0.10	1.00	0.20	3.00	2.50	0.50	0.10	0.00	0.00	7.60
Fruit-orchard*	0.00	0.10	0.10	0.10	1.00	0.10	2.20	2.20	0.50	0.10	0.00	0.00	6.40
Grapes-vineyard	0.00	0.10	0.10	0.10	1.50	1.50	0.30	0.10	1.40	0.10	0.00	0.00	5.20
Grapes-vineyard*	0.00	0.10	0.10	0.10	1.20	1.20	0.20	0.10	1.30	0.10	0.00	0.00	4.40
Melons	0.00	0.00	1.00	1.20	1.90	1.90	1.40	1.30	0.10	0.00	0.00	0.00	8.80
Other crops	0.00	0.00	0.10	1.00	1.00	2.00	0.10	0.00	0.00	0.00	0.00	0.00	4.20
Alfalfa	0.00	0.00	0.20	0.00	0.30	0.30	0.30	0.30	0.10	0.00	0.00	0.00	1.50
Alfalfa*	0.00	0.00	0.20	0.00	0.20	0.30	0.30	0.30	0.10	0.00	0.00	0.00	1.40

Note: \* non-irrigated

Data source: Farm survey

Table F-1-2-1(2) Monthly Requirement of Farm Labor Force by Crops  
Without Project

Study Area: Petrich	Unit: man-day												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0	55	1,375	990	165	440	935	330	1,045	220	275	0	5,830
Barley*	0	99	2,475	1,782	297	792	1,683	594	1,881	396	495	0	10,494
Maize	0	0	2,970	38,610	2,970	4,455	1,485	1,485	7,425	0	0	0	59,400
Tobacco	0	92,400	34,320	10,560	15,840	81,840	79,200	110,880	113,520	7,920	0	0	546,480
Vegetables	0	0	20,020	35,750	42,900	27,170	100,100	64,350	15,730	51,480	0	0	357,500
Fruit-orchard	0	124	124	124	1,240	248	3,720	3,100	620	124	0	0	9,424
Fruit-orchard*	0	371	371	371	3,710	371	8,162	8,162	1,855	371	0	0	23,744
Grapes-vineyard	0	234	234	234	3,510	3,510	702	234	3,276	234	0	0	12,168
Grapes-vineyard*	0	701	701	701	8,412	8,412	1,402	701	9,113	701	0	0	30,844
Melons	0	0	3,300	3,960	6,270	6,270	4,620	4,290	330	0	0	0	29,040
Other crops	0	0	1,375	13,750	13,750	27,500	1,375	0	0	0	0	0	57,750
Alfalfa	0	0	82	0	123	123	123	123	41	0	0	0	615
Alfalfa*	0	0	248	0	248	372	372	372	124	0	0	0	1,736
<b>Total</b>	<b>0</b>	<b>93,984</b>	<b>67,595</b>	<b>106,832</b>	<b>99,435</b>	<b>161,503</b>	<b>203,879</b>	<b>194,621</b>	<b>154,960</b>	<b>61,446</b>	<b>770</b>	<b>0</b>	<b>1,145,025</b>

Note: \* non-irrigated

Data source: Farm survey

Table F-1-2-1(3) Monthly Requirement of Farm Labor Force by Crops

Study Area: Rosizza	Without Project												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wheat*	0	1,259	31,468	22,657	3,776	10,070	21,398	7,552	23,915	5,035	6,294	0	133,422
Barley*	0	554	13,845	9,968	1,661	4,430	9,415	3,323	10,522	2,215	2,769	0	58,703
Maize	0	0	18,630	242,190	18,630	27,945	9,315	9,315	46,575	0	0	0	372,600
Sunflower*	0	0	16,614	8,307	8,307	0	0	0	24,921	0	0	0	58,149
Sugar beet*	0	5,030	4,024	1,509	2,012	503	503	503	12,575	0	0	0	26,659
Vegetables	0	0	13,216	23,600	28,320	17,936	66,080	42,480	10,384	33,984	0	0	236,000
Fruit-orchard	0	378	378	378	3,780	4,532	11,340	9,450	1,890	378	0	0	32,504
Fruit-orchard*	0	1,133	1,133	1,133	11,330	378	24,926	24,926	5,665	1,133	0	0	71,757
Grapes-vineyard	0	32	32	32	473	16,995	95	32	441	32	0	0	18,161
Grapes-vineyard*	0	944	944	944	11,328	378	1,888	944	12,272	944	0	0	30,586
Melons	0	0	7,550	9,060	14,345	17,936	10,570	9,815	755	0	0	0	70,031
Other crops	0	0	1,259	12,590	12,590	15,100	1,259	0	0	0	0	0	42,798
Alfalfa	0	0	1,258	0	1,887	3,777	1,887	1,887	629	0	0	0	11,325
Alfalfa*	0	0	3,776	0	3,776	1,887	5,664	5,664	1,888	0	0	0	22,655
Total	0	9,329	114,126	332,368	122,215	121,867	164,339	115,891	152,433	43,721	9,063	0	1,185,350

Note: \* non-irrigated

Data source: Farm survey

Table F-1-2-1(4) Monthly Requirement of Farm Labor Force by Crops

Crop	Without Project												Total	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Wheat*	0	3,152	78,793	56,731	9,455	25,214	53,579	18,910	59,882	12,607	15,759	0	0	334,080
Barley*	0	171	4,272	3,076	513	1,367	2,905	1,025	3,247	684	854	0	0	18,113
Maize	0	0	11,392	148,096	11,392	17,088	5,696	5,696	28,480	0	0	0	0	227,840
Maize*	0	0	7,594	94,925	9,493	13,290	18,985	18,985	18,985	0	0	0	0	182,256
Sunflower*	0	0	17,088	8,544	8,544	0	0	0	25,632	0	0	0	0	59,808
Sugar beet	0	1,560	1,200	600	600	120	120	120	3,360	0	0	0	0	7,680
Vegetables	0	0	53,480	95,500	114,600	72,580	267,400	171,900	42,020	137,520	0	0	0	955,000
Fruit-orchard	0	1,424	1,424	1,424	14,240	2,848	42,720	35,600	7,120	1,424	0	0	0	108,224
Fruit-orchard*	0	2,468	2,468	2,468	24,680	2,468	54,296	54,296	12,340	2,468	0	0	0	157,952
Grapes-vineyard	0	949	949	949	14,235	14,235	2,847	949	13,286	949	0	0	0	49,348
Grapes-vineyard*	0	3,797	3,797	3,797	45,564	45,564	7,594	3,797	49,361	3,797	0	0	0	167,068
Melons	0	0	9,490	11,388	18,031	18,031	13,286	12,337	949	0	0	0	0	83,512
Other crops	0	0	1,519	15,190	15,190	30,380	1,519	0	0	0	0	0	0	63,798
Alfalfa	0	0	1,900	0	2,850	2,850	2,850	2,850	950	0	0	0	0	14,250
Alfalfa*	0	0	3,608	0	3,608	5,412	5,412	5,412	1,804	0	0	0	0	25,256
Total	0	13,521	198,974	442,687	292,994	251,446	479,209	331,877	267,416	159,448	16,613	0	0	2,454,185

Note: \* non-irrigated

Data source: Farm survey

Table F-I-2-2(1) Monthly Requirement of Farm Labor Force by Crops

With Project

Crop	Unit: man-day/decare												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0.00	0.01	0.25	0.18	0.03	0.09	0.18	0.06	0.20	0.04	0.05	0.00	1.09
Wheat*	0.00	0.01	0.25	0.18	0.03	0.08	0.17	0.06	0.19	0.04	0.05	0.00	1.06
Barley	0.00	0.01	0.25	0.18	0.03	0.09	0.18	0.06	0.20	0.04	0.05	0.00	1.09
Barley*	0.00	0.01	0.25	0.18	0.03	0.08	0.17	0.06	0.19	0.04	0.05	0.00	1.06
Maize	0.00	0.00	0.20	2.80	0.30	0.40	0.10	0.10	0.60	0.00	0.00	0.00	4.50
Sunflower	0.00	0.00	2.10	1.20	1.10	0.10	0.00	0.00	3.60	0.00	0.00	0.00	8.10
Sunflower*	0.00	0.00	2.10	1.20	1.10	0.10	0.00	0.00	3.40	0.00	0.00	0.00	7.90
Sugar beet	0.00	1.30	1.00	0.50	0.50	0.10	0.10	0.10	2.80	0.00	0.00	0.00	6.40
Tobacco	0.00	7.00	2.60	0.80	1.20	6.20	6.10	8.50	8.70	0.60	0.00	0.00	41.70
Vegetables	0.00	0.00	1.40	4.40	3.20	1.90	8.00	4.90	1.30	2.50	0.00	0.00	27.60
Fruit-orchard	0.00	0.10	1.00	1.00	1.50	0.20	4.00	3.00	0.50	0.10	0.00	0.00	11.40
Grass-vineyard	0.00	0.10	0.20	0.20	1.50	1.50	0.50	0.20	2.20	0.20	0.00	0.00	6.60
Melons	0.00	0.00	1.00	1.20	2.70	2.70	1.40	1.30	0.10	0.00	0.00	0.00	10.40
Other crops	0.00	0.00	0.10	1.10	1.50	2.50	0.10	1.80	2.00	2.50	0.00	0.00	11.60
Alfalfa	0.00	0.00	0.20	0.00	0.40	0.40	0.40	0.40	0.10	0.00	0.00	0.00	1.90

Note: \* non-irrigated

Data source: Farm survey

Table F-1-2-2(2) Monthly Requirement of Farm Labor Force by Crops

Study Area: Petrich	With Project												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wheat	0	39	963	693	116	347	693	231	770	154	193	0	4,197
Barley	0	83	2,063	1,485	248	660	1,403	495	1,568	330	413	0	8,745
Maize	0	0	2,310	32,340	3,465	4,620	1,155	1,155	6,930	0	0	0	51,975
Tobacco	0	154,000	57,200	17,600	26,400	136,400	134,200	187,000	191,400	13,200	0	0	917,400
Vegetables	0	0	43,890	137,940	100,320	59,565	250,800	153,615	40,755	78,375	0	0	865,260
Fruit-orchard	0	495	4,950	4,950	7,425	990	19,800	14,850	2,475	495	0	0	56,430
Grapes-vineyard	0	825	1,650	1,650	12,375	12,375	4,125	1,650	18,150	1,650	0	0	54,450
Melons	0	0	3,300	3,960	8,910	8,910	4,620	4,290	330	0	0	0	34,320
Other crops	0	0	1,265	13,915	18,975	31,625	1,265	22,770	25,300	31,625	0	0	146,740
Alfalfa	0	0	880	0	1,760	1,760	1,760	1,760	440	0	0	0	8,360
<b>Total</b>	<b>0</b>	<b>155,441</b>	<b>118,470</b>	<b>214,533</b>	<b>179,993</b>	<b>257,252</b>	<b>419,821</b>	<b>387,816</b>	<b>288,118</b>	<b>125,829</b>	<b>605</b>	<b>0</b>	<b>2,147,877</b>

Note: \* non-irrigated

Data source: Farm survey

Table F-1-2-2(3) Monthly Requirement of Farm Labor Force by Crops

With Project

Crop	Unit: man-day												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0	252	6,293	4,531	755	2,265	4,531	1,510	5,034	1,007	1,259	0	27,455
Wheat*	0	1,259	31,468	22,657	3,776	10,070	21,398	7,552	23,915	5,035	6,294	0	133,422
Barley	0	121	3,020	2,174	362	1,087	2,174	725	2,416	483	604	0	13,167
Barley	0	483	12,083	8,699	1,450	3,866	8,216	2,900	9,183	1,933	2,417	0	51,230
Maize	0	0	10,572	148,008	15,858	21,144	5,286	5,286	31,716	0	0	0	237,870
Sunflower	0	0	52,857	30,204	27,687	2,517	0	0	90,612	0	0	0	203,877
Sunflower*	0	0	105,735	60,420	55,385	5,035	0	0	171,190	0	0	0	397,765
Sugar beet	0	16,367	12,590	6,295	6,295	1,259	1,259	1,259	55,252	0	0	0	80,576
Vegetables	0	0	31,724	99,704	72,512	43,054	181,280	111,034	29,458	56,650	0	0	625,416
Fruit-orchard	0	1,259	12,590	12,590	18,885	2,518	50,360	37,770	6,295	1,259	0	0	143,526
Grapes-vineyard	0	3,524	7,048	7,048	52,860	52,860	17,620	7,048	77,528	7,048	0	0	232,584
Melons	0	0	10,070	12,084	27,189	27,189	14,098	13,091	1,007	0	0	0	104,728
Other crops	0	0	2,014	22,154	30,210	50,350	2,014	36,252	40,280	50,350	0	0	233,624
Alfalfa	0	0	2,014	0	4,028	4,028	4,028	4,028	1,007	0	0	0	19,133
Total	0	23,265	300,077	436,568	317,253	227,243	312,264	228,455	524,893	123,765	10,573	0	2,504,354

Note: \* non-irrigated

Data source: Farm survey



Table F-I-2-2(4) Monthly Requirement of Farm Labor Force by Crops

Study Area: Sredna Tundja	With Project												Total				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
Wheat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheat*	0	3,128	78,200	56,304	9,384	25,024	53,176	18,768	59,432	12,512	15,640	0	331,568	0	0	0	0
Barley	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barley*	0	1,614	40,345	29,048	4,841	12,910	27,435	9,683	30,662	6,455	8,069	0	171,063	0	0	0	0
Maize	0	0	24,682	345,548	37,023	49,364	12,341	12,341	74,046	0	0	0	555,345	0	0	0	0
Sunflower	0	0	19,929	11,388	10,439	949	0	0	34,164	0	0	0	76,869	0	0	0	0
Sunflower*	0	0	239,232	136,704	125,312	11,392	0	0	387,528	0	0	0	899,968	0	0	0	0
Sugar beet	0	12,337	9,490	4,745	4,745	949	949	949	26,572	0	0	0	60,736	0	0	0	0
Vegetables	0	0	39,872	125,312	91,136	54,112	227,840	139,552	37,024	71,200	0	0	786,048	0	0	0	0
Fruit-orchard	0	1,899	18,990	18,990	28,485	3,798	75,960	56,970	9,495	1,899	0	0	216,486	0	0	0	0
Grapes-vineyard	0	2,848	5,696	5,696	42,720	42,720	14,240	5,696	62,656	5,696	0	0	187,968	0	0	0	0
Melons	0	0	9,490	11,388	25,623	25,623	13,286	12,337	949	0	0	0	98,696	0	0	0	0
Other crops	0	0	4,747	52,217	71,205	118,675	4,747	35,446	94,940	118,675	0	0	550,652	0	0	0	0
Alfalfa	0	0	5,696	0	11,392	11,392	11,392	11,392	2,848	0	0	0	54,112	0	0	0	0
Total	0	21,826	496,369	797,340	462,305	356,908	441,366	353,134	820,116	216,437	23,709	0	3,989,511	0	0	0	0

Note: \* non-irrigated

Data source: Farm survey

## 8. Farm Household Economy

Table F-I-3-1(1) Farm Household Economy  
Without Project

Study Area: Petrich	
Category	Description
Farm Size	2.0 ha
Cropping Pattern	Wheat (1.0 ha), Vegetables (1.2 ha), Melons (0.3ha) Alfalfa (0.1ha)
Farming System	Mixed with manual labor and mechanization Irrigated and rainfed farming (pump irrigation)
Farm Labor Force	Family labor: 3 persons
Draft/Domestic Animals	Pig: 2 head      Chicken: 10
Income (Lv)	
Farm Income	246,340
Off-farm Income	180,000    300 day x 600Lv/day
Gross Income	426,340
Expenditure (Lv)	
Production Costs*	106,400
Home Consumption	83,910
Living Expenses	194,640
Reserves (Lv)	41,390

Source: Farm survey

Note: \* Excluding family labor costs and non-cash materials  
Including water fee (adopted Sliven's fee)

Table F-I-3-1(2) Farm Household Economy  
With Project

Study Area: Petrich	
Category	Description
Farm Size	2.0 ha
Cropping Pattern	Wheat (1.0ha), Vegetables (1.4ha), Melons (0.2ha) Alfalfa (0.1ha)
Farming System	Mixed with manual labor and mechanization Irrigated farming (pump irrigation)
Farm Labor Force	Family labor: 3 persons
Draft/Domestic Animals	Pig: 2 head      Chicken: 10
Income (Lv)	
Farm Income	331,450
Off-farm Income	30,000    50 days x 600Lv/day
Gross Income	361,450
Expenditure (Lv)	
Production Costs*	118,050
Home Consumption	229
Living Expenses	194,640
Reserves (Lv)	48,531

Source: Farm survey

Note: \* Excluding family labor costs and non-cash materials  
Including water fee (adopted Sliven's fee)

Table F-I-3-2(1) Farm Household Economy  
Without Project

Study Area: Rositza	
Category	Description
Farm Size	1.9 ha
Cropping Pattern	Wheat (0.5ha), Maize (0.5ha), Vegetables (0.5ha), Melons (0.3ha) Alfalfa (0.1ha)
Farming System	Mixed with manual labor and mechanization Irrigated and rainfed farming
Farm Labor Force	Family labor: 2 persons
Draft/Domestic Animals	Pig: 3 head      Chicken: 29      Cattle: 1 head
Income (Lv)	
Farm Income	122,360
Off-farm Income	45,000 150 days x 300 lev/day
Other Income**	60,000
Gross Income	227,360
Expenditure (Lv)	
Production Costs*	64,220
Home Consumption	21,500
Living Expenses	130,730
Reserves (Lev)	10,910

Source: Farm survey

Note: \* Excluding family labor costs, non-cash materials and water fee.  
Including water fee (adopted Sliven's fee)

\*\* Land rent and dividend for 4 ha.

Table F-I-3-(2) Farm Household Economy  
With Project

Study Area: Rositza	
Category	Description
Farm Size	1.9 ha
Cropping Pattern	Wheat (0.5ha), Maize (0.5ha), Vegetables (0.6ha) Melons (0.2 ha), Alfalfa (0.1ha)
Farming System	Mixed with manual labor and mechanization Irrigated farming (pump irrigation)
Farm Labor Force	Family labor: 2 persons
Draft/Domestic Animals	Pig: 3 head      Chicken: 29      Cattle: 1 head
Income (Lv)	
Farm Income	213,630
Off-farm Income	9,000 30 days x 300lv/day
Other Income	60,000
Gross Income	282,630
Expenditure (Lv)	
Production Costs*	67,420
Home Consumption	10,165
Living Expenses	130,720
Reserves (Lev)	74,325

Source: Farm survey

Note: \* Excluding family labor costs and non-cash materials  
Including water fee (adopted Sliven's fee)

Table F-I-3-3(1) Farm Household Economy  
Without Project

Study Area: Sredna Tundja	
Category	Description
Farm Size	13.7 ha
Cropping Pattern	Wheat (4.5ha), Barley(2.0ha), Maize(1.0ha), Vegetables(1.7ha) Melons(0.5ha), Fruit(1.0ha), Grapes(1.5ha), Alfalfa(1.5ha)
Farming System	Mechanization Irrigated and rainfed farming (gravity irrigation)
Farm Labor Force	Family labor: 4 persons
Draft/Domestic Animals	Pig: 5 head, Chicken: 29, Cattle: 3 head, Sheep: 38 head
Income (Lv)	
Farm Income	1,351,640
Off-farm Income	0
Gross Income	1,351,640
Expenditure (Lv)	
Production Costs*	397,900
Home Consumption	209,940
Living Expenses	267,940
Reserves (Lv)	475,860

Source: Farm survey

Note: \* Excluding family labor costs and non-cash materials  
Including water fee (adopted Sliven's fee)

Table F-I-3-3(2) Farm Household Economy  
With Project

Study Area: Sredna Tundja	
Category	Description
Farm Size	13.7 ha
Cropping Pattern	Wheat (5.5ha), Barley(2.0ha), Maize(1.5ha), Vegetables(1.0ha) Melons(0.2ha), Fruit(1.0ha), Grapes(1.5ha), Alfalfa(1.0ha)
Farming System	Mechanization Irrigated and rainfed farming
Farm Labor Force	Family labor: 4 persons
Draft/Domestic Animals	Pig: 5 head, Chicken: 29, Cattle: 3 head, Sheep: 38 head
Income (Lv)	
Farm Income	1,954,520
Off-farm Income	0
Gross Income	1,954,520
Expenditure (Lv)	
Production Costs*	546,030
Home Consumption	209,940
Living Expenses	267,940
Reserves (Lv)	930,610

Source: Farm survey

Note: \* Excluding family labor costs and non-cash materials  
Including water fee (adopted Sliven's fee)

## 9. Farm Management of Production Co-operatives

Table F-I-4-1(1) Farm Management of Production Co-operatives  
Without Project

Study Area: Rositza	
Category	Description
Farmland	1,600 ha
Cropping Pattern	Wheat (477 ha)      Barley (138 ha)      Maize (270 ha) Sunflower (410 ha)      Vegetables (18 ha)      Melons (12 ha) Alfalfa (130 ha)      Pasture (145 ha)
Farming System	Mechanization
Irrigation System	Pumping method Irrigated crops: maize, vegetables, melons and alfalfa
Machinery	9 tractors, 1 combine harvester, 2 trucks
Organization	850 members      Board member: 11 Administration: 3,      Machinery workshop: 22, Workers: 15 - 20
Capital	11 million Leva
Credit	1.7 million Leva (1995) with annual interest rate of 34%
Revenues	
Gross Income	79,104,520
Expenditure	
Production Costs	54,997,897
Land Rent	16,000,000
Net Reserve	8,106,623
Net Return per Hectare by Crop (Lv)	
Wheat	26,490
Barley	27,430
Maize	15,870
Sunflower	1,980
Vegetables	130,106
Melons	7,020
Alfalfa	1,260

Note: Excluding amortization of building and machineries.

