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JAPAN INTERNATIONAL COOPERATION AGENCY

THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA MINISTRY OF DEVELOPMENT

THE STUDY ON INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT MASTER PLAN IN THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

FINAL REPORT

VOLUME V SUPPORTING REPORT 3

PROPOSED PROJECTS AND PROJECT EVALUATION

MAY 1999

NIPPON KOEI CO., LTD. KRI INTERNATIONAL CORPORATION

THE STUDY

ON

ON INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT MASTER PLAN

IN

THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

COMPOSITION OF FINAL REPORT

Volume I Executive Summary

Volume II Main Report

Volume III Supporting Report 1: Sector Study on Current Conditions

Appendix A Meteorology and Hydrology

Appendix B Groundwater
Appendix C Water Quality
Appendix D River Environment

Appendix E Watershed Management and Flood Control

Appendix F Socioeconomic Conditions

Appendix G Law and Institution Appendix H PCM Workshop

Volume IV Supporting Report 2: Water Demand Projection and Water Balance Study

Appendix I Current Condition of Water Utilization

Appendix J Water Demand Projection Appendix K Water Balance Study

Volume V Supporting Report 3: Proposed Projects and Project Evaluation

Appendix L Outline of Projects Evaluation

Appendix M Estimate of Cost, Economic Benefit and Financial Revenue

Appendix N Project Evaluation

Volume VI-1 Data Book: Rainfall and Discharge Records

Appendix O Rainfall and Discharge Records

Volume VI-2 Data Book: Results of Water Balance Study

Appendix P Results of Water Balance Study

Appendix Q Well Inventory
Appendix R Spring Inventory

EXCHANGE RATES

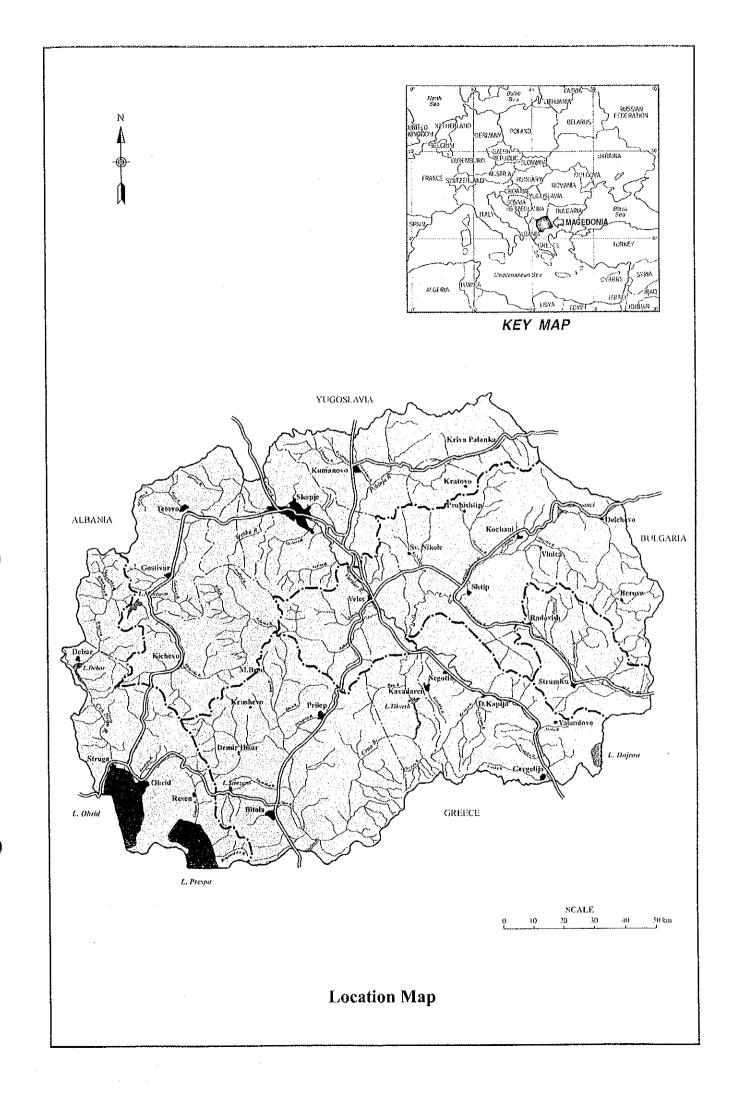
The exchange rates used in this Study are:

US Dollar (US\$)1.00 = Macedonian Denar (MKD) 52.00

Deutsche Mark (DM) 1.00 = Macedonian Denar (MKD) 30.98

as of Jan.1999





THE STUDY

ON

INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT MASTER PLAN

IN

THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

FINAL REPORT

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PROPOSED PROJECTS AND PROJECT EVALUATION

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THE STUDY

ON

INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT MASTER PLAN

IN

THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

FINAL REPORT

ABBREVIATIONS AND ACRONYMS

ACU - Aid Coordination Unit

a.s.l - above sea level

BOD - Biological Oxygen Demand CE(s) - Communal Enterprise(s) DO - Dissolved Oxygen

EBRD - European Bank for Reconstruction and Development

ECM - Electric Power Company of Macedonia

EC - European Community

EL - Elevation

EU - European Union

FRY - Federal Republic of Yugoslavia

FYROM - The Former Yugoslav Republic of Macedonia

GDP - Gross Domestic Product
GEF - Global Environment Facility
GNP - Gross National Product
GOJ - Government of Japan

GOJ - Government of Japan GOM - Government of Macedonia

GTZ - Deutsche Gesellschaft für Technische Zusammenarbeit

HMI - Republic Hydrometeorological Institute

I/R - Interim Report

IEE - Initial Environmental Examination

IBRD - International Bank for Reconstruction and Development

IDA - International Development Association

IMR - Infant Mortality Rate

JICA - Japan International Cooperation Agency

JUS - Jugoslavian Standards

MAFWE - Ministry of Agriculture, Forestry and Water Economy
MCIC - Macedonian Center for International Cooperation

MKS - Macedonian Standards
MOD - Ministry of Development
MOE - Ministry of Economy
MOH - Ministry of Health

MUPC - Ministry of Urban Planning and Construction

MOEn - Ministry of Environment MOS - Ministry of Science

MOFA - Ministry of Foreign Affaires

NDS - National Development Strategy 1997
 NEAP - National Environmental Action Plan 1997
 NEHAP - National Environmental Health Action Plan

NGO(s) - Non Governmental Organization(s)

ABBREVIATIONS AND ACRONYMS (Continued)

ODA - Official Development Assistance
O&M - Operation and Maintenance
PCM - Project Cycle Management
PDM - Project Design Matrix

PDM - Project Design Matrix

PHARE - Pologne et Hongri Aide a Reconstruction Economique

(Poland and Hungary Aid for Economic Reconstruction)

PIP - Program for Public Sector Investment in the Republic of Macedonia 1998-2000

P/R - Progress Report

PWME - Public Water Management Enterprise
RIHP - Republic Institute for Health Protection

S/W - Scope of Work

SS - Suspended Substances

SFRY - Socialist Federal Republic Yugoslavia
UNDP - United Nations Development Program

UNESCO - United Nations Educational, Scientific and Cultural Organization

UNICEF - United Nations Children's Fund
 WHO - World Health Organization
 WDI - Water Development Institute
 WMO(s) - Water Management Organization(s)

WUA(s) - Water Users' Association(s)