Including administration costs.

Source: Farm interview survey

**Table F-I-4-1(2) Farm Management of Production Co-operatives  
With Project**

Study Area: Rositza

Category	Description
Farmland	1,600 ha
Cropping Pattern	Wheat (570 ha)      Barley (140 ha)      Maize (180 ha)
	Sunflower (370 ha)      Vegetables (18 ha)      Melons (12 ha)
	Alfalfa (130 ha)      Vineyard (50 ha)      Pasture (130 ha)
Farming System	Mechanization
Irrigation System	Pumping method
	Irrigated crops: all crops
Machinery	9 tractors, 1 combine / Truck: 2
Organization	850 members      Board: 11
	Administration: 3,      Machinery workshop: 22, Workers: 15 - 20
Capital	11 million Leva
Credit	1.7 million Leva (1995) with annual interest rate of 34%
Revenues	
Gross Income	117,744,900
Expenditure	
Production Costs	57,199,107
Land Rent	16,000,000
Net Reserve	44,545,793
Net Return per Hectare by Crop (Lv)	
Wheat	45,404
Barley	37,512
Maize	59,100
Sunflower	10,898
Vegetables	291,857
Melons	20,529
Grapes	195,967
Alfalfa	2,882

Note: Excluding amortization of building and machineries.

Including administration costs.

Source: Farm interview survey

Table F-I-4-2(1) Farm Management of Production Co-operatives  
Without Project

Study Area: Sredna Tundja			
Category	Description		
Farmland	1,050 ha		
Cropping Pattern	Wheat (300 ha)	Barley (200 ha)	Maize (200 ha)
	Sunflower (150 ha)	Vegetables (15 ha)	Fruit (15 ha)
	Grapes (15 ha)	Alfalfa (50 ha)	Pasture (105 ha)
Farming System	Mechanization		
Irrigation System	Gravity method		
	Irrigated crops: maize, vegetables, orchard, vineyard and alfalfa		
Machinery	9 tractors, 1 combine harvester, 3 trucks		
Organization	500 members	Board member: 7	
	Administration: 3,	Machinery workshop: 15, Workers: 20	
Capital	8 million Leva		
Credit	Nil		
Revenues			
Gross Income	70,112,740		
Expenditure			
Production Costs	34,205,866		
Land Rent	10,500,000		
Net Reserve	25,406,874		
Net Return per Hectare by Crop (Lv)			
Wheat	44,100		
Barley	36,000		
Maize	53,400		
Sunflower	3,600		
Vegetables	173,711		
Fruit	11,444		
Grapes	92,934		
Alfalfa	1,800		

Note: Excluding amortization of building and machineries.

Including administration costs.

Source: Farm interview survey

Table F-I-4-2(2) Farm Management of Production Co-operatives  
With Project

Study Area: Sredna Tundja

Category	Description
Famland	1,050 ha
Cropping Pattern	Wheat (270ha), Barley (160ha), Maize (200ha), Sunflower (150ha) Sugar beet (30 ha), Vegetables (20ha), Fruit (25ha), Grapes (25ha) Alfalfa (50ha), Pasture (120ha)
Farming System	Mechanization
Irrigation System	Gravity method Irrigated crops: maize, sugar beet, vegetables, orchard, vineyard and alfalfa
Machinery	9 tractors, 1 combine harvester, 3 trucks
Organization	500 members      Board member: 7 Administration: 3,      Machinery workshop: 15, Workers: 20
Capital	8 million Leva
Credit	Nil
Revenues	
Gross Income	83,281,400
Expenditure	
Production Costs	40,293,680
Land Rent	10,500,000
Net Reserve	32,487,720
Net Return per Hectare by Crop (Lv)	
Wheat	51,400
Barley	38,700
Maize	55,500
Sunflower	14,500
Sugar beet	4,500
Vegetables	361,300
Fruit	58,600
Grapes	141,200
Alfalfa	2,500

Note: Excluding amortization of building and machineries.

Including administration costs.

Source: Farm interview survey



## Part II Farm Management of Pilot Project Area

### 1. Prices

Table F-II-I-1 Farm-gate Prices of Farm Products

Unit: USD			
Crop	Unit	Price	Remarks
Wheat	kg	0.16	
Barley	kg	0.13	
Maize	kg	0.16	
Sunflower	kg	0.10	
Vegetables	kg	0.08	weighted mean of tomato and others
Fruit	kg	0.08	represented by peaches
Grapes	kg	0.14	represented by wine grapes
Melons	kg	0.05	represented by watermelon
Other Crops	kg	0.11	represented by beans
Millet	kg	0.05	
Alfalfa	kg	0.02	
Milk	litre	0.18	fresh milk

Note: Exchange rate=224.30 Lv/USD, average rate of October, 1996

Data source: Farm survey (cooperatives and individual farmers)

Table F-II-I-2 Prices of Farm Inputs and Wages

Unit: USD			
Inputs	Unit	Price	Remarks
<b>SEEDS</b>			
Wheat	kg	0.27	
Barley	kg	0.20	
Maize	kg	0.41	
Sunflower	kg	0.76	
Vegetables	10 gr	0.42	
Melons	10 gr	0.19	
Other crops	kg	0.61	
Alfalfa	10 gr	0.02	
<b>FERTILIZER</b>			
TSP	kg	0.52	estimated from international prices
Am. Nitrate	kg	0.18	
Organic Manure	ton	3.00	estimated
<b>CHEMICALS</b>			
Herbicides	25 lts	3.30	2.4 D
	10 lts	9.80	Trofe
	5 lts	15.90	Dual
Insecticides	5 lts	28.75	Vaztak
	1 lt	13.50	Karate
	10 lts	16.24	Nurele
Fungi/Pesticides	1 lt	85.50	Alto
	20 kgs	2.06	Kuprothin
	10 kgs	31.59	Baifeton
	25 kgs	13.30	Ridmil
	12 kgs	3.20	TMTD
	1 lt	45.10	Topaz
Farm Wages	man-day	1.56	Average wage

Note: Exchange rate=224.30 Lv/USD, average rate of October, 1996

Data source: Farm survey (cooperatives and traders)

## 2. Planted Area and Production

Table F-II-2-1 Planted Area, Yield and Production by Crops Without Project

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount(USD)
Wheat (non-irri)	4,434	3,500	15,519,000	0.16	2,483,040
Barley (non-irri)	2,445	3,300	8,068,500	0.13	1,048,905
Maize (irri)	1,513	4,000	6,052,000	0.16	968,320
Sunflower (non-irri)	2,156	1,100	2,371,600	0.10	237,160
Millet (non-irri)	397	800	317,600	0.05	15,880
Vegetables (irri)	113	7,750	875,750	0.08	70,060
Melons (irri)	21	6,500	136,500	0.05	6,825
Other Crops (irri)	343	2,910	998,130	0.11	109,794
Fruit (non-irri)	165	1,500	247,500	0.08	19,800
Grapes (irri)	305	4,500	1,372,500	0.14	192,150
Grapes (non-irri)	305	2,100	640,500	0.14	89,670
Alfalfa (irri)	132	4,500	594,000	0.02	11,880
Alfalfa (non-irri)	264	2,750	726,000	0.02	14,520
Pasture non-irri)	191	1,000	191,000	0	0
Unplanted	152	0	0	0	0
On-Farm Roads	264	0	0	0	0
<b>Grand Total</b>	<b>13,200</b>		<b>38,110,580</b>		<b>5,268,004</b>

Table F-II-2-2 Planted Area, Yield and Production by Crops With Project

Crop	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Farmgate Price (USD/kg)	Production Amount(USD)
Wheat (non-irri)	4,620	3,800	17,556,000	0.16	2,808,960
Barley (non-irri)	2,244	3,600	8,078,400	0.13	1,050,192
Maize (irri)	1,716	7,500	12,870,000	0.16	2,059,200
Sunflower (irri)	264	1,650	435,600	0.10	43,560
Sunflower (non-irri)	1,320	1,500	1,980,000	0.10	198,000
Millet (non-irri)	396	1,100	435,600	0.05	21,780
Vegetables (irri)	660	14,080	9,292,800	0.08	743,424
Melons (irri)	66	9,000	594,000	0.05	29,700
Other Crops (irri)	396	3,900	1,544,400	0.11	169,884
Fruit (irri)	172	7,500	1,290,000	0.08	103,200
Grapes (irri)	620	10,000	6,200,000	0.14	868,000
Alfalfa (irri)	528	6,500	3,432,000	0.02	68,640
Pasture (non-irri)	132	1,500	198,000	0	0
Unplanted	132	0	0	0	0
On-Farm Roads	264	0	0	0	0
<b>Grand Total</b>	<b>13,530</b>		<b>63,906,800</b>		<b>8,164,540</b>

### 3. Expenditure

Table F-II-2-3(1) Expenditure of Farm Management - Farm Budget  
Without Project

Crop	Variable Costs											Fixed Costs			Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total				
	81.00	36.00	19.20	110.00	12.17	25.84	284.20	0.00	33.44	1.67	35.11				
Wheat*	81.00	36.00	19.20	110.00	12.17	25.84	284.20	0.00	33.44	1.67	35.11	319.32			
Barley*	48.00	28.80	18.00	110.00	11.23	21.60	237.64	0.00	33.44	1.67	35.11	272.75			
Maize	10.25	45.00	21.70	125.00	31.82	23.38	257.15	22.47	35.67	2.91	61.05	318.20			
Sunflower*	7.60	0	3.00	75.00	2.81	8.84	97.25	0.00	35.67	1.78	37.45	134.70			
Miller*	5.00	0	0	45.00	1.87	5.19	57.06	0.00	0.00	0.00	0.00	57.06			
Vegetables	84.00	30.00	18.50	15.00	299.68	44.72	491.89	24.97	66.87	4.59	96.43	588.33			
Melons	38.00	15.00	12.70	15.00	152.88	23.36	256.94	24.97	0.00	1.25	26.22	283.16			
Orchards*	0	0.00	10.20	20.00	49.76	8.00	87.96	0.00	0.00	0.00	0.00	87.96			
Vineyard*	0	15.00	23.00	20.00	68.64	12.66	139.30	0.00	26.75	1.34	28.09	167.39			
Vineyard	0	15.00	23.00	20.00	83.77	14.18	155.95	9.99	26.75	1.84	38.58	194.53			
Other Crops	30.50	15.00	18.90	15.00	65.52	14.49	159.41	24.97	0.00	1.25	26.22	185.63			
Alfalfa*	5.00	0	0	5.00	17.94	2.79	30.73	0.00	0.00	0.00	0.00	30.73			
Alfalfa	5.00	0	5.00	5.00	24.96	4.00	43.96	15.00	0.00	0.75	15.75	59.71			

Note: \* non-irrigated

Data source: Farm survey

Table F-II-2-3(C) Expenditure of Farm Management(Farm Budget) in the Pilot Project Area

Crop	Without Project										Unit USD	
	Variable Costs					Fixed Costs						
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others		Sub-Total
Wheat*	359,154	159,624	85,133	487,740	53,953	114,560	1,260,164	0	148,273	7,414	155,687	1,415,851
Barley*	117,360	70,416	44,010	268,950	27,462	52,820	581,018	0	81,761	4,088	85,849	666,867
Maize	15,508	68,085	32,832	189,125	48,150	35,370	389,070	33,997	53,969	4,398	92,364	481,434
Sunflower*	16,386	0	6,468	161,700	6,054	19,061	209,668	0	0	3,845	3,845	213,514
Millet*	1,985	0	0	17,865	743	2,059	22,653	0	0	0	0	22,653
Vegetables	9,492	3,390	2,091	1,695	33,863	5,053	55,584	2,822	7,556	519	10,897	66,481
Melons	798	315	267	315	3,210	491	5,396	524	0	26	551	5,946
Orchards*	0	0	1,683	3,300	8,211	1,319	14,513	0	0	0	0	14,513
Vineyard*	0	4,575	7,015	6,100	20,935	3,863	42,488	0	8,159	408	8,567	51,054
Vineyard	0	4,575	7,015	6,100	25,550	4,324	47,565	3,047	8,159	560	11,766	59,330
Other Crops	10,462	5,145	6,483	5,145	22,473	4,971	54,678	8,565	0	428	8,993	63,671
Alfalfa*	1,320	0	0	1,320	4,736	738	8,114	0	0	0	0	8,114
Alfalfa	660	0	660	660	3,295	527	5,802	1,980	0	99	2,079	7,881
Total	533,124	316,125	193,656	1,150,015	258,637	245,156	2,696,713	50,935	307,876	21,786	380,597	3,077,310

Note: \* non-irrigated

Data source: Farm survey

Table F-II-2-4(1) Expenditure of Farm Management - Farm Budget  
With Project

Crop	Variable Costs										Fixed Costs			Unit:USD/ha
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total	Grand Total		
	Wheat*	81.00	45.00	25.00	110.00	14.66	27.57	303.23	0.00	33.44	1.67	35.11	338.34	
Barley*	48.00	36.00	23.00	110.00	13.26	23.03	253.29	0.00	33.44	1.67	35.11	288.40		
Maize	10.25	62.00	28.20	125.00	67.39	29.28	322.13	20.10	35.67	2.79	58.56	380.68		
Sunflower*	7.60	0.00	3.00	75.00	3.12	8.87	97.59	0.00	35.67	1.78	37.45	135.05		
Sunflower	7.60	0.00	3.00	75.00	3.43	8.90	97.94	7.70	35.67	2.17	45.54	143.47		
Millet*	5.00	3.00	0.00	45.00	2.03	5.50	60.53	0.00	0.00	0.00	0.00	60.53		
Vegetables	84.00	90.80	35.50	15.00	444.60	66.99	736.89	19.90	66.87	4.34	91.11	828.00		
Melons	38.00	42.40	16.50	15.00	162.24	27.41	301.55	27.60	0.00	1.38	28.98	330.53		
Orchards	0	35.00	31.30	20.00	132.29	21.86	240.45	23.10	26.75	2.49	52.34	292.79		
Vineyard	0	41.00	29.80	20.00	94.38	18.52	203.70	11.50	26.75	1.91	40.16	243.86		
Other Crops	30.50	33.40	24.60	15.00	129.48	23.30	256.28	15.40	0.00	0.77	16.17	272.45		
Alfalfa	5.00	0	5.00	5.00	32.76	4.78	52.54	25.20	0.00	1.26	26.46	79.00		

Note: \* non-irrigated

Data source: Farm survey

Table F-II-2-4(2) Expenditure of Farm Management(Farm Budget) in the Pilot Project Area

With Project

Crop	Variable Costs										Fixed Costs				Grand Total
	Seeds	Fertilizers	Chemicals	Mechani.	Farm Labor	Others	Sub-Total	Water Fee	Insurance	Others	Sub-Total	Others	Sub-Total		
Wheat*	374,220	207,900	115,500	508,200	67,748	127,357	1,400,924	0.00	154,493	7,725	162,217	7,725	162,217	1,563,142	
Barley*	107,712	80,784	51,612	246,840	29,755	51,670	568,374	0	75,039	3,752	78,791	3,752	78,791	647,165	
Maize	17,589	106,392	48,391	214,500	115,645	50,252	552,769	34,492	61,210	4,785	100,486	4,785	100,486	653,255	
Sunflower*	10,032	0	3,960	99,000	4,118	11,711	128,821	0	47,084	2,354	49,439	2,354	49,439	178,260	
Sunflower	2,006	0	792	19,800	906	2,350	25,855	2,033	9,417	572	12,022	572	12,022	37,877	
Millet*	1,980	1,188	0	17,820	803	2,179	23,970	0	0	0	0	0	0	23,970	
Vegetables	55,440	59,928	23,430	9,900	293,436	44,213	486,347	13,134	44,134	2,863	60,132	2,863	60,132	546,479	
Melons	2,508	2,798	1,089	990	10,708	1,809	19,903	1,822	0	91	1,913	91	1,913	21,815	
Orchards	0	6,020	5,384	3,440	22,754	3,760	41,357	3,973	4,601	429	9,003	429	9,003	50,360	
Vineyard	0	25,420	18,476	12,400	58,516	11,481	126,293	7,130	16,585	1,186	24,901	1,186	24,901	151,194	
Other Crops	12,078	13,226	9,742	5,940	51,274	9,226	101,486	6,098	0	305	6,403	305	6,403	107,889	
Alfalfa	2,640	0	2,640	2,640	17,297	2,522	27,739	13,306	0	665	13,971	665	13,971	41,710	
Total	586,205	503,657	281,015	1,141,470	672,960	318,531	3,503,838	81,987	412,563	24,728	519,278	24,728	519,278	4,023,116	

Note: \* non-irrigated

Data source: Farm survey

#### 4. Balance of Farm Economy

Table F-II-2-5 Revenues and Expenditure of Farm Management  
in the Pilot Project Area - Without Project

Crop	Planted Area (ha)	Revenues	Expenditure	Return (USD)	Return per ha (USD)
		Production	Production		
		Amount(USD)	Costs(USD)		
Wheat (non-irri)	4,434	2,483,040	1,415,851	1,067,189	241
Barley (non-irri)	2,445	1,048,905	666,867	382,038	156
Maize (irri)	1,513	968,320	481,434	486,886	322
Sunflower (non-irri)	2,156	237,160	213,514	23,646	11
Millet (non-irri)	397	15,880	22,653	-6,773	-17
Vegetables (irri)	113	70,060	66,481	3,579	32
Melons (irri)	21	6,825	5,946	879	42
Orchards (non-irri)	165	19,800	14,513	5,287	32
Vineyard (non-irri)	305	89,670	51,054	38,616	127
Vineyard (irri)	305	192,150	59,330	132,820	435
Other Crops (irri)	343	109,794	63,671	46,123	134
Alfalfa (non-irri)	264	11,880	8,114	3,766	14
Alfalfa (irri)	132	14,520	7,881	6,639	50
<b>Total</b>	<b>12,593</b>	<b>5,268,004</b>	<b>3,077,309</b>	<b>2,190,695</b>	<b>174</b>

Table F-II-2-6 Revenues and Expenditure of Farm Management  
in the Pilot Project Area - With Project

Crop	Planted Area (ha)	Revenues	Expenditure	Return (USD)	Return per ha (USD)
		Production	Production		
		Amount(USD)	Costs(USD)		
Wheat (non-irri)	4,620	2,808,960	1,563,142	1,245,818	270
Barley (non-irri)	2,244	1,050,192	647,165	403,027	180
Maize (irri)	1,716	2,059,200	653,255	1,405,945	819
Sunflower (non-irri)	1,320	198,000	178,260	19,740	15
Sunflower (irri)	264	43,560	37,877	5,683	22
Millet (non-irri)	396	21,780	23,970	-2,190	-6
Vegetables (irri)	660	743,424	546,479	196,945	298
Melons (irri)	66	29,700	21,815	7,885	119
Orchards (irri)	172	103,200	50,360	52,840	307
Vineyard (irri)	620	868,000	151,194	716,806	1,156
Other Crops (irri)	396	169,884	107,889	61,995	157
Alfalfa (irri)	528	68,640	41,710	26,930	51
<b>Total</b>	<b>13,002</b>	<b>8,164,540</b>	<b>4,023,116</b>	<b>4,141,424</b>	<b>319</b>

## 5. Labor Requirement

Table F-II-3-1(1) Monthly Requirement of Farm Labor Force by Crops  
Without Project

Crop	Unit: man-day/dka												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0.00	0.01	0.20	0.10	0.05	0.05	0.17	0.06	0.10	0.05	0.00	0.00	0.78
Barley*	0.00	0.01	0.20	0.10	0.05	0.10	0.05	0.07	0.10	0.05	0.00	0.00	0.72
Maize	0.00	0.00	0.03	1.40	0.10	0.06	0.08	0.12	0.20	0.05	0.00	0.00	2.04
Sunflower*	0.00	0.00	0.01	0.05	0.00	0.03	0.00	0.04	0.05	0.00	0.00	0.00	0.18
Millet*	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.12
Vegetables	0.00	0.00	0.01	0.80	1.40	3.40	1.90	5.00	3.50	3.20	0.00	0.00	19.21
Melons	0.00	0.00	0.50	1.20	1.90	1.40	1.90	1.90	1.00	0.00	0.00	0.00	9.80
Orchard*	0.00	0.00	0.03	0.60	0.03	0.15	0.15	1.10	1.10	0.03	0.00	0.00	3.19
Vineyard*	0.00	0.00	0.27	0.18	0.11	0.22	0.54	1.10	1.98	0.00	0.00	0.00	4.40
Vineyard	0.00	0.00	0.27	0.18	0.15	0.52	0.65	1.50	2.10	0.00	0.00	0.00	5.37
Other Crops	0.00	0.00	0.00	0.10	1.00	1.00	2.00	0.10	0.00	0.00	0.00	0.00	4.20
Alfalfa*	0.00	0.00	0.20	0.00	0.20	0.20	0.20	0.20	0.15	0.00	0.00	0.00	1.15
Alfalfa	0.00	0.00	0.20	0.00	0.30	0.30	0.30	0.30	0.20	0.00	0.00	0.00	1.6

Note: \* non irrigated

Data source: Farm survey



Table F-II-3-1(2) Monthly Requirement of Farm Labor Force by Crops in the Pilot Project Area

Without Project

Crop	Unit man-day												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0	443	8,868	4,434	2,217	2,217	7,538	2,660	4,434	2,217	0	0	34,585
Barley*	0	245	4,890	2,445	1,223	2,445	1,223	1,712	2,445	1,223	0	0	17,604
Maize	0	0	454	21,182	1,513	908	1,210	1,816	3,026	757	0	0	30,865
Sunflower*	0	0	216	1,078	0	647	0	862	1,078	0	0	0	3,881
Millet*	0	0	0	199	79	0	0	40	159	0	0	0	476
Vegetables	0	0	11	904	1,582	3,842	2,147	5,650	3,955	3,616	0	0	21,707
Melons	0	0	105	252	399	294	399	399	210	0	0	0	2,058
Orchard*	0	0	50	990	50	248	248	1,815	1,815	50	0	0	3,927
Vineyard*	0	0	824	549	336	671	1,647	3,355	6,039	0	0	0	11,041
Vineyard	0	0	824	549	458	1,586	1,983	4,575	6,405	0	0	0	12,963
Other Crops	0	0	0	343	3,430	3,430	6,860	343	0	0	0	0	14,406
Alfalfa*	0	0	528	0	528	528	528	528	396	0	0	0	3,036
Alfalfa	0	0	264	0	396	396	396	396	264	0	0	0	2,112
Total	0	688	17,032	32,925	12,209	17,211	24,178	24,151	30,226	7,862	0	0	158,661

Note: \* non irrigated

Data source: Farm survey

Table F-II-3-2(1) Monthly Requirement of Farm Labor Force by Crops

With Project

Crop	Unit: man-day/dka												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0.00	0.01	0.23	0.15	0.05	0.05	0.25	0.06	0.10	0.05	0.00	0.00	0.94
Barley*	0.00	0.01	0.20	0.15	0.05	0.15	0.08	0.07	0.10	0.05	0.00	0.00	0.85
Maize	0.00	0.00	0.03	2.80	0.35	0.12	0.15	0.30	0.52	0.05	0.00	0.00	4.32
Sunflower*	0.00	0.00	0.01	0.05	0.00	0.04	0.00	0.05	0.05	0.00	0.00	0.00	0.20
Sunflower	0.00	0.00	0.01	0.05	0.01	0.05	0.00	0.05	0.05	0.00	0.00	0.00	0.22
Millet*	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.13
Vegetables	0.00	0.00	1.30	1.60	3.20	4.00	1.90	8.00	4.90	3.60	0.00	0.00	28.50
Melons	0.00	0.00	0.50	1.20	1.90	1.40	2.20	2.20	1.00	0.00	0.00	0.00	10.40
Orchard	0.00	0.00	0.06	2.12	0.25	0.38	1.82	3.60	3.00	0.06	0.00	0.00	8.48
Vineyard	0.00	0.00	0.50	1.20	1.50	1.50	0.65	1.80	3.60	0.00	0.00	0.00	6.05
Other Crops	0.00	0.00	0.00	1.00	1.20	1.50	4.00	0.60	0.00	0.00	0.00	0.00	8.30
Alfalfa	0.00	0.00	0.20	0.00	0.40	0.40	0.40	0.40	0.30	0.00	0.00	0.00	2.10

Note: \* non irrigated

Data source: Farm survey

Table F-II-3-2(2) Monthly Requirement of Farm Labor Force by Crops in the Pilot Project Area

With Project

Crop	Unit: man-day												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat*	0	462	10,626	6,930	2,310	2,310	11,550	2,772	4,620	2,310	0	0	43,428
Barley*	0	224	4,488	3,366	1,122	3,366	1,795	1,571	2,244	1,122	0	0	19,074
Maize	0	0	515	48,048	6,006	2,059	2,574	5,148	8,923	858	0	0	74,131
Sunflower*	0	0	132	660	0	528	0	660	660	0	0	0	2,640
Sunflower	0	0	26	132	26	132	0	132	132	0	0	0	581
Millet*	0	0	0	198	40	0	0	79	198	0	0	0	515
Vegetables	0	0	8,580	10,560	21,120	26,400	12,540	52,800	32,340	23,760	0	0	188,100
Melons	0	0	330	792	1,254	924	1,452	1,452	660	0	0	0	6,864
Orchard	0	0	103	3,646	430	654	3,130	6,192	5,160	103	0	0	14,586
Vineyard	0	0	3,100	7,440	9,300	9,300	4,030	11,160	22,320	0	0	0	37,510
Other Crops	0	0	0	3,960	4,752	5,940	15,840	2,376	0	0	0	0	32,868
Alfalfa	0	0	1,056	0	2,112	2,112	2,112	2,112	1,584	0	0	0	11,088
<b>Total</b>	<b>686</b>	<b>28,956</b>	<b>85,732</b>	<b>48,472</b>	<b>48,472</b>	<b>53,725</b>	<b>55,024</b>	<b>86,454</b>	<b>78,841</b>	<b>28,153</b>	<b>0</b>	<b>0</b>	<b>431,384</b>

Note: \* non irrigated

Data source: Farm survey

## 6. Farm Household Economy

Table F-II-4-1 Farm Household Economy - Present Private Farm

Category	Description
Farm Size	140 dka (14.0 ha) with 5 plots
Land Tenancy	Temporary ownership rights of farmland
Cropping Pattern	Wheat: 70 dka, Barley: 18 dka, Maize: 30 dka, Alfalfa: 0.8 dka Vineyard (wine grapes): 14 dka
Farming System	Mechanization (1 tractor with attachment - 50hp) Irrigated and rainfed farming (gravity irrigation for maize and alfalfa)
Farm Labor Force	Family labor: 1.5 persons, Other labor: 2.0 persons (seasonal working by relatives)
Domestic Animals	Cow: 2, Calf: 4, Sheep: 6, Pig: 7, Chicken: 30, Turkey: 5, Duck: 15
Garden Size	5.0 dka (0.5 ha)
Organization	Non-membership of agricultural production co-operative
Farming Source	Own fund
<b>Income (Lev)</b>	
Farm Income	1,682,600
Other Income	416,000
Gross Income	2,098,600
<b>Expenditure (Lev)</b>	
Production Costs	944,370
Water Fee	18,550
Home Consumption	282,400
Living Expenses	120,000
Total Expenditure	1,365,320
Net Reserves (Lev)	733,280

Source: Farm Interview Survey (sample farm)

Note: Excluding family labor costs and non-cash materials

Water fee of ISC, Sliven is adopted.

Table F-II-4-2 Farm Management - Present Agri. Production Co-operative

Category	Description
Farmland	7,800 dka (780 ha)
Land Tenancy	Leasehold (Total: 8,006 dka)
Cropping Pattern	Wheat: 1,720 dka, Barley: 870 dka, Maize: 1,800 dka, Sunflower: 700 dka Orchard: Peaches - 170 dka, Cherries - 50 dka Vineyard: Table grapes - 160 dka, Wine grapes - 440 dka Unplanted: 1,890 dka
Farming System	Mechanization
Irrigation System	Gravity system, Irrigated crops: maize
Machinery	Tractors: 5 (150hp-1, 80hp-1, 75hp-1, 70hp-1, 60hp-1), Combine: 1, Truck: 1
Organization	Membership: 980 (village-360, outside-620) Board member: 5 Administrative section: 6 persons, Workshop: 3 persons Permanent worker: 17 persons
Capital	5,680,000 Lev
Property	Building: 7 (2,000 m <sup>2</sup> ), Storage: 3 (1,000 ton), Cowshed: 1 (600 m <sup>2</sup> )
Credit	500,000 Lev (1995) with annual interest rate 53%, for wheat and barley
Livestock	Pig raising: 158
Revenues	
Farm Income	69,961,300
Livestock Income	635,700
Gross Income	70,597,000
Expenditure	
Production Costs	34,685,520
Self-consumption	5,472,000
Rent	4,003,000
Dividend	7,029,700
Wages-Permanent	2,160,000
Wages-Seasonal	2,040,500
Admini. and Others	820,350
Total Expenditure	56,211,070
Net Reserves	14,385,930

Source: Field Survey by Questionnaire and Interview (sample agri. production co-operative)

Note: Production costs include farm input, machinery, water fee and insurance.

## 7. Farm Management and Economy

Table F-II-5-1 Farm Management and its Economy by Farm Size  
With Project

Category	Small-scale Farm	Med.-scale Farm	Partnership Farm	Large-scale Farm
Farm Size	15.0 ha	40.0 ha	65.0 ha	300.0 ha
Farming System	Mechanization	Mechanization	Mechanization	Mechanization
Farm Labor Force (family)	2 persons	2 persons	3 persons	1 person
Farm Labor Force (hired)	235 m-d	1,100 m-d	910 m-d	7,770 m-d
Domestic Animals	Cow: 2 head Pig: 3 head	Cow: 2 head Pig: 6 head		
Farming Source	Credit*	Credit*		
<b>Income (1,000 Lev)</b>				
Farm Income	2,453	5,904	9,100	40,274
Other Income (milk)	320	320	0	0
Gross Income	2,773	6,224	9,100	40,274
<b>Expenditure (1,000 Lev)</b>				
Production Costs	1,205	2,922	4,289	18,483
Water fee	25	65	90	420
Self consumption**	447	447	0	0
Interests	112	269	0	0
Land Rent	0	781	20	10,928
Total Expenditure	1,789	4,484	4,399	29,831
Return (1,000 Lev)	984	1,740	4,701	10,443
<b>Cropping Pattern (ha)</b>				
Wheat (non-irri)	5.3	13.5	22.8	100.7
Barley (non-irri)	2.6	6.8	10.9	44.0
Maize (irri)	1.7	5.8	12.1	42.3
Sunflower (irri)	0.0	1.0	0.0	6.0
Sunflower (non-irri)	1.2	3.8	7.0	28.3
Millet (non-irri)	0.2	1.1	1.5	11.7
Vegetables (irri)	1.8	3.4	2.0	6.7
Melons (irri)	0.2	0.2	0.5	2.0
Orchard (irri)	0.0	0.5	0.4	8.0
Vineyard (irri)	1.2	1.5	1.3	15.0
Other Crops (irri)	0.9	1.2	2.3	11.0
Alfalfa (irri)	0.3	1.7	1.8	10.3
Pasture (non-irri)	0.3	0.3	0.2	4.0
Unplanted	0.1	0.4	0.7	4.3
On-farm Road	0.5	1.1	1.3	6.7
Total	16.3	42.3	64.8	301
Crop Intensity	1.087	1.057	0.997	1.000
Irrigated Area (ha)	6.1	15.3	20.4	101.3

Note: Production costs include farm input, machinery, wages, insurances, and family labor costs.

\* Interest rate is assumed based on new credit co-operatives (annual rate: 54%)

\*\* Livestock and self consumption (feeds) of partnership farm and large-scale farm is excluded.  
Partnership farm and large-scale farm (enterprise) are formed by the commercial law.

Table F-II-5-2 Farm Management and its Economy of Agri. Production Co-operative  
With Project

Category	Description			
Farm Size	1,000 ha			
Land Tenancy	Leasehold (Total: 1,030 ha)			
Farming System	Mechanization			
Organization	Board member: 5 Administrative section: 6 persons, Workshop: 4 persons Permanent workers: 10 persons			
Farm Labor Force	Workshop: 4 (technicians and machine operators) Permanent workers: 10 Seasonal workers:			
Income (1,000 Lev)				
Farm Income	123,885			
Gross Income*	123,885			
Expenditure (1,000 Lev)				
Production Costs	52,152			
Water Fee	1,144			
Land Rent	1,030			
Dividend	12,388			
Wages - employee	2,232			
Wages - seasonal workers	4,976			
Others	1,000			
Total Expenditure	74,922			
Reserves (1,000 Lev)	48,963			
Cropping Pattern (ha)	Wheat (non-irri)	362.6	Vegetables (irri)	5.0
	Barley (non-irri)	174.2	Melons (irri)	1.2
	Maize (irri)	109.6	Orchard (irri)	19.4
	Sunflower (irri)	29.2	Vineyard (irri)	47.2
	Sunflower (non-irri)	111.0	Other Crops (irri)	16.0
	Millet (non-irri)	39.0	Alfalfa (irri)	51.6
			Pasture (non-irri)	8.6
			Unplanted	12.2
			On-farm Road	9.6
Total				996.4
Crop Intensity				0.996
Irrigated Area (ha)				279.2

Note: \* Livestock activity is excluded.

It takes no account of credit/loan for farming.

Production costs include farm input, machinery, insurance and others for farming.

Assumption: Rent - 1,000 Lev per ha

Dividend - 10% of gross income

Table F-II-5-3(1) Cash Flow of Small-scale Private Farm

With Project

Category/Year	Unit 1,000 Lev									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Initial Fund	0	245	945	1,827	2,784	3,854	5,123	6,392	7,661	8,930
Farm Credit (Short-term)	558	398	398	398	398	398	398	398	398	398
Sub-Total (A)	558	643	1,343	2,225	3,182	4,252	5,521	6,790	8,059	9,328
Required Fund										
Production Costs	1,155	995	995	995	995	995	995	995	995	995
Self-consumption	447	447	447	447	447	447	447	447	447	447
Living Expenses	180	180	180	180	180	180	180	180	180	180
Sub-Total (B)	1,602	1,442	1,442	1,442	1,442	1,442	1,442	1,442	1,442	1,442
Incomes										
Farm Income	1,703	1,884	2,066	2,141	2,254	2,453	2,453	2,453	2,453	2,453
Other Income	360	360	360	360	360	360	360	360	360	360
Sub-Total (C)	2,063	2,244	2,426	2,501	2,614	2,813	2,813	2,813	2,813	2,813
Term-end Fund										
Water Fee	65	65	65	65	65	65	65	65	65	65
Interests (Short-term)	151	37	37	37	37	37	37	37	37	37
Repayment (Short-term)	558	398	398	398	398	398	398	398	398	398
Sub-Total (D)	774	500	500	500	500	500	500	500	500	500
Balanced Carried Forward	245	945	1,827	2,784	3,854	5,123	6,392	7,661	8,930	10,199



Table F-II-5-3(2) Cash Flow of Medium-scale Private Farm

With Project

Category/Year	Unit 1,000 Lev									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Initial Fund	0	410	1,998	4,090	6,299	8,671	11,307	13,943	16,579	19,215
Farm Credit (Short-term)	957	717	717	717	717	717	717	717	717	717
Sub-Total (A)	558	1,127	2,715	4,807	7,016	9,388	12,024	14,660	17,296	19,932
Required Fund										
Production Costs	3,162	2,922	2,922	2,922	2,922	2,922	2,922	2,922	2,922	2,922
Self-consumption	447	447	447	447	447	447	447	447	447	447
Living Expenses	180	180	180	180	180	180	180	180	180	180
Sub-Total (B)	3,609	3,369	3,369	3,369	3,369	3,369	3,369	3,369	3,369	3,369
Incomes										
Farm Income	4,381	4,856	5,360	5,477	5,640	5,904	5,904	5,904	5,904	5,904
Other Income	360	360	360	360	360	360	360	360	360	360
Sub-Total (C)	4,741	5,216	5,720	5,837	6,000	6,264	6,264	6,264	6,264	6,264
Term-end Fund										
Water Fee	65	65	65	65	65	65	65	65	65	65
Interest (Short-term)	258	194	194	194	194	194	194	194	194	194
Repayment (Short-term)	957	717	717	717	717	717	717	717	717	717
Sub-Total (D)	1,280	976	976	976	976	976	976	976	976	976
Balanced Carried Forward	410	1,998	4,090	6,299	8,671	11,307	13,943	16,579	19,215	21,851

## 8. Farm Mechanization

Table F-II-6-1 Farm Machinery in Nova Zagora Municipality

Type of Farm Machinery	Total Nos of Municipality	Total Nos of Private Farms	Total Nos of Cooperatives
<b>1. Wheel Tractors</b>			
K-700, K-701	5	2	3
T-150-K	45	18	27
MTZ-80, TK-80	120	48	72
YUMZ-6	300	120	180
T-40	5	2	3
T-25	10	4	6
Other models	30	12	18
<b>Total</b>	<b>515</b>	<b>206</b>	<b>309</b>
<b>2. Chain Tractors</b>			
T-150	10	4	6
DT-75	60	24	36
T-54V	14	6	8
<b>Total</b>	<b>84</b>	<b>34</b>	<b>50</b>
<b>3. Grain Combine Harvesters</b>			
CK-5 "Niva"	23	6	17
E-516, E-517	58	8	50
Class Dominator D-106	1	1	-
Don 1500	31	2	29
Other models	-	-	-
<b>Total</b>	<b>113</b>	<b>17</b>	<b>96</b>
4. Ploughs	214	84	130
5. Disc Harrows	95	35	60
6. Sowing Machines	194	56	138
7. Cultivators	213	83	130
8. Gathering Pressors for hay and straw	60	15	45
9. Adaptors for sunflower seeds	38	5	33
10. Adaptors for maize	34	6	28
11. Adaptors for soybeans	11	1	10
12. Chemical Sprayers	117	24	93

Data source: Nova Zagora Municipality, as of 1995/1996 agricultural year.