WEIGHTS AND MEASURES

Metric System

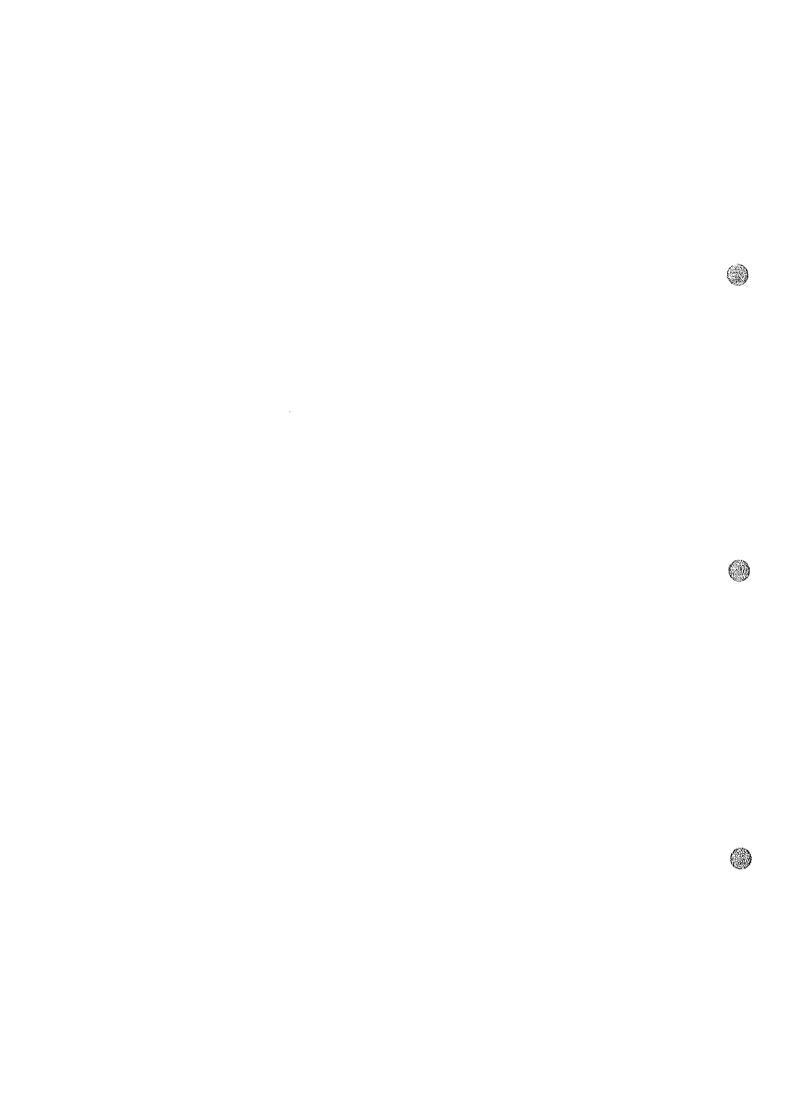
mm - Millimeter(s) ha - Hectare (100m x 100m)
m - Meter(s) l - Liter(s)
m² - Square meter(s) lit/sec (l/sec) - Liter per second

km² - Square kilometer(s) m³ - Cubic meter(s)

lpcd - litre/capita/day m³/sec (m³/s) - Cubic meter(s) per second p.e. - population equivalent

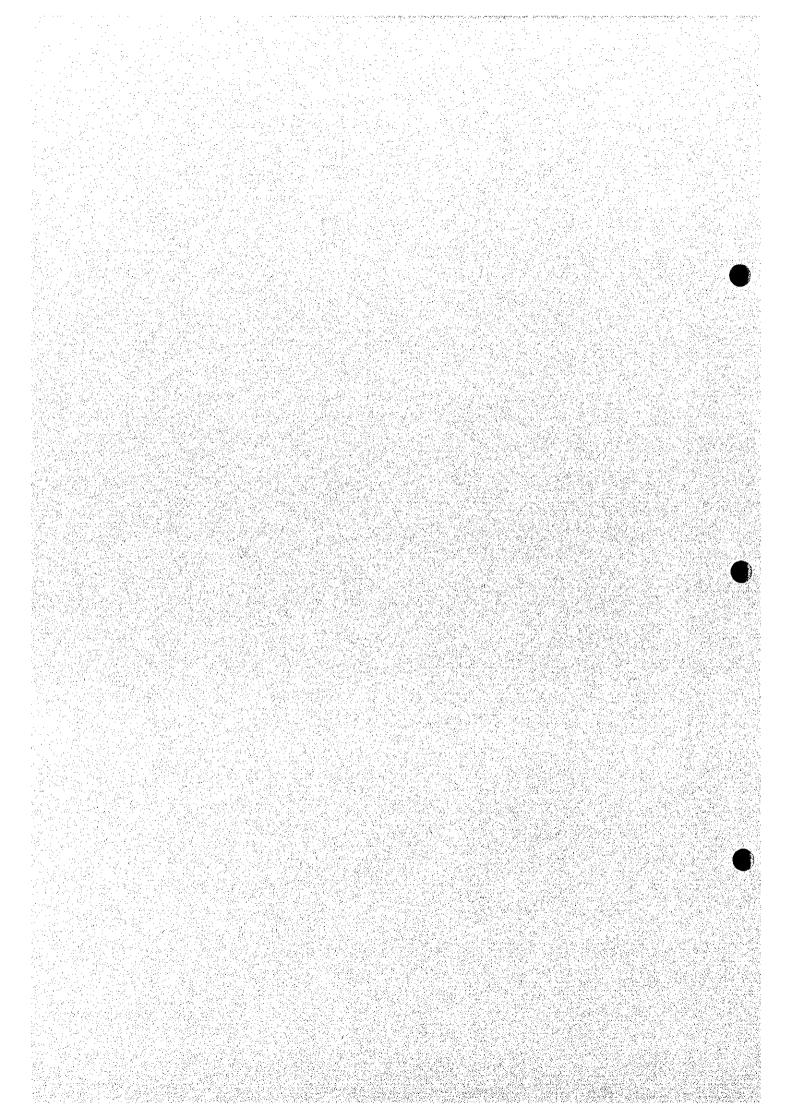
CURRENCY

MKD - Macedonian Denar DM - Deutsche Mark
USD - United States Dollar JPY - Japanese Yen