Table F-II-6-2 Estimation of Farm Machinery by Farm Size in the Pilot Project Area  
With Project

Type of Farm	Farm Size (ha)	Type of Machinery	Capacity (h.p.)	Unit	Remarks
Small-scale Farm	15	Tractor	18	1	3 farms/uit rental machine for harvesting
Medium-scale Farm	40	Tractor	25	1	rental machine for harvesting
Partnership Farm	65	Tractor	45	1	rental machine for harvesting
			18	1	
Large-scale Farm	300	Tractor	65	2	chain tractor: 1
			45	1	
		Combine- harvester		1	
Production Coop.	1,000	Tractor	80	3	
			65	4	chain tractor: 2
			45	2	
			25	2	
		Combine- harvester		2	

Note: Number of machinery estimated based on the data of IFME, Agricultural Academy

Table F-II-6-3 Existing Farm Machinery of Agri. Production Cooperatives  
in the Pilot Project Area

Type of Farm Machinery	Total Number
1. Wheel Tractor	
K-701	1
T-150K	5
TK-80	32
UMZ	22
T-25	7
2. Chain Tractor	
DT-75	11
3. Combine Harvester	
E-516, E-517	9
Other models	5

Date source: Field survey (10 cooperatives)

**APPENDIX G**

**FARMERS' ORGANIZATIONS &  
WATER USERS' ASSOCIATIONS**

## CONTENTS

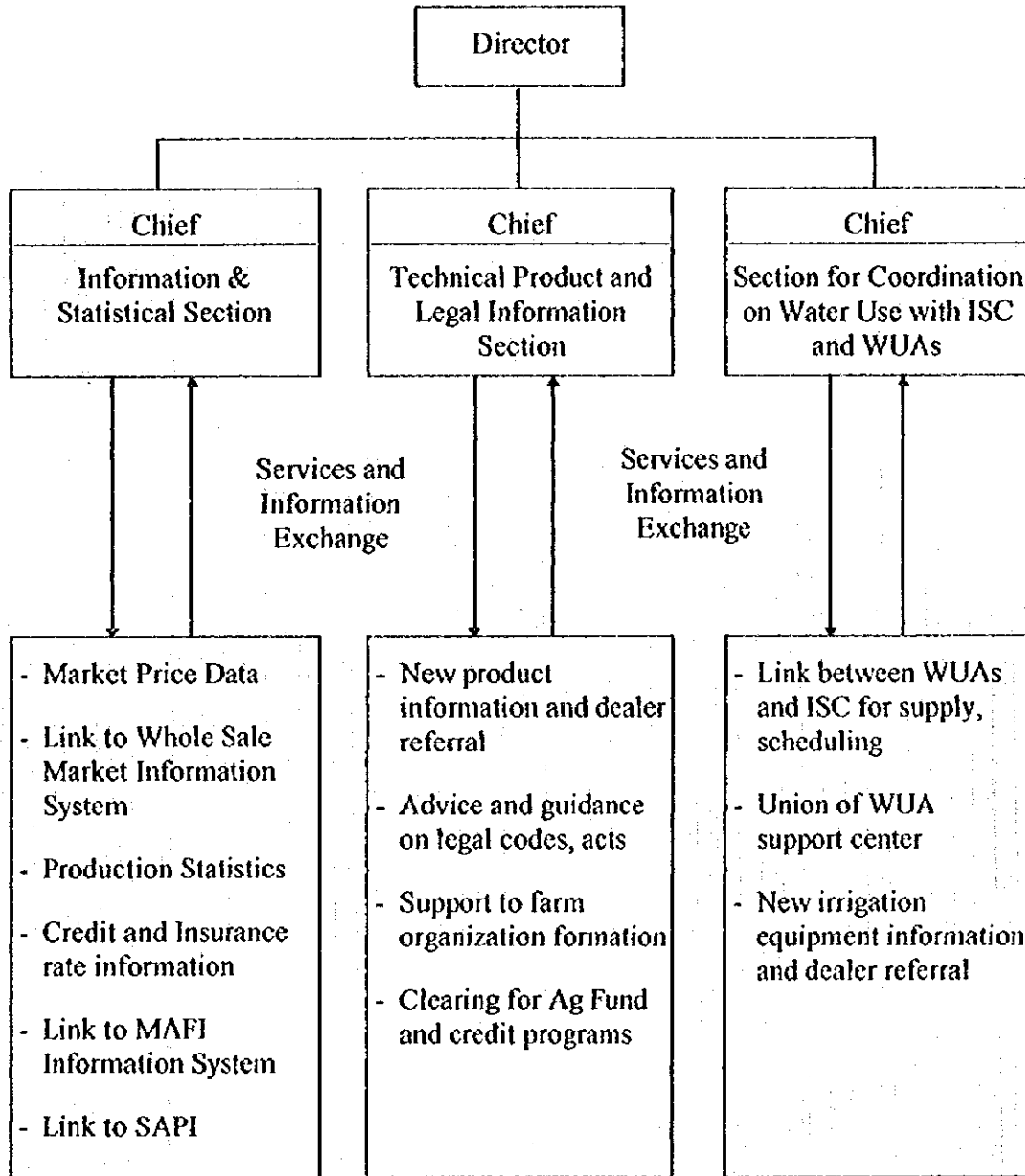
### LIST OF FIGURES AND EXHIBIT

Figure G-1	Nova Zagora Municipality Agribusiness Information Center (ABC) Structure and Functions .....	G-1
Figure G-2	Nova Zagora Municipal Extension Office .....	G-2
Exhibit G-1	Illustrative Water User Associations - Defined on a Technological Principle .....	G-3



**Figure G-1 NOVA ZAGORA Municipality Agribusiness Information Center (ABC)**

**Structure and Functions**



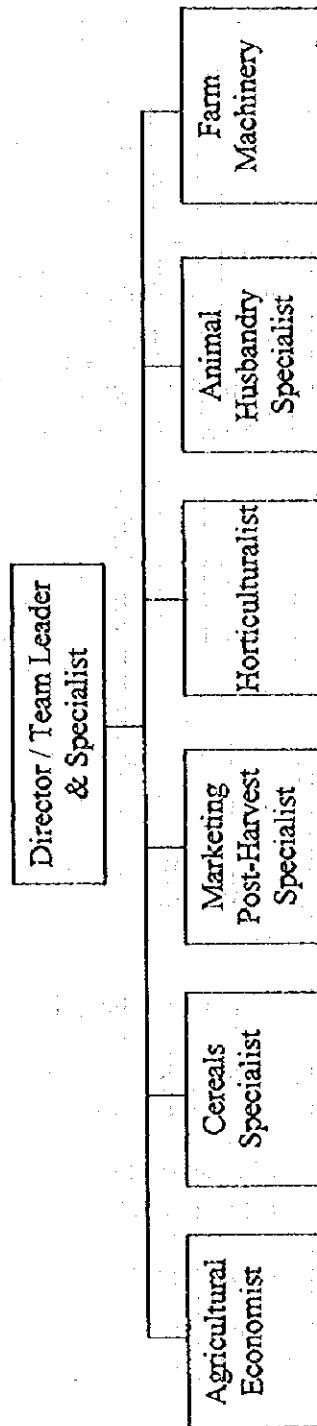
**Figure G-2 Nova Zagora Municipal Extension Office**

Reporting to MAFI/Research & Education Department

**Major Functions of Local Advisory Office:**

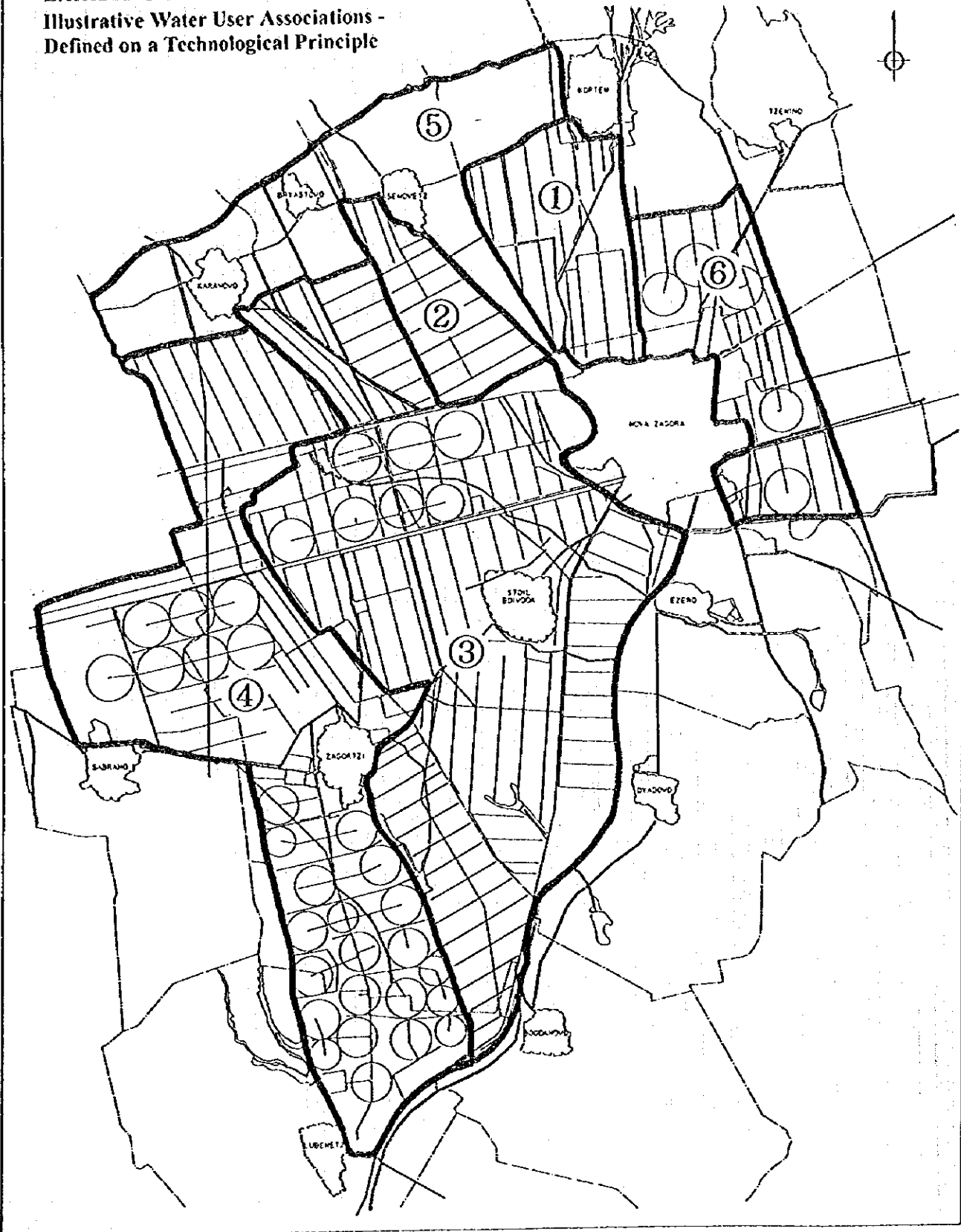
- Technical advice on animal breeding and crop production
- Land management consultations
- Leadership of small demonstration plots
- Project design and business planning
- Support to establishment of new farmer and business enterprises
- Link to Yambol Experiment & Extension Office and Irrigation Institute (Sofia)

**Structure of Nova Zagora Office**





**EXHIBIT G-1**  
**Illustrative Water User Associations -**  
**Defined on a Technological Principle**



**APPENDIX H**

**INSTITUTIONS AND SUPPORTING SERVICES**

## CONTENTS

### LIST OF TABLES AND FIGURES

Table H-1	National Agricultural Advisory System - Planned Offices .....	H-1
Figure H-1	Structure of the National Agricultural Advisory System (NASS).....	H-2
Figure H-2	Structure of the Regional Advisory Office .....	H-3
Figure H-3	Structure of a Local Advisory Office .....	H-4

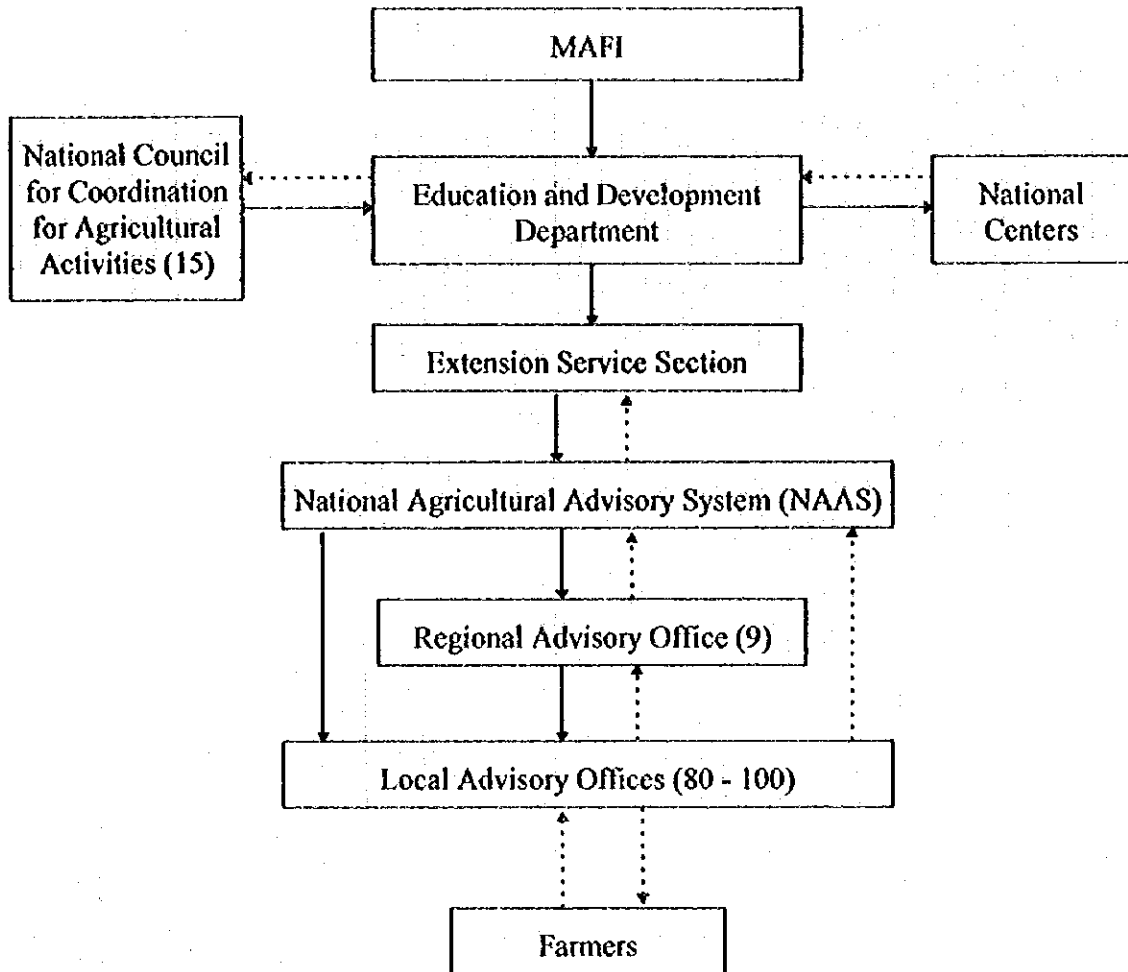


**Table II-1 National Agricultural Advisory System - Planned Offices**

Years	Types of NAAS Services	Number of Employees	Team Leaders	Experts
1996	Local advisory offices (LAO)	19	19	76
	Regional advisory offices (RAO)	9	9	36
	National centers	4	4	20
	Central office	1	1	3
	<b>Total for 1996</b>	<b>33</b>	<b>33</b>	<b>135</b>
1997	Local advisory offices (LAO)	35	35	140
	Regional advisory offices (RAO)	9	9	36
	National centers	4	4	24
	Central office	1	1	4
	<b>Total for 1997</b>	<b>49</b>	<b>49</b>	<b>204</b>
1998	Local advisory offices (LAO)	50	50	200
	Regional advisory offices (RAO)	9	9	36
	National centers	4	4	24
	Central office	1	1	5
	<b>Total for 1998</b>	<b>64</b>	<b>64</b>	<b>265</b>
1999	Local advisory offices (LAO)	70	70	280
	Regional advisory offices (RAO)	9	9	36
	National centers	4	4	26
	Central office	1	1	5
	<b>Total for 1999</b>	<b>84</b>	<b>84</b>	<b>347</b>
2000	Local advisory offices (LAO)	90	90	360
	Regional advisory offices (RAO)	9	9	36
	National centers	4	4	30
	Central office	1	1	6
	<b>Total for 2000</b>	<b>104</b>	<b>104</b>	<b>432</b>

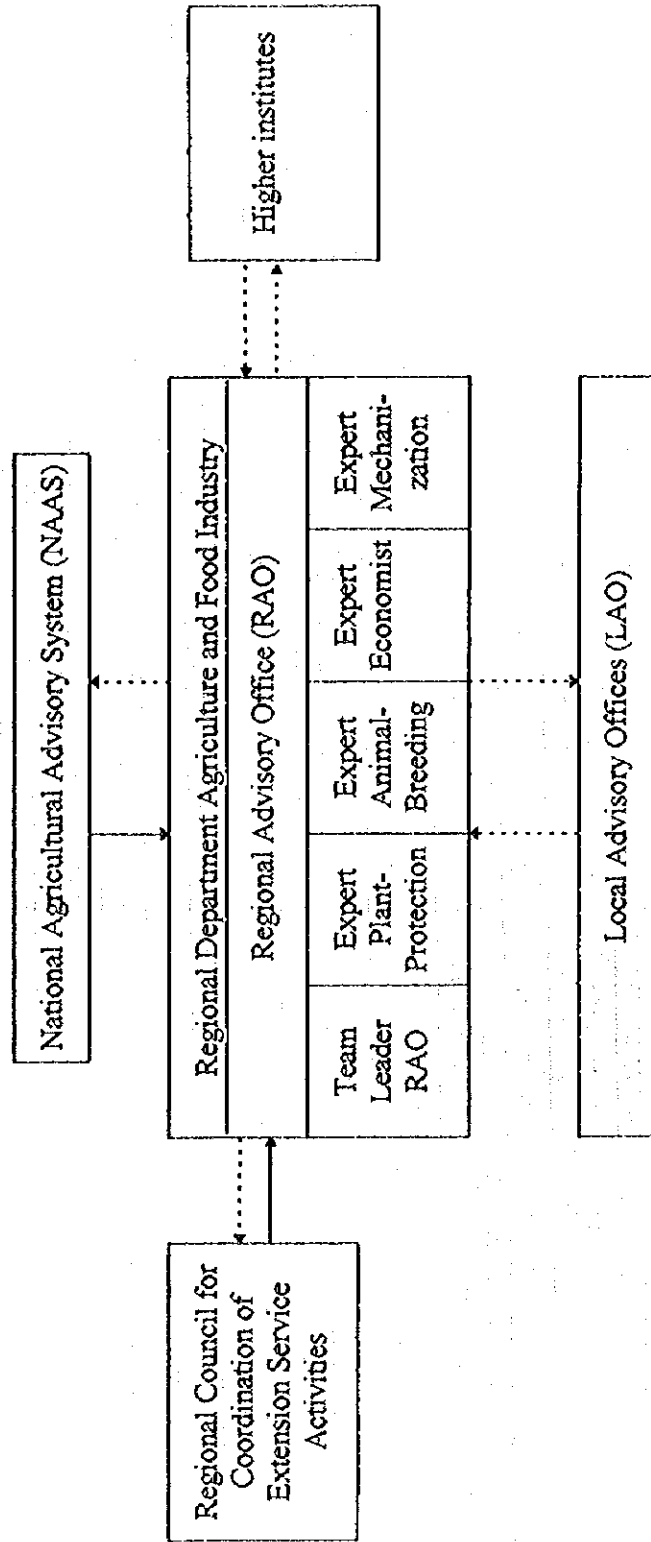
Source: MAFI (November 1996)

Figure II-1 Structure of the National Agricultural Advisory System (NAAS)



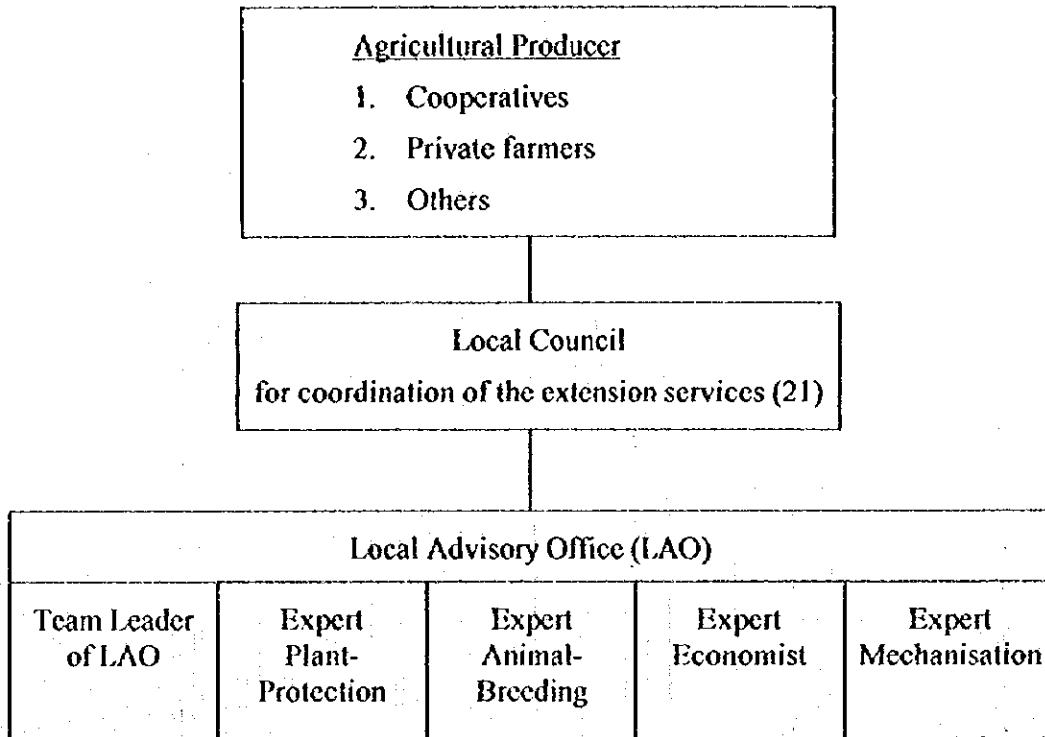
Source: MAFI

Figure H-2 Structure of the Regional Advisory Office



Source: MAFI

**Figure II-3 Structure of a Local Advisory Office**



**Remark:** According to the specific conditions of the area, there might be different experts.



**APPENDIX I**  
**HYDROMETEOROLOGY**

## CONTENTS

### LIST OF TABLES

Table I-1-1	Climatic Data at Petrich .....	I-1
Table I-1-2	Climatic Data at Pavlikeni .....	I-2
Table I-1-3	Climatic Data at Suhindol .....	I-3
Table I-1-4	Climatic Data at Sadievo .....	I-4
Table I-1-5	Climatic Data at Jambol .....	I-5
Table I-2-1	Monthly Precipitation at Petrich .....	I-6
Table I-2-2	Monthly Precipitation at Pavlikeni .....	I-7
Table I-2-3	Monthly Precipitation at Suhindol .....	I-8
Table I-2-4	Monthly Precipitation at Sadievo .....	I-9
Table I-2-5	Monthly Precipitation at Jambol .....	I-10
Table I-3-1	Monthly Runoff of Struma River .....	I-11
Table I-3-2	Monthly Runoff of Strumeshnitza River .....	I-12
Table I-3-3	Monthly Runoff of Lebnitza River .....	I-13
Table I-3-4	Monthly Runoff of Rositza River .....	I-13
Table I-3-5	Monthly Runoff of Tundja River .....	I-13
Table I-3-6	Annual Inflow And Outflow of the Reservoir .....	I-14

### LIST OF FIGURES

Figure I-3-1	Annual Mean Runoff of Struma River .....	I-15
Figure I-3-2	Annual Mean Runoff of Strumeshnitza River .....	I-16

**TABLE I-1-1 CLIMATIC DATA AT PETRICH**

**(1) MONTHLY MEAN AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	2.0	0.4	8.0	15.7	21.1	22.7	26.3	26.0	20.2	12.7	8.8	5.1
1986	3.6	3.8	9.1	16.7	19.4	22.8	25.0	26.0	21.8	14.2	6.4	0.4
1987	1.0	6.4	4.7	13.3	17.5	23.6	27.7	24.7	23.0	13.5	8.5	4.8
1988	3.9	5.5	7.9	13.5	18.9	22.6	28.0	26.0	21.7	13.6	2.7	2.1
1989	1.9	6.3	11.6	16.7	17.8	20.8	23.9	24.3	19.8	12.9	7.5	1.3
1990	1.2	7.3	12.5	13.7	18.5	23.0	25.2	24.6	19.4	14.8	9.8	3.7
1991	1.4	2.8	10.6	13.1	15.4	23.9	23.6	23.6	20.3	14.7	9.5	0.5
1992	2.9	4.1	9.2	13.9	17.8	22.4	23.8	26.9	20.1	15.4	9.2	1.8
1993	1.8	2.5	8.3	14.0	19.3	24.0	25.7	26.4	20.9	17.4	6.4	5.4
1994	5.7	5.8	11.6	15.2	19.8	23.3	25.5	26.7	25.4	15.3	8.4	4.0
MEAN	2.5	4.5	9.4	14.6	18.6	22.9	25.5	25.5	21.3	14.5	7.7	2.9

**(2) MONTHLY MEAN MAXIMUM AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	5.8	5.3	12.4	22.5	27.8	29.0	31.4	33.6	28.3	20.3	12.3	9.5
1986	6.7	6.9	13.3	24.0	25.5	28.7	31.1	34.2	29.5	20.9	11.5	5.1
1987	4.3	10.2	9.1	19.0	23.6	30.1	35.1	31.4	21.0	18.4	12.5	7.8
1988	6.9	10.7	12.6	19.5	25.5	28.9	33.0	31.6	28.7	20.9	6.9	6.1
1989	6.6	12.5	17.7	23.8	24.0	26.5	30.5	32.2	26.9	19.2	11.8	4.3
1990	5.4	13.4	19.9	19.7	25.0	29.8	32.9	32.3	27.2	21.6	13.9	5.9
1991	5.2	6.2	15.8	17.8	20.9	30.5	30.6	30.0	28.0	20.0	13.0	3.7
1992	7.2	9.8	15.5	19.9	24.2	28.3	30.2	35.5	28.1	20.3	13.6	5.0
1993	6.4	7.5	13.4	20.2	25.7	30.3	33.7	35.1	29.3	24.2	9.6	8.6
1994	8.4	9.5	18.0	20.9	26.8	30.3	32.7	35.0	33.6	20.4	12.4	7.5
MEAN	6.3	9.2	14.8	20.7	24.9	29.2	32.1	33.1	28.1	20.6	11.8	6.4

**(3) MONTHLY MEAN MINIMUM TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-0.5	-4.0	4.7	9.2	14.8	16.1	18.1	18.0	13.6	6.7	5.9	1.4
1986	0.7	1.2	5.4	9.3	13.8	17.0	18.2	18.8	14.3	8.2	2.3	-3.5
1987	-1.8	3.1	0.2	7.8	11.5	16.5	19.9	17.8	16.0	9.8	5.5	1.9
1988	1.5	0.7	3.9	8.2	12.6	16.2	20.0	18.0	14.3	7.8	-0.6	-1.6
1989	-2.1	0.7	5.8	9.6	11.7	14.8	17.3	16.9	14.0	7.7	3.9	-1.8
1990	-2.9	1.9	5.7	8.9	12.7	16.2	17.4	16.9	13.0	9.5	6.4	1.5
1991	-2.1	-0.8	6.3	9.0	10.6	17.0	17.8	17.8	13.6	10.6	6.2	-2.1
1992	-1.0	-1.0	3.8	8.2	12.1	16.7	17.3	18.6	12.9	11.1	5.5	-1.0
1993	-2.5	-2.1	3.5	8.1	13.4	16.9	17.6	18.2	13.4	12.0	3.8	2.4
1994	2.9	2.2	5.7	10.0	13.3	16.5	19.0	19.0	17.0	11.2	4.9	0.6
MEAN	-0.8	0.2	4.5	8.8	12.7	16.4	18.3	18.0	14.2	9.5	4.4	-0.2

**(4) MONTHLY MEAN ABSOLUTE HUMIDITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	6.0	4.6	8.3	10.6	16.6	16.9	18.3	18.0	14.1	9.1	9.3	6.7
1986	6.4	7.2	8.9	11.0	14.9	17.4	17.7	18.2		10.4	7.4	4.9
1987	6.1	8.3	7.1	10.1	11.8	16.5	19.9	18.3	17.4	11.4	8.9	6.8
1988	6.9	7.0	8.1	10.6	14.0		20.5	18.8	16.0	10.9	5.8	5.8
1989	5.0	7.3	9.1	10.3	12.4	16.3	17.7	18.7	16.0	10.9	8.9	5.8
1990	5.7	7.0	8.3	10.8	13.9							7.4
1991							18.8	18.7	15.3	12.3	10.2	5.1
1992	5.6	6.0	7.7	11.5	14.1	20.4	20.1	20.5	16.0	14.1	9.4	6.3
1993	5.7	5.5	8.4	11.2	16.4	18.4	14.7	15.4	15.5	13.9	8.5	7.8
1994	8.0	7.6	9.0	12.2	15.5	17.2	19.0	17.6	16.1	13.4	9.0	6.4
MEAN	6.2	6.7	8.3	10.9	14.4	17.6	18.5	18.2	15.8	11.8	8.6	6.3

**(5) MONTHLY MEAN WIND VELOCITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	3.4	3.5	3.0	3.2		3.1	2.9	2.8	2.4	2.5	2.9	2.9
1986	3.3	3.3	2.9	3.3	3.0	3.3	3.1	2.9	2.7	2.8	2.6	2.7
1987	3.1	3.0	3.1	2.9	3.3	3.0	2.8	3.0	2.7	2.8	3.0	3.1
1988	2.7	3.1	3.3	3.0	3.1	3.2	2.9		2.9	2.9	3.2	3.2
1989	3.1	2.9	2.9	3.3	3.1	3.2	2.7	2.5	2.8	2.8	3.1	3.0
1990	3.2	3.0	2.9	3.4	3.2	3.1	2.7	2.8	3.0	2.6	2.7	3.4
1991	2.9	2.9	2.7	3.3	3.5	2.7	2.7	2.7	2.6	3.0	3.1	3.0
1992	3.0	3.3	3.2	3.0	2.7	3.0	2.8	2.5	2.9	2.8	3.1	2.8
1993	2.9	3.0	3.3	2.8	2.7	2.9	2.8	2.7	2.7	2.7	2.6	2.5
1994	2.0	2.7	2.7	2.5	2.4	2.2	1.9	1.7	1.8	1.9	1.8	1.9
MEAN	3.0	3.1	3.0	3.1	3.0	3.0	2.7	2.6	2.7	2.7	2.8	2.9

**TABLE I-1-2 CLIMATIC DATA AT PAVLIKENI**

**(1) MONTHLY MEAN AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-5.5	-3.2	4.5	13.9	20.1	20.5	22.6	23.5	18.2	11.1	6.0	4.9
1986	2.0	-2.8	4.9	15.3	18.5	21.1	21.8	23.3	18.9	11.4	4.0	0.6
1987	-2.9	0.4	1.3	11.1	16.1	22.1	25.0	21.6	20.8	10.3	8.4	1.9
1988	2.8	2.4	6.8	10.7	16.8	21.9	26.1	23.7	19.2	9.7	0.3	2.3
1989	1.3	5.1	9.9	15.3	15.7	19.3	22.9	22.9	17.7	12.2	4.4	1.4
1990	-3.0	5.0	10.3	12.5	16.5	20.9	23.7	22.2	17.0	12.2	8.0	2.0
1991	0.9	-2.0	6.3	10.9	14.6	20.6	22.2	20.6	18.1	11.7	6.3	-1.8
1992	1.4	2.2	6.8	12.1	15.6	20.0	21.5	24.9	17.5	15.1	7.8	-0.9
1993	0.9	-0.6	4.8	11.7	17.0	21.2	23.2	23.8	19.0	15.0	0.1	3.6
1994	3.8	2.3	8.5	13.9	18.3	21.6	23.4	24.2	23.3	12.4	6.1	1.5
MEAN	0.2	0.9	6.4	12.7	16.9	20.9	23.2	23.1	19.0	12.1	5.1	1.6

**(2) MONTHLY MEAN MAXIMUM AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-1.5	1.0	9.0	20.6	26.5	26.7	29.5	30.6	25.5	18.0	10.4	9.0
1986	5.6	0.7	9.2	22.8	25.1	25.9	27.0	31.0	26.8	17.2	7.7	5.1
1987	1.3	4.2	5.8	16.4	21.3	28.3	31.5	28.0	28.6	15.4	12.2	4.7
1988	6.9	7.7	11.5	16.3	22.4	27.3	30.9	31.4	26.2	16.7	4.3	6.1
1989	7.6	11.4	15.6	22.6	21.6	25.8	29.4	30.8	23.8	18.9	9.6	7.2
1990	1.8	10.5	17.8	18.8	23.4	28.0	31.2	30.4	24.8	20.2	14.8	4.5
1991	5.5	1.3	11.0	15.6	20.1	26.6	28.1	27.0	25.9	17.1	10.4	1.2
1992	4.8	7.7	13.0	18.6	21.6	25.3	27.9	32.8	25.4	21.7	12.3	-2.6
1993	5.1	4.2	9.5	17.8	22.5	27.9	30.4	31.4	26.6	21.8	4.1	8.1
1994	8.2	7.1	14.5	19.5	24.8	28.3	29.1	31.5	30.9	17.6	11.2	4.5
MEAN	4.5	5.6	11.7	18.9	22.9	27.0	29.5	30.5	26.5	18.5	9.7	5.3

**(3) MONTHLY MEAN MINIMUM TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-9.5	-8.1	0.4	6.7	12.8	13.5	14.5	14.3	10.7	4.3	1.5	0.5
1986	-1.3	-6.0	0.6	5.4	9.3	12.6	12.3	14.9	10.0	6.0	0.3	-4.0
1987	-7.2	-4.1	-3.7	3.9	8.9	12.4	15.3	14.3	12.5	5.0	4.3	-1.7
1988	-1.1	-3.6	1.9	4.2	10.2	14.9	17.8	14.7	9.9	3.4	-3.3	-1.0
1989	-3.4	-1.0	4.0	7.9	8.5	13.7	15.5	16.0	12.5	6.6	0.6	-4.0
1990	-7.3	-0.2	2.5	6.3	8.9	13.9	15.4	13.3	10.7	5.4	2.5	-0.4
1991	-3.5	-6.4	1.4	4.9	9.5	14.3	15.6	15.4	11.6	7.1	1.7	-5.2
1992	-2.2	-3.4	0.6	5.7	9.5	14.8	15.9	16.6	9.5	8.0	3.3	-4.7
1993	-4.9	-6.4	-0.4	5.1	10.6	14.7	15.7	14.7	10.0	7.9	-3.9	-0.9
1994	-0.6	-2.5	2.5	8.3	11.8	14.9	17.7	16.9	15.7	7.2	1.0	-1.5
MEAN	-4.1	-4.2	1.0	5.8	10.0	14.0	15.6	15.1	11.3	6.1	0.8	-2.3

**(4) MONTHLY MEAN ABSOLUTE HUMIDITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	3.7	3.8	6.8	9.1	15.0	15.1	16.3	15.9	13.4	9.3	7.9	7.6
1986	6.2	4.9	7.0	9.0	13.9	17.1	18.7	17.8	12.2	10.4	7.1	5.2
1987	4.6	5.7	5.4	8.4	12.8	16.4	18.7	15.7	15.1	9.6	9.0	6.2
1988	6.4	5.7	7.3	9.6	13.9	17.9	21.9	17.2	15.1	10.0	5.5	6.8
1989	5.8	7.0	8.8	11.1	12.5	15.3	17.2	17.7	14.4	10.5	7.1	6.0
1990	4.5	6.8	7.7	10.7	12.8							6.8
1991							19.8	17.9	13.8	11.7	8.3	4.9
1992	5.3	6.2	7.4	9.8	12.2	18.3	18.4	17.5	12.4	12.2	8.9	4.8
1993	5.4	4.6	6.7	8.6	14.2	14.8	15.3	14.9	12.9	12.9	5.9	6.8
1994	6.5	6.0	7.6	10.7	13.6	13.8	17.8	16.7	15.1	11.0	7.6	5.7
MEAN	5.4	5.6	7.2	9.7	13.4	16.1	18.2	16.8	13.8	10.8	7.5	6.1

**(5) MONTHLY MEAN WIND VELOCITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	0.7		0.5	1.4	0.4	2.5	0.8	1.1	1.2	0.5	1.2	1.1
1986	1.7	1.6	0.4	1.7	0.2	0.6	0.6	0.9	0.3	0.6	0.3	0.8
1987	0.6	0.3	0.4	0.9	0.8	0.9	0.3	1.5	0.4	0.1	0.3	0.3
1988	0.1	1.4	1.7	1.3	1.1	1.9	0.6	1.1	0.8	0.8	1.3	1.8
1989	1.0	1.0	1.4	2.5	1.6	2.0	1.2	0.8	1.3	2.4	2.8	1.8
1990	1.1	2.6	2.4	2.6	1.5	2.0	1.5	1.5	1.9	1.1	1.3	1.5
1991	1.5	1.5	1.3	2.5	3.1	2.2	0.9	1.4	1.6	2.3	1.6	1.9
1992	3.3	2.6	2.5	2.4	2.0	2.9	2.5	1.5	2.3	2.8	3.0	1.8
1993	2.4	2.4	2.9	3.7	2.8	2.8	3.1	0.6	2.7	2.2	3.2	2.8
1994	2.5	3.1	3.0	2.8	2.9	3.0	2.6	2.2	2.5	2.9	3.0	3.1
MEAN	1.5	1.8	1.7	2.2	1.7	2.1	1.4	1.3	1.5	1.6	1.8	1.7

**TABLE I-1-3 CLIMATIC DATA AT SUHINDOL**

**(1) MONTHLY MEAN AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-4.9	-3.1	3.8	13.4	18.9	19.9	22.8	23.1	18.2	11.5	5.9	4.6
1986	1.8	-2.7	4.7	14.6	17.6	19.8	21.1	23.1	19.1	11.2	3.6	0.6
1987	-2.4	0.5	0.9	10.4	15.2	21.4	24.3	21.4	21.3	9.9	8.0	1.9
1988	2.3	2.6	6.4	10.3	15.9	20.5	25.3	23.6	18.7	9.7	0.6	2.3
1989	1.8	5.2	9.8	15.4	15.1	18.9	22.1	22.5	17.6	11.9	4.9	2.9
1990	-0.9	5.6	10.9	12.2								
1991												
1992												
1993												
1994												
MEAN	-0.3	0.5	5.1	12.7	16.5	20.1	23.1	22.7	19.0	10.8	4.6	2.5

**(2) MONTHLY MEAN MAXIMUM AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-0.4	0.6	7.5	19.4	24.8	25.7	28.8	29.7	24.4	17.3	9.5	8.3
1986	4.9	0.3	8.1	21.1	23.8	25.0	25.6	30.2	26.3	16.4	7.1	5.0
1987	1.4	4.4	5.3	15.6	20.4	27.4	30.8	27.5	27.7	14.1	11.2	4.5
1988	6.1	7.3	10.5	15.0	21.0	25.4	31.7	30.5	24.7	15.5	4.1	5.9
1989	6.5	10.1	14.6	21.6	20.3	23.8	27.8	28.8	22.5	18.0	9.6	8.1
1990	3.3	9.9	17.2	17.2								
1991												
1992												
1993												
1994												
MEAN	3.6	5.4	10.5	18.3	22.1	25.5	28.9	29.3	25.1	16.3	8.3	6.4

**(3) MONTHLY MEAN MINIMUM TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-8.7	-7.5	0.4	8.0	12.7	14.1	15.6	16.2	11.9	5.9	2.1	1.1
1986	-1.7	-5.6	0.9	7.7	10.8	14.5	16.0	16.5	11.9	6.6	0.6	-3.1
1987	-5.9	-3.1	-3.4	5.3	10.0	15.1	17.6	15.4	14.8	5.9	4.8	-0.9
1988	-0.8	-1.8	2.3	5.5	10.3	15.3	19.1	16.5	12.7	5.0	-2.8	-0.9
1989	-2.4	0.3	5.2	8.8	10.0	14.4	15.9	16.1	12.7	7.2	0.8	-2.2
1990	-5.1	1.3	4.5	7.2								
1991												
1992												
1993												
1994												
MEAN	-4.1	-2.7	1.7	7.1	10.8	14.7	16.8	16.1	12.8	6.1	1.1	-1.2

**(4) MONTHLY MEAN ABSOLUTE HUMIDITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	3.9	4.0	6.9	10.0	16.6	16.8	19.1	18.4	15.3	10.6	8.4	7.7
1986	6.4	4.8	7.9	12.9	14.8	18.9	20.2	21.4		9.9	6.9	5.3
1987	4.8	5.9	5.5	8.4	12.6	16.4	19.9	17.0	17.2	10.8	9.6	6.6
1988	6.7	6.6	8.1	10.4	14.7	19.0	22.7	18.2	14.3	9.5	5.5	6.1
1989	5.4	6.9	9.0	11.1	12.7	15.6	15.8	17.3	14.2	10.4	7.6	6.6
1990												
1991												
1992												
1993												
1994												
MEAN	5.4	5.6	7.5	10.6	14.3	17.3	19.5	18.5	15.3	10.2	7.6	6.5

**(5) MONTHLY MEAN WIND VELOCITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	0.4	2.3	0.9	1.5	0.8	1.5	0.6	0.8	1.2	0.7	1.2	1.4
1986	0.8	0.2	0.5	1.2	0.8	0.8	0.9	1.2	1.0	0.9	0.5	0.9
1987	0.8	0.4	0.7	0.8	1.6	0.9	0.6	1.2	0.5	0.2	0.6	0.5
1988	0.3	1.1	1.4	1.2	0.6	2.2	0.6	0.8	0.9	0.4	1.1	1.5
1989	0.6	0.8	0.8	1.1	1.1	1.8	1.1	0.8	0.6	1.0	1.3	0.5
1990												
1991												
1992												
1993												
1994												
MEAN	0.6	1.0	0.9	1.2	1.0	1.5	0.8	1.0	0.8	0.6	0.9	1.0