Appendix L

Outline of Project Evaluation



Appendix L OUTLINE OF PROJECT EVALUATION

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Appendix L OUTLINE OF PROJECT EVALUATION

L.1 General

Based on the water balance calculation and needs of water resources development and water quality conservation in each river basin, development projects were initially studied on their background and feature as proposed ones. As for gathering information on water resources development projects identified in the past, the following study documents and national development plan prepared by the Government were reviewed at initial stages of the Study:

- 1) Integrated Development of the Vardar/Axios River Basin Master Plan
- Program for Public Sector Investment in the Republic of Macedonia (1998 2000)

Apart from the development projects once scrutinized by the above, 44 development projects were identified and selected, and the project evaluation was carried out for getting one of bases for formulation of the Water Resources Development Plan in the Master Plan especially in the aspect of appropriate location of dam sites considering the present condition of inhabitants surrounding the sites, relevant information from the local governments and outcome of the PCM Workshops as well. The selected projects are tabulated in Table L.1 by region, which are grouped into two; one is a group of development projects except for rural water supply projects, and the other is a group of rural water supply projects.

The first group includes 33 projects targeting supply for mainly municipal water, industrial water and agricultural water, and further water supply for hydropower generation to be developed newly as well as water for environmental conservation.

The second group includes 11 rural water supply projects, which were separately investigated and studied from the municipal and industrial water supply and irrigation development projects by the Communal Enterprises(ECs) and Water Management Organizations (presently PWMEs). It is because that development goal and direction, and parameters for improvement of social environment are different each other. In other words, development projects by the CEs are concerned with the improvement of the water services to meet demand on water of the inhabitants. On the other hand, rural water supply projects are more deeply connected with satisfaction of the Basic Human Needs (BHN), such as decrease of infant death rate and acute communicable diseases, etc.

44 projects as selected were evaluated firstly from 6 aspects with tentative prioritization (called as "First/tentative prioritization" hereinafter), then the

results were reviewed from viewpoints of consistency with outputs in the PCM workshops, results of the Initial Environmental Examination(IEE; if Environmental Impact Study or EIS will be required for the next step or not), objectives of the Water Quality Conservation Plan — one of the Water Resources Management Plan — so as to harmonize the projects with environment, and so on (called as "Final prioritization").

The rural water supply projects were evaluated separated from the other projects.

Prior to the project evaluation, estimate of cost and economic benefit/financial revenue was carried out for the next steps.

L.2 Profile and Drawings for Development Projects

Profiles of development projects are compiled in Annex 16 together with drawings, principal features of potential dams, principal features of existing and under construction dams, and project description in the 5 river basins (or region).

The work quantities of development projects were estimated approximately based on the drawings and referring to the profile. Such quantities were used for cost estimate as described in Appendix M. The drawings were prepared based on topographic maps if any available and following to the project dimensions on the Master Plan levels. From these circumstances, there are some differences in an accuracy among quantities of each project, which shall be taken into consideration in the evaluation.

L.3 Preconditions for Development Projects

L.3.1 Preconditions for Municipal and Industrial Water Supply Projects

The water supply projects by ECs, which supply municipal water and industrial water for the urban area and a part of rural area, require development of new water sources as well as water supply system to each households and factories. Improvement projects for the existing facilities were not planned in the Master Plan, of which importance was called for an attention because of data availability and huge/complicated works which need some more time and be carried out separated from formulation of the Master Plan.

L.3.2 Preconditions of Agricultural Water Supply Projects

The water supply projects by PWMEs and/or ECs, which supply agricultural water for the irrigation system, require development of new water sources as well as water supply system to each irrigation area. Improvement projects for the existing facilities were partly included in this Master Plan, because of its cost performance with rather small works for the planning comparing with that for municipal and industrial water supply project on the Master Plan level.

L.3.3 Preconditions of Water Supply Projects for Power Generation and Environmental Conservation

The projects relating to the power generation are just additional and assumed to use surplus water from the above three water use purpose. The project relation to environmental conservation is assumed to supply/discharge water to the polluted river with quantity not less than the biological minimum, which was set at 10 % of the average discharge of the river together with supply of municipal water.