TABLE I-1-4 CLIMATIC DATA AT SADIEVO

(1) MONTHLY MEAN AIR TEMPERATURE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	0.1	-2.0	4.5	12.9	18.2	20.1	22.4	23.7	18.6	11.4	7.5	4.3
1986	3.7	0.5	5.1	13.7	16.8	20.9	22.5	24.0	20.1	12.4	4.6	0.4
1987	-1.1	3.5	1.6	10.7	15.4	21.5	25.0	22.2	20.3	11.5	8.8	2.7
1988	2.5	2.9	6.5	10.0	15.4	20.4	25.5	23.8	18.7	10.9	2.2	2.5
1989	1.7	4.7	8.9	13.8	15.1	19.5	22.2	22.9	17.7	11.9	5.7	0.7
1990	-0.7	5.5	9.1	11.9	15.7	20.7	23.7	22.0	17.4	12.5	8.7	4.9
1991	0.4	1.8	5.2	9.7	13.8	20.7	22.8	21.9	18.7	12.8	7.2	-0.6
1992	1.3	2.1	6.5	11.3	14.9	19.9	21.7	24.8	17.8	14.9	7.9	0.4
1993	-0.3	0.0	5.2	10.5	16.2	20.4	22.6	23.1	18.7	14.6	3.9	4.1
1994	4.4	3.0	8.5	12.8	17.9	21.2	24.4	25.5	24.1	14.4	6.0	2.9
MEAN	1.2	2.2	6.1	11.7	15.9	20.5	23.3	23.4	19.2	12.7	6.3	2.2

(2) MONTHLY MEAN MAXIMUM AIR TEMPERATURE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	3.2	3.1	8.7	19.3	24.6	26.6	29.5	30.4	25.9	17.8	11.4	8.0
1986	7.3	4.1	9.9	22.0	24.2	27.1	28.5	31.4	27.6	17.7	9.7	5.3
1987	2.9	7.7	7.2	15.9	21.2	27.9	31.8	28.4	28.2	16.5	12.4	6.4
1988	5.9	7.3	11.5	16.0	23.4	29.7	32.7	31.2	26.1	18.4	6.2	6.8
1989	7.3	11.8	15.5	22.6	22.5	27.0	29.5	30.8	24.5	18.5	10.8	5.8
1990	4.5	10.9	17.7	18.3	22.7	27.5	30.8	29.4	24.6	19.9	14.0	8.1
1991	4.6	5.9	10.1	15.0	19.4	27.2	29.4	28.2	25.8	18.5	11.3	3.7
1992	5.8	8.1	12.8	17.9	21.9	26.0	27.6	32.4	25.2	20.8	12.8	5.0
1993	5.7	6.6	11.3	17.3	21.8	27.1	29.9	30.6	26.2	20.8	8.0	8.2
1994	7.8	8.0	14.5	18.4	24.0	27.9	30.0	32.1	31.3	19.3	11.1	6.9
MEAN	5.5	7.4	11.9	18.3	22.6	27.4	30.0	30.5	26.5	18.8	10.8	6.4

(3) MONTHLY MEAN MINIMUM TEMPERATURE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-2.8	-6.9	0.9	7.0	11.7	13.7	14.8	16.1	11.7	5.5	3.7	0.5
1986	-0.2	-2.8	0.1	6.0	9.3	14.9	15.7	16.5	12.1	6.9	-0.5	-4.3
1987	-5.2	-0.4	-3.6	4.6	9.4	14.3	16.7	15.3	13.5	6.6	5.0	-0.5
1988	-0.9	-2.0	1.7	4.4	9.3	14.1	17.8	15.9	12.5	5.2	-1.8	-1.9
1989	-4.9	-1.7	3.0	6.6	8.2	13.7	14.9	15.8	12.2	6.4	1.5	-4.1
1990	-6.5	-0.1	0.7	5.8	8.6	13.0	15.1	14.6	10.2	6.3	4.2	1.3
1991	-3.8	-2.7	0.6	3.9	8.0	13.2	15.7	15.4	11.1	7.4	3.6	-3.7
1992	-3.6	-5.1	-0.5	3.6	6.5	13.0	13.8	16.1	11.6	14.3	0.4	-6.1
1993	-5.9	-5.4	-0.3	4.1	11.2	13.2	14.3	14.8	11.0	9.2	-0.5	-1.4
1994	-1.3	-2.2	1.0	5.2	9.3	12.7	16.7	17.2	15.1	8.8	-0.2	-1.8
MEAN	-3.5	-2.9	0.4	5.1	9.2	13.6	15.6	15.8	12.1	7.7	1.5	-2.2

(4) MONTHLY MEAN ABSOLUTE HUMIDITY

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	5.5	4.2	6.8	10.6	15.0	14.8	15.1	16.4	12.6	8.9	8.7	7.1
1986	6.7	6.1	7.3	9.7	11.6	16.4	16.5	16.8	11.7	10.4	6.9	5.0
1987	5.2	6.9	5.7	9.0	12.1	16.7	18.8	17.4	15.9	11.0	9.9	6.7
1988	8.6	6.1	7.5	8.6	13.8	17.0	20.0	16.6	15.2	8.8	5.8	5.7
1989	4.5	5.9	7.8	10.6	11.8	15.9	16.3	16.7	14.9	10.1	7.3	5.4
1990	5.1	6.1	6.7	9.6	12.0							0.6
1991							18.4	16.8	13.8	11.5	9.1	4.6
1992	5.0	4.9	6.7	9.7	11.7	17.8	18.2	22.5	15.1	82.0	7.9	5.0
1993	4.3	4.1	6.2	8.6	14.7	15.5	15.3	14.8	12.2	12.5	7.0	7.2
1994	7.2	6.2	7.7	10.4	12.7	14.4	16.6	15.9	14.8	11.3	7.5	5.9
MEAN	5.6	5.6	6.9	9.6	12.8	16.1	17.2	17.1	14.0	16.5	7.8	5.3

(5) MONTHLY MEAN WIND VELOCITY

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	1.9	3.8	1.6	2.7	1.6	2.7	1.6	2.6	2.3	1.7	2.4	1.7
1986	2.1	1.9	1.5	2.5	2.1	2.1	2.2	2.0	2.1	1.9	1.3	2.3
1987	1.8	1.8	3.0	2.6	2.3	1.9	2.0	2.4	2.0	2.2	2.1	2.1
1988	1.8	2.7	3.3	2.9	1.7	2.2	1.8	2.1	2.1	2.0	2.2	3.3
1989	2.0	2.3	2.5	2.1	1.8	2.2	1.2	1.6	1.3	1.5	2.5	1.4
1990	1.0	3.1	2.4	2.2	1.5	1.7	1.8	1.9	1.4	0.9	0.8	2.2
1991	1.7	1.9	1.1	1.7	1.6	1.1	1.1	1.6	1.7	2.2	1.5	2.4
1992	2.4	1.8	3.2	2.0	2.2	1.6	1.7	1.7	1.6		2.3	1.4
1993	2.8	1.3	2.7	1.5	1.0	2.0	2.3	1.7	2.2	1.0	2.6	0.9
1994	0.7	1.6	1.6	1.2	1.1	1.6	2.0	1.4	0.8	1.1	1.7	1.7
MEAN	1.8	2.2	2.3	2.1	1.7	1.9	1.8	1.9	1.8	1.6	1.9	1.9

**TABLE I-1-5 CLIMATIC DATA AT JAMBOL**

**(1) MONTHLY MEAN AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-0.1	-2.3	4.4	12.8	18.0	20.2	22.6	23.8	18.6	11.6	7.9	4.9
1986	3.6	0.4	4.9	13.2	16.4	21.4	22.7	24.3	19.6	12.1	4.9	0.8
1987	-0.9	3.3	1.6	9.7	15.3	21.5	24.9	21.9	20.2	11.3	9.1	1.7
1988	3.1	3.0	6.6	10.4	16.3	21.5	26.7	24.5	20.2	11.7	2.5	2.9
1989	1.3	5.0	9.2	14.2	15.0	19.4	22.8	23.7	18.1	12.4	6.1	1.5
1990	-0.5	5.6	9.5	12.3	15.8	21.0	24.0	22.8	18.3	13.0	9.2	5.0
1991	0.7	1.9	5.3	9.8	14.2	20.6	22.8	21.8	18.5	13.1	7.7	-0.3
1992	1.2	1.8	6.4	11.3	14.2	20.6	21.9	24.7	17.9	15.2	7.6	0.6
1993	0.2	0.1	4.6	10.6	16.3	20.3	22.7	22.8	18.7	14.7	3.8	4.1
1994	3.9	2.6	7.7	12.7	18.1	21.0	24.0	24.9	23.6	13.8	5.8	2.8
MEAN	1.3	2.1	6.0	11.7	16.0	20.8	23.5	23.5	19.4	12.9	6.5	2.4

**(2) MONTHLY MEAN MAXIMUM AIR TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	3.0	2.9	7.8	19.0	24.8	26.2	30.2	31.2	26.5	19.2	14.1	10.2
1986	9.1	5.5	11.1	22.8	25.3	29.2	30.6	33.2	28.5	17.9	10.3	5.4
1987	3.0	7.6	7.2	16.4	21.7	28.4	38.6	29.3	29.0	17.2	13.3	6.2
1988	6.8	8.1	12.1	16.4	23.1	28.6	34.6	32.6	27.6	18.4	6.7	7.3
1989	7.7	11.8	15.3	21.7	22.1	26.3	30.4	31.7	24.6	19.1	11.1	6.5
1990	4.0	11.3	18.0	19.2	23.2	28.4	32.7	31.8	26.2	20.8	15.0	8.6
1991	5.2	7.0	9.9	15.0	20.0	27.8	30.4	29.8	27.1	19.5	11.7	3.9
1992	6.2	8.9	12.6	18.0	22.3	27.3	29.3	34.3	26.8	22.1	13.1	5.7
1993	5.9	6.8	10.6	18.1	22.6	27.9	31.7	32.3	27.5	21.9	8.5	9.4
1994	8.0	8.1	15.3	20.4	26.7	30.6	32.7	34.4	32.9	20.2	12.5	7.9
MEAN	5.9	7.8	12.0	18.7	23.2	28.1	32.1	32.1	27.7	19.6	11.6	7.1

**(3) MONTHLY MEAN MINIMUM TEMPERATURE**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	-3.3	-8.4	0.6	7.2	11.6	13.9	14.4	16.1	11.5	5.3	3.2	1.0
1986	0.0	-3.1	-0.2	5.7	7.9	13.7	14.8	15.4	11.4	7.0	0.4	-3.3
1987	-4.7	-0.4	-3.5	4.0	9.1	14.5	17.0	15.3	12.9	6.2	5.1	-0.6
1988	-0.2	-1.4	2.1	4.7	9.4	14.2	18.0	16.3	13.1	5.5	-2.2	-0.8
1989	-3.9	-0.9	3.5	8.0	9.0	13.3	15.5	16.5	12.8	7.0	2.0	-3.1
1990	-4.8	0.5	1.9	6.4	8.7	14.0	16.0	15.6	11.6	7.0	3.4	2.0
1991	-2.7	-1.9	1.9	5.4	9.4	14.7	17.0	16.1	12.2	8.6	4.6	-3.3
1992	-2.9	-4.0	1.8	4.9	7.8	14.3	14.8	16.2	10.6	9.6	3.4	-3.1
1993	-4.6	-5.2	-0.4	4.7	11.1	13.5	14.9	15.4	11.6	9.9	0.1	0.3
1994	0.7	-2.1	1.8	6.8	10.9	13.5	16.9	17.3	16.4	9.8	1.3	-0.7
MEAN	-2.6	-2.7	1.0	5.8	9.5	14.0	15.9	16.0	12.4	7.6	2.1	-1.2

**(4) MONTHLY MEAN ABSOLUTE HUMIDITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	5.8	4.0	7.0	9.8	14.8	14.5	15.5	16.5	12.1	8.9	9.1	7.5
1986	6.6	6.2	7.1	10.2	12.0	17.0	17.8	17.7		11.0	7.0	5.3
1987	5.2	7.0	5.9	8.6	12.7	17.8	19.2	17.1	15.5	10.6	9.7	6.5
1988	6.8	6.2	7.5	9.1	13.5	18.8	18.4	16.1	13.1	9.1	5.9	6.3
1989	4.6	5.6	7.7	10.4	12.3	15.3	15.7	16.4	14.1	9.8	7.4	5.4
1990	4.8	5.6	6.1	9.4	11.9							8.0
1991							18.3	17.1	13.4	11.7	9.2	4.7
1992	5.3	4.9	6.7	9.6	11.3	17.3	16.8	17.5	11.9	12.0	7.9	5.6
1993	5.0	4.5	6.6	8.5	14.4	15.9	15.6	16.2	12.9	12.8	7.4	7.2
1994	7.3	6.0	7.4	10.8	13.2	15.4	17.8	17.0	16.7	12.3	7.4	6.4
MEAN	5.7	5.6	6.9	9.6	12.9	16.3	17.2	16.8	13.7	10.9	7.9	6.3

**(5) MONTHLY MEAN WIND VELOCITY**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1985	2.8	3.3	2.3	2.1	1.0	2.1	1.4	2.4	2.2	1.8	3.4	1.5
1986	2.1	4.4	2.4	3.1	2.3	2.8	2.6	2.1	2.9	2.1	1.6	2.5
1987	3.7	2.3	4.0	3.8	2.3	1.4	2.1	2.2	2.5	2.2	1.5	1.9
1988	1.7	3.4	3.1	2.5	3.4	3.9	3.2	2.9	2.9	3.6	3.0	2.3
1989	1.5	2.8	3.4	3.6	2.7	2.1	1.8	2.3	2.1	2.3	1.6	2.1
1990	0.7	2.6	4.0	3.3	2.8	2.1	1.9	3.0	2.0	1.4	1.2	3.2
1991	2.7	3.2	3.0	3.2	2.4	2.0	2.2	2.8	2.2	3.2	3.1	3.4
1992	2.6	2.3	3.8	3.3	2.8	2.1	2.3	2.0	1.7	2.1	3.0	2.7
1993	3.7	3.1	3.7	3.3	2.3	1.9	2.1	2.9	2.7	2.0	4.6	2.2
1994	1.4	5.4	2.2	3.1	2.4	2.7	3.4	2.0	2.6	3.5	2.7	2.3
MEAN	2.3	3.3	3.2	3.1	2.4	2.3	2.3	2.5	2.4	2.4	2.6	2.4

TABLE I-2-1 MONTHLY PRECIPITATION AT PETRICH

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1954	87.3	101.2	33.3	25.3	19.8	49.9	51.8	5.6	7.9	100.3	148.9	73.6	704.9
1955	140.0	18.5	91.0	45.0	29.6	75.5	69.7	27.3	25.7	95.0	107.3	13.0	737.6
1956	19.2	153.8	110.6	29.9	69.8	64.0	19.1	10.3	1.6	57.8	122.1	135.6	793.8
1957	73.1	23.5	6.0	61.9	145.3	116.6	30.2	74.7	46.6	106.9	20.1	70.8	775.7
1958	202.1	33.5	118.7	71.7	11.6	28.6	30.9	7.9	37.6	33.1	81.8	37.8	695.3
1959	132.2	10.9	32.1	139.5	86.1	168.8	37.3	24.6	42.6	128.4	79.8	97.1	979.4
1960	193.7	49.0	63.9	91.8	82.1	47.2	67.0	15.9	86.9	29.0	157.1	103.4	987.0
1961	18.3	11.1	25.2	55.4	91.1	52.9	25.2	0.8	13.8	12.7	161.6	51.2	519.3
1962	25.0	51.0	136.1	47.5	20.0	30.2	57.2	1.8	17.3	22.3	193.0	39.6	641.0
1963	78.7	145.5	47.3	11.1	59.3	35.7	26.7	3.5	42.1	55.4	57.1	54.5	616.9
1964	11.8	17.3	35.0	20.6	84.3	52.3	18.6	22.0	79.2	23.0	75.8	76.4	516.3
1965	122.2	72.0	28.6	84.0	87.7	39.8	15.0	27.5	2.5	1.7	37.8	90.1	587.9
1966	109.1	33.9	58.8	21.5	61.2	56.8	22.3	13.7	18.3	56.9	150.7	14.3	617.5
1967	53.5	6.9	36.7	56.8	49.5	62.8	46.5	46.1	33.0	24.3	17.7	53.8	487.6
1968	52.0	73.2	13.6	1.8	26.9	40.8	5.8	12.2	27.0	8.7	63.1	92.4	417.5
1969	104.5	101.4	39.2	48.9	2.9	23.0	12.3	33.7	11.1	-	17.0	197.9	591.9
1970	46.9	90.7	39.1	45.6	88.0	23.4	77.7	5.3	36.2	64.2	21.2	28.8	567.1
1971	56.7	45.4	125.8	25.6	44.9	60.9	44.1	56.5	66.6	50.4	17.8	61.2	655.9
1972	38.6	113.1	10.9	62.7	41.6	21.7	37.9	77.5	79.2	150.7	23.8	-	657.7
1973	37.5	91.4	64.0	73.9	30.2	47.2	66.6	65.0	31.7	28.1	29.0	50.4	615.0
1974	35.4	75.9	57.8	43.8	84.3	93.6	17.3	1.3	16.2	70.8	62.7	80.6	639.7
1976	24.3	16.6	54.0	17.8	42.4	72.0	117.4	30.1	4.4	44.4	98.8	14.5	536.7
1976	16.0	12.7	21.6	39.7	42.3	46.6	78.1	79.4	4.1	54.3	99.0	54.9	546.7
1977	50.5	44.1	32.7	28.2	64.1	56.9	50.5	20.0	25.1	0.9	15.7	6.1	394.8
1978	51.7	36.1	51.4	79.2	127.8	22.9	7.1	43.8	165.6	91.3	71.1	67.1	815.1
1979	65.8	34.2	23.6	91.9	31.7	53.2	52.9	98.1	33.6	76.9	92.2	35.3	689.4
1980													0.0
1981													0.0
1982													0.0
1983													0.0
1984													0.0
1985	117.0	40.0	59.0	14.0	54.0	17.0	5.0	60.0	21.0	8.0	161.0	6.0	562.0
1986	69.0	259.0	16.0	8.0	52.0	85.0	8.0	2.0	9.0	26.0	16.0	27.0	577.0
1987	137.0	96.0	127.0	92.0	50.0	28.0	6.0	39.0	8.0	62.0	135.0	26.0	806.0
1988	8.0	100.0	85.0	27.0	36.0	81.0	35.0	4.0	2.0	27.0	128.0	54.0	587.0
1989	0.0	20.0	34.0	20.0	31.0	78.0	68.0	32.0	28.0	134.0	100.0	20.0	565.0
1990	1.0	22.0	8.0	93.0	31.0	24.0	38.0	38.0	8.0	25.0	21.0	229.0	538.0
1991	7.8	77.6	21.2	53.2	52.2	10.4	36.9	44.1	23.0	61.2	72.6	7.0	467.2
1992	0.0	0.6	12.8	87.6	35.2	15.3	22.6	11.8	8.4	38.6	75.2	26.0	334.1
1993	16.4	23.2	57.8	18.3	46.9	22.6	3.1	21.9	19.4	12.0	50.4	57.2	349.2
1994	65.2	35.4	17.8	86.9	38.3	18.7	91.8	11.2	5.4	83.6	26.0	66.2	546.6
MEAN	63.0	59.4	49.9	50.0	54.2	50.6	38.9	29.7	30.2	53.3	78.0	60.5	617.7