L.3.4 Preconditions on Village Water Supply System

Although the statistical values contain uncertain data, especially village population, as detailed in Annex 17, the coverage rates in 1991 and 1997 can be estimated as follows;

- The coverage rates in rural areas are 20 % contributed by CEs and 55 % by VSs.
- The total population not yet supplied by CEs and VSs is approximately 200,000.
- The total number of villages not yet supplied by CEs and VSs is approximately 700. (VSs: Village Supply(ies))
- Coverage percentage by CEs will be not changed in future, i.e. 20 % up to the final target year 2025.
- Coverage percentage by VSs is 55 % in 1996 and will be increased to 80 % up to the final target year 2025.
- The average daily water consumption in Macedonia is currently about 150 liter/capita. The net domestic water consumption is assumed to be 250 liter/capita and day, which is equivalent to a gross figure after adding communal demands and system losses.
- Details of preconditions on the village water supply system are referred to Annex 17.

L.4 Component of Structures

In the Study, preliminary facility planning and dimensioning structures were conducted to estimate investment cost and operation/maintenance cost of the projects. For that purpose, the following basic configuration was assumed by each type of project, such as municipal/industrial water supply, irrigation water supply and water supply for hydropower projects.

L.4.1 Municipal and Industrial Water Supply Systems

Municipal and industrial water supply systems contemplated in the development projects are divided into the three kinds of structures as follows:

- 1) Water source intake structures
- 2) Water conveying structures
- 3) Water purifying structures

Taking account of the existing dominant systems in Macedonia for municipal and industrial water supply facilities, the following structures for above three components, which is consisting of the whole system, were considered.

- 1) Dam and river intake (or wells)
- 2) Main pipeline (steel or PVC pipe), service reservoir and pumping station
- 3) Filter station

L.4.2 Irrigation Water Supply Systems

The structures for irrigation water supply systems were assumed to be common configuration as same as the existing irrigation systems in Macedonia, such as dam, river intake, main canal, diversion structures, secondary/tertiary canals, pumping facilities and distribution pipe network etc. Regarding the cost estimate of the systems for economic/financial evaluation is described in Appendix M.

L.4.3 Hydropower Generating Facilities

Hydropower development is considered to gain the incremental benefit by implementation of multipurpose projects in the river basin. The scale of power plants attached to the dam project varies from 5,000 to 15,000 kW in terms of installed capacity for total 3 proposed projects. The components of the required structures are intake structure (normally incorporated in dam and reservoir), valve chamber, headrace, surge chamber, penstock, power station and swictchyard etc.

L.4.4 Village Water Supply Systems

The following four (4) types of village water supply systems were designed according to available water sources;

- 1) Spring intake system
- 2) Well/borehole system
- 3) River intake (Tyrolean intake) system
- 4) Mixed system

Details of the above system are shown in Annex 17 including standard drawings of domestic well, spring intakes and Tyrolean intakes.