253.6



TABLE I-2-2 MONTHLY PRECIPITATION AT PAVLIKENI

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1954	49.2	80.1	24.6	40.3	45.0	52.2	97.7	72.1	29.0	67.0	86.7	92.1	738.0
1955	55.1	28.8	52.5	60.8	59.5	227.8	128.3	79.6	53.3	37.4	52.3	30.7	866.1
1956	46.0	51.7	37.3	54.4	145.1	102.1	64.3	13.6	-	51.7	69.4	81.8	717.4
1957	8.0	22.9	16.3	82.2	116.6	164.4	59.3	27.6	113.2	49.0	25.7	68.1	753.3
1958	67.1	3.8	52.2	81.6	33.6	115.7	27.8	9.6	19.0	64.2	12.6	7.8	495.0
1959	28.3	5.0	26.5	65.9	97.7	66.7	80.5	68.1	52.0	25.5	58.4	56.5	631.1
1960	36.9	14.9	17.4	83.7	81.1	139.7	98.2	41.9	50.2	23.9	29.9	89.4	707.2
1961	45.7	22.3	36.1	42.5	174.8	74.6	34.7	54.3	21.0	39.7	35.8	78.3	659.8
1962	26.9	52.7	80.0	74.5	24.5	13.7	49.8	40.7	11.5	81.7	53.7	68.8	578.5
1963	105.0	56.4	30.7	37.2	65.3	50.2	99.4	66.7	26.7	54.2	12.4	44.8	649.0
1964	14.5	32.0	22.1	47.2	121.9	78.2	76.3	49.2	158.9	21.9	38.7	4.0	664.9
1965	35.2	49.3	33.5	39.1	133.5	26.4	0.2	28.1	0.5	1.9	65.0	61.7	472.4
1966	50.5	29.6	52.0	56.9	46.7	116.2	52.6	21.3	39.3	87.6	130.9	76.7	760.3
1967	18.3	34.5	26.2	56.9	52.1	110.7	9.9	55.9	50.9	42.0	17.3	33.5	508.2
1968	30.1	30.5	25.8	5.2	36.5	21.2	53.1	110.3	100.9	10.0	60.1	35.3	519.0
1969	57.3	48.8	90.7	11.0	21.4	163.5	122.5	68.6	32.8	-	8.8	111.7	737.1
1970	53.3	62.3	65.3	46.6	156.1	114.2	57.9	33.9	5.4	31.8	46.2	11.5	684.5
1971	63.7	68.2	11.3	29.6	102.9	42.1	121.8	34.4	51.2	42.5	34.9	16.7	619.3
1972	19.8	42.4	9.9	47.9	69.5	26.1	71.1	104.6	114.6	140.0	31.2	8.1	685.2
1973	42.0	29.6	96.7	149.3	49.9	137.6	83.2	31.2	15.0	16.9	34.5	30.0	715.9
1974	13.2	16.5	25.5	68.2	43.5	69.6	51.0	42.8	30.7	12.3	38.0	52.9	464.2
1975	29.1	17.4	22.8	118.5	71.6	64.1	76.2	99.5	21.7	72.9	77.1	3.9	674.8
1976	9.0	9.5	9.1	85.8	33.3	50.2	70.0	92.3	26.0	40.0	52.9	32.3	510.4
1977	65.5	32.2	14.7	59.5	81.0	110.9	79.5	45.3	64.7	4.1	37.9	45.1	640.4
1978	17.9	55.3	86.4	40.8	60.1	68.4	37.3	7.8	66.9	10.5	7.0	31.0	489.4
1979	72.7	41.6	13.1	39.6	140.5	39.0	44.8	100.0	12.1	72.5	51.4	14.0	641.3
1980													0.0
1981													0.0
1982													0.0
1983													0.0
1984													0.0
1985	27.7	24.8	33.6	23.8	58.8	70.0	19.7	37.0	31.3	10.3	86.2	2.0	425.2
1986	61.2	84.2	11.0	21.2	5.9	69.3	81.6	27.3	10.4	43.1	0.5	27.7	443.4
1987	91.2	41.6	34.2	123.5	54.1	17.5	57.0	48.1	8.2	43.5	69.6	37.4	625.9
1988	8.6	46.2	114.6	44.3	40.9	30.3	10.8	21.0	8.9	51.0	82.1	23.0	481.7
1989	1.0	5.0	46.2	58.5	45.5	34.9	22.7	47.5	21.1	30.6	41.0	50.5	404.5
1990	8.0	14.0	2.5	30.5	49.5	18.0	8.0	14.0	38.5	23.0	9.5	55.0	270.5
1991	19.0	29.0	26.0	66.0	156.0	64.0	161.0	76.0	7.0	44.0	30.0	30.0	708.0
1992	9.0	19.0	25.0	74.0	45.0	95.0	21.0	15.0	5.0	10.0	32.0	15.0	365.0
1993	16.0	14.0	46.0	21.0	79.0	28.0	13.0	16.0	14.0	19.0	56.0	34.0	356.0
1994	8.0	5.0	25.5	61.3	18.3	28.7	93.0	17.7	4.0	46.8	13.0	35.5	356.8
MEAN	36.4	33.9	37.3	56.9	72.7	75.0	62.1	47.7	37.6	40.6	44.1	41.6	585.0

352.0

TABLE 1-2-3 MONTHLY PRECIPITATION AT SUHINDOL

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1954	47.9	90.4	21.9	40.0	70.9	97.0	112.1	48.3	33.2	58.0	101.3	66.0	807.0
1955	50.5	28.3	66.8	73.4	59.4	163.6	152.7	67.9	64.7	44.4	87.2	34.9	913.8
1956	45.1	53.7	43.0	62.8	59.4	101.5	62.6	0.8	3.8	46.3	74.9	89.8	643.7
1957	8.7	27.4	17.0	71.8	177.2	168.2	105.5	28.3	114.7	54.2	32.5	74.9	880.4
1958	74.5	3.0	67.2	101.5	23.8	102.2	45.7	11.5	44.9	48.9	9.5	14.2	546.9
1959	33.7	4.1	28.2	54.4	81.7	105.9	86.5	98.2	59.5	32.2	54.0	50.0	688.4
1960	44.3	34.9	40.0	127.1	121.1	99.0	93.9	8.1	62.6	23.8	32.6	90.8	778.2
1961	31.3	11.3	11.0	58.2	164.3	61.4	32.2	31.1	26.5	31.5	47.6	61.9	568.3
1962	41.3	45.1	80.8	76.8	46.5	15.5	39.9	36.2	15.3	103.0	60.6	82.6	643.6
1963	126.3	53.1	31.8	50.9	65.4	53.8	134.4	22.0	27.2	53.3	14.0	47.3	679.5
1964	18.2	52.0	32.6	66.4	134.8	79.5	129.5	68.2	181.1	23.2	37.8	8.4	831.7
1965	35.7	77.2	44.7	52.3	161.1	36.4	2.5	25.3	0.5	1.6	67.8	74.6	579.7
1966	71.3	34.2	66.7	67.6	89.7	168.3	67.5	14.3	29.8	39.0	119.5	105.9	873.8
1967	17.7	51.7	21.5	58.5	69.2	86.1	13.7	21.4	43.7	32.1	16.1	32.8	464.5
1968	30.3	47.7	33.6	4.0	20.0	28.2	34.9	154.7	91.8	14.1	59.9	33.6	552.8
1969	71.0	39.8	86.8	12.0	26.8	195.9	88.7	35.3	45.2	-	12.4	96.0	709.9
1970	47.8	56.5	48.9	59.6	140.9	90.5	78.7	46.0	3.1	34.0	47.3	9.6	662.9
1971	52.1	62.9	15.1	28.5	104.1	77.7	120.3	51.8	57.1	46.4	31.1	23.3	670.4
1972	24.4	38.8	8.0	34.6	69.8	37.0	57.7	83.8	115.4	162.3	31.4	5.8	669.0
1973	37.9	18.9	78.6	158.0	71.4	63.7	125.6	49.5	14.1	21.9	31.9	38.9	710.4
1974	11.6	24.9	25.9	96.0	58.9	127.2	49.2	34.5	35.5	14.6	61.8	63.0	603.1
1975	40.7	21.2	14.8	131.1	103.1	170.8	73.1	177.5	5.8	84.8	67.9	14.5	905.3
1976	6.2	7.0	6.8	111.7	43.8	66.8	118.1	92.2	25.6	39.9	47.7	29.9	595.7
1977	76.1	32.0	19.7	53.0	90.6	87.9	81.1	58.1	67.2	5.0	42.1	48.8	661.6
1978	16.4	42.4	34.9	32.5	72.4	97.8	52.7	8.2	101.7	11.5	2.5	15.5	488.5
1979	60.7	44.9	15.7	60.3	183.0	50.2	66.9	116.3	11.0	91.5	54.2	14.5	769.2
1980													0.0
1981													0.0
1982													0.0
1983													0.0
1984													0.0
1985													0.0
1986													0.0
1987													0.0
1988													0.0
1989													0.0
1990													0.0
1991													0.0
1992													0.0
1993													0.0
1994													0.0
MEAN	43.1	38.6	37.0	67.0	88.8	94.3	77.9	53.4	49.3	44.7	47.9	48.0	690.1

430.8

TABLE I-2-4 MONTHLY PRECIPITATION AT SADIEVO

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1957								43.0	113.0	41.0	12.0	58.0	267.0
1958	69.0	15.0	54.0	99.0	56.0	82.0	30.0	5.0	7.0	23.0	25.0	3.0	468.0
1959	34.0	0.0	27.0	61.0	92.0	49.0	58.0	116.0	53.0	25.0	73.0	61.0	649.0
1960	67.0	58.0	14.0	60.0	59.0	96.0	81.0	34.0	12.0	3.0	50.0	100.0	634.0
1961	64.0	20.0	28.0	41.0	64.0	144.0	62.0	24.0	43.0	17.0	28.0	38.0	573.0
1962	8.0	16.0	63.0	54.0	16.0	33.0	52.0	13.0	27.0	78.0	84.0	22.0	466.0
1963	128.0	85.0	47.0	73.0	67.0	52.0	69.0	40.0	18.0	37.0	40.0	35.0	691.0
1964	9.0	21.0	31.0	29.0	63.0	31.0	15.0	39.0	84.0	35.0	40.0	40.0	437.0
1965	41.0	80.0	7.0	34.0	95.0	10.0	30.0	24.0	1.0	5.0	73.0	112.0	612.0
1966	58.0	16.0	28.0	68.0	54.0	123.0	99.0	40.0	39.0	38.0	236.0	127.0	926.0
1967	33.0	20.0	10.0	32.0	30.0	41.0	50.0	45.0	62.0	20.0	18.0	40.0	401.0
1968	37.0	52.0	6.0	5.0	8.0	70.0	20.0	100.0	88.0	16.0	36.0	43.0	481.0
1969	58.0	76.0	80.0	24.0	38.0	67.0	73.0	3.0	25.0	0.0	12.0	182.0	638.0
1970	26.0	44.0	61.0	71.0	37.0	70.0	37.0	19.0	4.0	41.0	51.0	22.0	483.0
1971	28.0	61.0	51.0	27.0	81.0	36.0	109.0	9.0	36.0	55.0	27.0	23.0	541.0
1972	25.0	16.0	2.0	83.0	51.0	29.0	65.0	47.0	48.0	131.0	18.0	3.0	518.0
1973	46.0	27.0	75.0	115.0	34.0	54.0	113.0	2.0	33.0	16.0	23.0	34.0	572.0
1974	5.0	16.0	58.0	54.0	57.0	50.0	58.0	13.0	18.0	26.0	71.0	57.0	481.0
1975	12.0	15.0	57.0	44.0	83.0	71.0	66.0	118.0	1.0	113.0	27.0	23.0	630.0
1976	4.0	17.0	8.0	51.0	43.0	32.0	103.0	59.0	54.0	37.0	73.0	22.0	503.0
1977	48.0	34.0	9.0	35.0	94.0	83.0	47.0	9.0	34.0	18.0	28.0	23.0	462.0
1978	20.0	47.0	47.0	57.0	88.0	72.0	11.0	34.0	72.0	9.0	20.0	36.0	513.0
1979	46.0	42.0	4.0	43.0	85.0	48.0	48.0	113.0	4.0	52.0	87.0	14.0	586.0
1980													0
1981													0
1982													0
1983													0
1984													0
1985	40.9	41.9	14.7	52.8	64.5	61.2	8.9	27.3	10.1	3.3	101.3	4.2	431.1
1986	32.4	135.6	11.8	7.8	11.9	44.7	17.4	34.2	26.2	34.3	3.3	11.3	370.9
1987	31.2	36.7	19.6	103.0	36.5	40.6	23.7	7.5	19.0	36.0	44.5	64.3	462.6
1988	38.6	38.4	65.3	22.7	43.9	68.5	0.9	1.2	13.9	28.6	61.3	22.6	405.9
1989	14.0	4.0	46.5	26.3	45.1	53.1	34.0	51.0	38.9	38.1	40.4	55.4	446.8
1990	0.0	8.7	0.4	66.7	29.0	31.8	33.3	20.4	42.3	35.6	14.5	107.0	389.7
1991	14.0	58.2	24.0	33.2	96.8	41.7	60.4	23.9	2.4	36.4	25.6	15.7	432.3
1992	3.5	4.8	37.9	68.6	42.7	174.6	62.4	3.6	7.2	17.3	49.8	15.6	488.0
1993	5.0	10.7	34.8	78.0	95.4	51.6	19.2	42.0	13.4	47.7	90.6	16.0	504.4
1994	16.8	4.3	27.6	91.3	25.5	49.2	70.1	8.8	6.2	57.0	27.2	91.8	475.8
MEAN	33.1	35.0	32.7	53.5	55.8	61.3	50.8	35.4	32.0	35.5	48.8	46.1	520.1

288.8

TABLE I-2-5 MONTHLY PRECIPITATION AT JAMBOL

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1950	41.0	2.0	43.0	20.0	39.0	54.0	30.0	6.0	6.0	10.0	124.0	36.0	411.0
1951	23.0	21.0	24.0	48.0	69.0	40.0	37.0	61.0	60.0	33.0	46.0	8.0	470.0
1952	26.0	54.0	28.0	5.0	86.0	26.0	20.0	5.0	14.0	45.0	131.0	82.0	522.0
1953	34.0	22.0	3.0	61.0	101.0	66.0	7.0	42.0	7.0	52.0	17.0	11.0	423.0
1954	16.0	55.0	22.0	50.0	33.0	33.0	39.0	25.0	52.0	47.0	81.0	53.0	506.0
1955	84.0	20.0	43.0	39.0	77.0	66.0	111.0	32.0	6.0	16.0	24.0	24.0	542.0
1956	28.0	31.0	24.0	43.0	87.0	38.0	18.0	0.0	5.0	36.0	102.0	24.0	436.0
1957	6.0	36.0	3.0	38.0	144.0	69.0	37.0	29.0	51.0	54.0	9.0	46.0	522.0
1958	36.0	13.0	66.0	159.0	26.0	59.0	64.0	17.0	16.0	45.0	11.0	4.0	516.0
1959	52.0	11.0	27.0	60.0	118.0	33.0	34.0	8.0	61.0	17.0	79.0	-	500.0
1960	-	-	-	-	40.0	52.0	79.0	32.0	6.0	15.0	38.0	70.0	332.0
1961	35.0	24.0	32.0	44.0	72.0	67.0	45.0	31.0	19.0	12.0	25.0	46.0	452.0
1962	7.0	25.0	72.0	55.0	52.0	26.0	28.0	18.0	25.0	65.0	96.0	34.0	503.0
1963	100.0	68.0	36.0	78.0	48.0	65.0	20.0	6.0	33.0	43.0	21.0	29.0	547.0
1964	6.0	32.0	22.0	34.0	70.0	55.0	36.0	38.0	109.0	35.0	55.0	53.0	545.0
1965	22.0	92.0	16.0	55.0	93.0	11.0	34.0	38.0	4.0	0.0	68.0	133.0	566.0
1966	62.0	21.0	38.0	66.0	77.0	77.0	72.0	36.0	28.0	51.0	198.0	113.0	859.0
1967	42.0	19.0	11.0	96.0	34.0	67.0	30.0	22.0	56.0	56.0	8.0	45.0	486.0
1968	47.0	55.0	8.0	6.0	4.0	70.0	38.0	72.0	127.0	11.0	65.0	69.0	572.0
1969	66.0	95.0	57.0	34.0	8.0	81.0	44.0	26.0	76.0	0.0	-	178.0	665.0
1970	21.0	80.0	59.0	42.0	37.0	46.0	8.0	19.0	8.0	64.0	89.0	24.0	497.0
1971	47.0	52.0	70.0	11.0	38.0	92.0	82.0	36.0	64.0	36.0	32.0	22.0	582.0
1972	21.0	30.0	10.0	77.0	33.0	29.0	72.0	13.0	70.0	118.0	19.0	0.0	492.0
1973	47.0	43.0	75.0	82.0	72.0	51.0	147.0	3.0	32.0	33.0	32.0	39.0	656.0
1974	5.0	27.0	40.0	43.0	83.0	31.0	29.0	15.0	30.0	18.0	68.0	37.0	426.0
1975	30.0	82.0	43.0	78.0	111.0	115.0	55.0	110.0	3.0	147.0	50.0	21.0	845.0
1976	10.0	11.0	16.0	54.0	35.0	52.0	98.0	92.0	31.0	66.0	54.0	59.0	578.0
1977	45.0	59.0	8.0	25.0	68.0	104.0	63.0	18.0	36.0	18.0	36.0	17.0	497.0
1978	23.0	69.0	39.0	58.0	121.0	66.0	33.0	28.0	76.0	10.0	10.0	17.0	550.0
1979	68.0	57.0	8.0	35.0	41.0	65.0	96.0	126.0	8.0	77.0	84.0	29.0	694.0
1980													0.0
1981													0.0
1982													0.0
1983													0.0
1984													0.0
1985	35.0	48.5	18.2	71.3	42.0	50.3	14.2	23.4	6.0	10.7	96.4	3.5	419.5
1986	33.1	159.2	3.7	14.5	16.2	66.0	50.0	35.4	19.9	60.7	12.8	28.1	499.6
1987	58.4	38.4	18.6	64.7	30.7	68.1	32.0	22.9	12.2	29.9	34.5	49.6	460.0
1988	7.2	35.5	106.8	32.5	13.8	55.2	0.5	1.5	10.5	34.3	88.6	29.5	415.9
1989	0.0	3.5	67.4	10.8	70.3	56.2	26.9	53.6	43.6	26.7	50.1	63.9	473.0
1990	5.5	6.0	1.3	53.5	68.2	59.1	22.3	7.5	53.4	27.5	19.0	120.8	444.1
1991	9.0	69.4	24.8	34.4	68.4	45.2	78.1	27.8	2.5	54.8	22.0	26.9	463.3
1992	3.1	6.2	40.6	53.1	28.0	93.2	52.8	0.3	8.4	20.8	66.8	11.9	385.2
1993	10.0	25.7	102.6	60.1	82.6	62.1	0.9	48.6	8.1	43.6	64.7	14.2	523.2
1994	13.7	2.7	42.0	72.5	23.1	42.0	61.8	6.3	1.4	71.6	51.3	85.4	473.8
MEAN	31.9	41.1	35.1	50.3	59.0	57.6	46.1	30.8	32.1	40.3	55.9	45.0	525.2

276.0

**TABLE I-3-1 MONTHLY RUNOFF OF STRUMA RIVER  
AT MARINO POLE**

(STATION NUMBER = 51880) (unit : cu.m/s)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1944	55.70	133.00	113.00	172.00	105.00	46.90	130.00	31.00	24.80	12.10	104.00	87.20	84.56
1945	97.10	79.70	105.00	115.00	93.90	26.60	11.00	5.79	16.00	28.90	39.30	58.40	56.22
1946	40.50	58.90	97.80	62.70	112.00	55.10	16.30	12.70	15.40	34.20	62.10	90.20	54.83
1947	38.00	121.00	99.50	58.50	67.10	59.90	42.40	24.90	34.50	41.70	44.90	136.00	64.03
1948	108.00	55.00	80.50	131.00	180.00	196.00	41.70	19.20	13.30	14.50	18.00	17.50	72.89
1949	22.50	20.30	34.70	37.10	44.30	33.50	22.50	21.50	23.60	24.40	46.90	37.80	30.76
1950	37.50	67.70	75.90	127.00	62.30	36.00	9.18	2.91	5.90	17.90	63.40	74.70	48.37
1951	68.10	117.00	165.00	176.00	173.00	105.00	31.30	15.00	21.20	33.30	51.50	39.10	82.96
1952	58.50	79.00	87.20	97.50	68.80	46.60	12.30	4.28	6.77	25.50	58.00	231.00	64.62
1953	165.00	126.00	65.90	99.50	122.00	225.00	93.30	13.70	16.10	32.30	27.20	25.20	84.27
1954	34.80	60.00	271.00	158.00	153.00	102.00	29.30	7.96	8.40	32.80	114.00	98.80	89.17
1955	256.00	139.00	180.00	148.00	150.00	76.40	85.40	33.40	43.50	120.00	100.00	134.00	122.14
1956	86.20	188.00	161.00	258.00	176.00	141.00	58.00	12.60	14.60	24.40	57.00	60.10	102.91
1957	35.00	50.90	46.70	56.60	174.00	239.00	90.00	28.10	48.20	55.80	56.80	79.50	80.05
1958	174.00	84.30	200.00	288.00	185.00	53.20	17.80	15.60	19.80	22.50	30.40	29.30	93.33
1959	34.20	29.40	38.90	49.30	108.00	119.00	53.40	18.50	31.10	35.90	76.30	89.60	56.97
1960	91.70	130.00	116.00	113.00	169.00	114.00	59.20	19.00	29.10	34.00	71.20	146.00	91.02
1961	55.50	55.40	76.50	89.50	212.00	112.00	21.10	6.98	9.92	19.30	54.20	52.90	63.78
1962	50.60	73.70	243.00	214.00	160.00	83.90	17.10	8.06	9.15	19.20	131.00	132.00	95.14
1963	211.00	402.00											306.50
1964													
1965													
1966										21.20	76.00	105.00	67.40
1967	94.70	84.50	104.00	133.00	164.00	128.00	77.60	29.60	27.30	35.50	40.30	51.80	80.88
1968	47.70	106.00	80.20	78.70	82.80	53.60	6.99	26.70	38.90	27.60	46.20	57.50	54.41
1969	112.00	203.00	220.00	196.00	218.00	98.80	47.20	17.00	22.00	24.80	45.80	105.00	109.13
1970	102.00	102.00	180.00	148.00	222.00	128.00	68.60	33.60	39.70	66.80	62.30	63.20	101.35
1971	104.00	65.80	150.00	156.00	149.00	97.30	28.80	21.30	38.50	37.60	38.80	64.60	79.31
1972	43.20	68.00	72.10	82.30	91.30	41.90	18.70	21.90	55.50	295.00	108.00	76.70	81.22
1973	58.50	113.00	145.00	258.00	206.00	84.10	38.90	23.20	34.50	33.70	36.40	91.90	93.60
1974	93.70	109.00	119.00	114.00	238.00	221.00	72.60	17.10	25.10	49.70	60.50	67.30	98.92
1975	65.00	53.20	87.50	85.30	136.00	103.00	70.10	35.30	24.50	55.70	70.40	71.10	71.43
1976	54.40	61.00	51.60	96.70	184.00	186.00	110.00	107.00	43.60	39.50	155.00	206.00	107.90
1977	110.00	257.00	174.00	130.00	124.00	107.00	49.30	191.00	20.60	27.70	44.10	40.40	106.26
1978	63.66	83.87	95.91	156.06	170.18	123.28	36.70	40.44	65.73	57.13	59.36	93.99	87.19
1979	91.61	162.51	134.42	158.21	133.55	79.76	23.52	39.93	35.10	95.20	99.49	90.37	95.31
1980	85.15	85.31	99.82	112.26	281.06	175.78	52.34	28.96	26.01	60.21	79.39	117.61	100.32
1981	78.59	109.64	151.37	97.40	107.66	73.66	39.08	39.72	33.16	38.98	55.28	118.91	78.62
1982	66.67	53.39	94.48	141.18	144.91	74.61	24.58	34.97	25.03	31.81			69.16
1983													
1984													
1985	52.45	36.47	56.43	48.61	69.31	26.87	9.39	8.98	16.59	14.21	43.57	29.84	34.39
1986	36.27	155.94	138.17	70.23	81.53	53.24	29.96	11.49	13.31	17.70	19.59	17.24	53.72
1987	38.70	56.43	62.70	143.24	100.12	82.81	18.01	9.82	8.17	29.55	55.06	60.70	55.44
1988	43.26	52.38	79.17	107.36	106.52	78.26	37.37	7.48	14.19	18.94	40.48	56.68	53.51
1989	29.68	29.44	42.58	41.27	65.54	66.90	36.85	17.78	23.16	72.08	57.24	45.18	43.98
1990	34.30	41.80	37.60	58.80	54.40	42.70	10.40	7.39	9.18	18.50	31.00	72.90	34.91
1991	44.10	61.80	93.10	99.80	200.00	128.00	45.20	24.80	24.30	42.60	69.30	32.50	72.13
1992	23.40	20.90	21.30	77.80	59.40	83.30	56.50	16.70	12.90	12.40	24.10	28.40	38.26
1993	19.60	18.20	49.70	73.30	69.80	26.90	7.57	6.93	8.57	10.90	15.20	20.20	27.24
1994	36.60	30.90	30.30	51.10	57.90	30.50	12.70	9.20	11.50	15.60	18.90	22.90	27.34
MEAN	72.81	93.26	106.85	119.27	134.05	94.81	42.01	25.10	24.14	40.85	59.07	76.07	74.02

**TABLE I-3-2 MONTHLY RUNOFF OF STRUMESHNITZA RIVER  
AT STRUMESHNITZA**  
(STATION NUMBER = 51560) (unit : cu.m/s)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1960													
1961										0.73	4.83	3.33	2.96
1962	4.56	8.44	32.50	16.40	6.62	2.11	0.55	0.43	0.32	1.68	13.80	15.20	8.55
1963	22.00	45.50	30.30	25.70	18.80	15.10							26.23
1964													
1965													
1966													
1967	8.06	4.88	5.28	4.06	3.54	2.11	4.05	1.36	1.07	1.70	2.21	3.10	3.45
1968	4.20	12.00	6.32	2.78	2.48	3.08	0.56	0.26	0.48	0.64	2.46	3.47	3.23
1969	8.68	19.00	19.80	18.60	5.57	2.32	1.52	0.95	1.10	1.60	2.40	10.80	7.70
1970	9.25	8.70	15.40	9.50	9.71	3.38	4.90	0.96	1.02	2.30	1.79	1.99	5.74
1971	4.22	4.26	16.20	13.60	4.11	3.34	1.23	0.93	1.10	1.55	1.90	3.24	4.64
1972	2.99	6.52	7.21	7.65	6.31	1.41	0.77	0.68	2.98	10.30	5.48	4.21	4.71
1973	4.63	11.40	13.90	14.40	6.05	2.00	2.91	1.58	3.15	2.48	2.74	4.51	5.81
1974	5.22	8.61	9.38	9.77	9.20	3.88	0.96	1.09	1.84	1.91	3.37	3.76	4.91
1975	4.97	2.78	4.98	2.80	2.16	1.39	1.02	0.75	0.35	1.53	2.87	2.30	2.33
1976	2.75	3.73	4.56	3.60	5.97	5.97	2.10	1.28	0.57	3.94	17.40	14.30	5.51
1977	8.00	11.70	7.37	4.43	2.12	2.11	0.77	0.62	0.61	0.83	1.25	1.17	3.42
1978	1.78	3.50	2.85	6.71	4.53	3.25	0.30	0.29	0.91	1.87	2.74	5.14	2.82
1979	5.90	9.48	3.64	7.65	4.12	1.31	0.80	0.99	1.37	1.84	6.65	3.48	3.93
1980	6.19	6.25	6.81	5.94	17.22	4.46	1.22	0.91	1.21	5.63	4.53	13.27	6.13
1981	6.88	15.80	15.49	7.24	4.86	2.45	0.99	0.82	1.14	2.21	4.80	13.97	6.37
1982	5.59	3.68	7.90	10.84	10.91	3.03	1.11	1.43	1.27	2.21			4.79
1983													
1984													
1985	6.37	4.60	9.24	5.98	6.46	3.60	0.50	0.20	0.44	0.69	4.21	3.77	3.84
1986	7.45	34.54	16.12	4.62	4.42	3.95	1.55	1.03	0.97	1.14	1.57	1.72	6.59
1987	3.65	5.25	8.03	16.53	5.60	2.60	1.05	0.65	0.80	1.53	3.11	3.20	4.34
1988	2.57	5.49	5.33	4.04	2.34	1.55	0.32	0.35	0.52	0.86	1.67	2.88	2.33
1989	2.33	2.45	2.51	1.77	1.51	0.96	1.50	0.37	0.48	2.31	2.12	1.71	1.67
1990	1.43	2.03	1.60	2.89	1.26	0.65	0.23	0.09	0.14	0.25	0.69	10.70	1.83
1991	3.14	8.57	4.70	5.34	6.65	3.20	1.31	0.72	0.53	1.64	4.01	3.06	3.57
1992	3.20	2.98	2.78	4.45	1.58	2.01	1.26	0.22	0.29	0.81	2.16	4.70	2.20
1993	2.69	2.21	2.81	2.16	1.09	0.62	0.32	0.21	0.36	0.52	0.83	1.11	1.24
1994	3.11	2.65	2.01	3.72	2.63	0.52	0.56	0.27	0.28	0.56	0.67	1.96	1.58
MEAN	5.43	9.17	9.46	7.97	5.63	2.94	1.27	0.72	0.94	1.97	3.79	5.26	4.55

**TABLE I-3-3 MONTHLY RUNOFF OF LEBNITZA RIVER  
AT LEBNITZA**

(STATION NUMBER = 51550) (unit : cu.m/s)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1985	1.52	1.13	2.78	1.77	1.61	1.24	0.43	0.18	0.39	0.36	1.83	1.15	1.20
1986	2.10	15.55	11.24	3.50	5.42	4.08	1.57	0.29	0.21	0.27	0.33	0.33	3.66
1987	0.83	2.78	6.16	8.07	1.55	0.71	0.27	0.11	0.11	0.40	0.78	0.85	1.87
1988	0.48	1.19	2.19	1.90	1.31	1.26	0.46	0.39	0.14	0.19	0.55	1.12	0.93
1989	0.87	1.33	1.70	1.17	0.89	1.19	1.60	0.55	0.45	1.37	0.95	0.83	1.07
1990	0.80	1.13	0.81	2.04	1.61	0.60	0.29	0.30	0.27	0.34	0.41	2.37	0.91
1991	0.70	2.58	2.77	2.59	2.33	0.97	0.53	0.45	0.36	0.49	0.85	0.55	1.28
1992	0.43	0.42	0.46	1.99	1.15	1.00	0.62	0.34	0.37	0.37	0.54	0.90	0.72
1993	0.40	0.38	1.32	1.52	2.07	0.60	0.06	0.01	0.01	0.15	0.32	0.76	0.64
1994	1.62	1.35	1.04	2.28	1.63	0.35	0.40	0.16	0.11	0.23	0.27	0.41	0.82
MEAN	0.97	2.78	3.05	2.69	1.98	1.20	0.62	0.28	0.24	0.42	0.68	0.93	1.31

**TABLE I-3-4 MONTHLY RUNOFF OF ROSITZA RIVER  
AT SEVLIEVD**

(STATION NUMBER = 23500) (unit : cu m/s)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1985	2.11	3.34	3.88	5.88	4.12	4.00	1.68	0.32	0.34	0.21	1.40	0.59	2.31
1986	1.12	8.48	5.90	4.60	3.33	5.55	7.39	0.70	0.20	0.38	0.54	0.34	3.17
1987	0.87	5.98	5.95	24.72	9.12	4.65	12.39	1.16	0.44	0.70	2.86	4.36	6.06
1988	1.55	10.55	21.79	14.09	7.92	16.50	1.85	0.47	0.55	0.66	1.86	4.87	6.85
1989	2.86	1.73	12.45	4.02	7.29	13.64	1.86	0.80	0.85	2.48	3.65	1.12	4.41
1990	4.77	2.98	1.34	1.58	5.89	3.22	0.87	0.56	0.71	0.53	0.61	5.68	2.37
1991	0.99	1.35	4.40	8.14	26.40	10.30	22.20	5.20	1.36	1.53	2.30	1.33	7.20
1992	1.84	2.51	7.01	16.50	4.39	26.20	3.92	0.90	0.44	0.43	0.76	0.82	5.43
1993	0.95	0.98	3.68	7.28	29.40	2.86	1.10	0.29	0.23	0.25	0.48	0.99	4.08
1994	0.55	0.82	2.50	8.47	4.86	4.00	10.70	1.27	0.23	1.29	1.25	3.36	3.30
MEAN	1.74	3.87	6.89	9.53	10.27	9.09	6.38	1.17	0.54	0.84	1.57	2.34	4.52

**TABLE I-3-5 MONTHLY RUNOFF OF TUNDJA RIVER  
AT BANYA**

(STATION NUMBER = 74750) (unit : cu.m/s)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1985	0.23	0.12	0.11	0.51	2.87	17.14	17.00	4.54	1.35	0.46	0.47	0.19	3.77
1986	0.14	1.05	0.49	1.74	13.35	8.61	20.73	10.27	2.89	0.98	0.12	1.10	5.18
1987	0.08	0.06	0.07	0.23	1.97	9.18	28.49	9.55	1.69	0.55	1.49	0.80	4.57
1988	0.16	0.13	0.37	0.30	3.50	11.29	38.66	27.84	4.65	0.45	0.17	0.29	7.39
1989	0.88	1.08	0.49	2.06	7.26	14.67	27.47	9.33	1.77	1.06	0.63	0.48	5.85
1990	0.43	0.42	0.42	0.53	2.16	8.03	22.60	5.45	1.56	1.55	1.55	1.77	3.91
1991	1.53	1.29	0.99	1.05	1.88	12.10	40.00	23.60	10.50	5.08	2.98	2.90	8.74
1992	3.00	3.00	3.00	24.40	24.50	20.30	33.00	29.50	13.40	2.85	1.61	1.81	13.40
1993	1.52	2.16	1.75	1.38	1.40	6.38	25.20	28.50	2.50	2.12	1.54	1.20	6.38
1994	1.38	1.11	0.75	1.29	2.98	7.69	11.10	7.71	2.31	1.01	1.05	0.67	3.28
MEAN	0.93	1.04	0.84	3.35	6.19	11.54	26.42	15.63	4.26	1.61	1.16	1.12	6.23

**TABLE I-3-6 ANNUAL INFLOW AND OUTFLOW OF THE RESERVOIR  
(UNIT : MCM)**

Year	Jrebchevo Dam		Al. Stamboliiski Dam	
	Inflow	Outflow	Inflow	Outflow
1970	457.625	517.916		
1971	308.702	380.110		
1972	329.041	333.042		
1973	531.006	489.087		
1974	216.918	198.863		
1975	265.667	150.286		
1976	219.687	212.558		
1977	298.444	363.768		
1978	277.780	266.396		
1979	269.135	209.280		
1980	460.256	482.282		
1981	335.746	429.010		
1982	243.037	216.332		
1983	163.128	210.643		
1984	363.447	357.827		
1985	109.979	146.009		
1986	190.488	194.086		
1987	206.475	173.725		
1988	287.231	228.731		
1989	102.080	169.667		
1990	82.380	114.521		
1991	492.700	238.403	389.239	247.881
1992	279.286	414.602	275.544	301.786
1993	141.790	228.440	163.063	193.172
1994	85.304	117.680	114.982	113.150
1995	279.710	142.296	330.974	279.642
MEAN	269.117	268.675	254.760	227.126

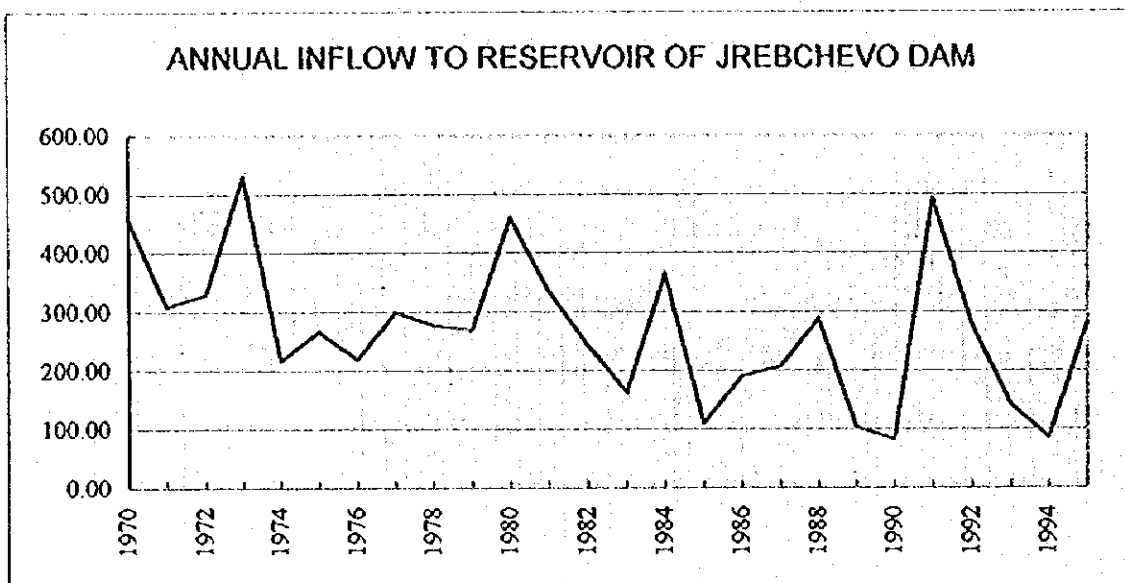




FIGURE I-3-1 ANNUAL MEAN RUNOFF OF STRUMA RIVER AT MARINO POLE

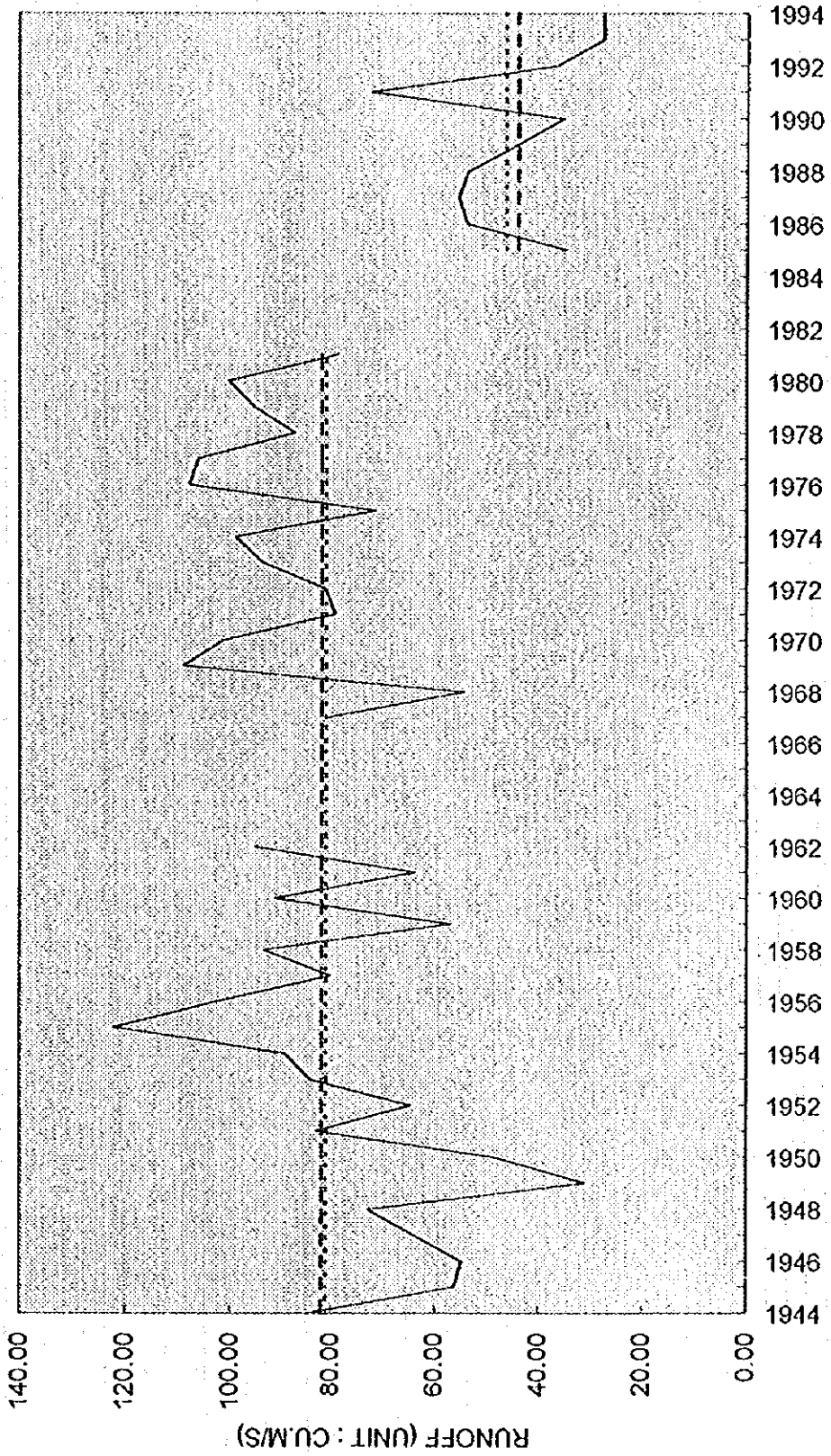


FIGURE I-3-2 ANNUAL MEAN RUNOFF OF STRUMESHNITZA RIVER AT STRUMESHNITZA