Table L.1 Projects Identified/Selected for Project Evaluation

River Basin	No.	Code	Project Name	Purpose
except Rural Water	Supp	ly Proj	ects)	
. Vardar River	1/2	A1-1	Water Supply Project for Tetovo - River Pena Intake	M&I
Upper Reach	2/	A1-2	Studena Voda Groundwater Development Project	M
• •	3 4	A1-3	Kichevsko Pole Area Irrigation Rehabilitation Project	RI
	4	A1-4	Construction of By-pass Channel Raven - Rechica	A
		A1-5	Patishka Reka Water Supply Project	M
		A1-6	Paligrad Multipurpose Dam Project	M&I,A,P
		A.1-7	Slupchanka Dam Project	M
		A1-8	Lipkovo - Glaznja Area Irrigation Rehabilitation Project	RI
		A1-9	Kiselichka Dam Project	M&I,A
		A1-10	Vakuf Multipurpose Dam Project	M&I,A,P
			Pelince Dam Project	A
2. Vardar River	1	A2-1	Razlovci Dam Project	M&I,A
Middle Reach		A2-2	Blatec Dam Project	M&I,A
Middle Reach		A2-3	Rechani Multipurpose Dam Project	M&I,A,P
		A2-3 A2-4	Zletovica Multipurpose Dam Project	M&I,A,P
	1	A2-5	Construction of Irrigation of Sub-system	A
	10	A2-3	"Shtipskpo - Pole",left side	
3. Vardar River	+ 17	A3-1	Krapa Dam Project	M&I,A
		A3-1 A3-2	Zhvan Dam Project	A
Lower Reach		A3-2 A3-3	Obednik Dam Project	A
			Kochiste Dam Project	- A
		A3-4		A
		A3-5	Zhurche Dam Project	$\frac{\Lambda}{A}$
		A3-6	Konjarka Dam Project Studencica Supplemental Water Supply Project	M&I
•		A3-7		A
		A3-8	Petrushka Dam Project	$ \frac{A}{A}$
		A3-9	Kovanska Dam Project	M&I,A
÷			Konsko Dam Project	RI
		A3-11	Valandovo Area Irrigation Rehabilitation Project	RI
4. Cm Drim		A4-1	Irrigation System Betterment Project in Resen	RI
<u> </u>	_	A4-2	Ohrid Area Irrigation Rehabilitation Project	M&I,A
5. Strumica		A5-1	Podares Dam Project	M&E
		A5-2	Oraovica Dam Project	RI
		A5-3	Mantovo Area Irrigation Rehabilitation Project	RI
	33	A5-4	Strumica Area Irrigation Rehabilitation Project	
		l	•	
(Rural Water Supp				RS
1. Vardar River		B1-1	Vardar River Upper Reach Rural Water Supply Project	RS
Upper Reach		B1-2		
		B1-3	Regional Water Supply "Petrovec"	RS
		B1-4	Skopje Circle Rural Water Supply Project	RS
		B1-5	Kriva Palanka/Kumanovo Circle Rural Water Supply Project	RS
Vardar River	39	B2-1	Bregalnica River Basin Rural Water Supply Project	RS
Middle Reach		<u> </u>		
3. Vardar River		B3-1	Pelagonia Circle Rural Water Supply Project	RS
Lower Reach		B3-2	Regional Water Supply "Medzitlija"	RS
3/5. Vardar	42	B3-3	Vardar River Lower Reach/Strumica River Basin	RS
River Lower				
	1			
Reach/Strumica	1			
Reach/Strumica 4. Crn Drim	43	B4-1	Southwest Mountainous Area Rural Water Supply Project	RS
		B4-1 B6-1	Southwest Mountainous Area Rural Water Supply Project Nationwide Rural Water Supply Extension/Improvement	RS

Remarks: M: Municiapl, I: Industrial, A: Agricultural, P: Power, E: Environmental,

RI: Irrigation Rehabilitation, RS: Rural Water Supply



Appendix M

Estimate of Cost, Economic Benefit and Financial Revenue

Appendix M ESTIMATE OF COST, ECONOMIC BENEFIT AND FINANCIAL REVENUE

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Appendix M ESTIMATE OF COST, ECONOMIC BENEFIT AND FINANCIAL REVENUE

M.1 General

Cost, economic benefit and financial revenue were estimated prior to the project evaluation, because they play among other important parts for Economical Internal Rate of Return (EIRR) as well as Financial Rate of Return (FIRR), which are estimated based on the economic benefit (B) and economic cost (C) for economical viability and the financial revenue (R) and financial expenditure (E) for financial viability, respectively.

M.2 Estimate of Cost

Cost estimate was carried out multiplying work quantities of major items to unit cost drawn from similar projects.

M.2.1 Estimate of Construction Cost

- (1) Cost Estimate for Development Projects except for Rural Water Supply Construction costs were estimated based on quantity of major items as follows;
- 1) Fill type dam,
- 2) Tyrolean intake,
- 3) Main pipeline,
- 4) Filter station,
- 5) Service reservoir,
- 6) Pumping station

Data referred to for these structures are compiled in Annex 18, together with (i) tariff of electricity, (ii) labour cost, and (iii) Inflation rate (These 3 figures are used in the Project Evaluation in Chapter 9).

(2) Costs Estimate of Rural Water Supply Projects

The construction costs of spring intakes, wells/boreholes, pipelines, reservoirs and filter stations are estimated based on reviews of the technical reports of village water supply systems, which were reported to MUPC to obtain the governmental subsidies.

1) Spring intake

The costs of spring intakes are estimated as follows;

Population	Demand (l/sec)	Cost (10 ³ MKD)
450	1.3	600
1320	3.8	1,000

2) Well/borehole and well-pump station

The cost of well construction is estimated at 20,000 US\$, in the case that the designed well depth with a bottom cap of 1 m for sedimentation is 50 cm, the designed pumping head is 30 m and that the designed diameter of the well is 250 mm.

The construction cost of a well-pump station is estimated at 28,000 US\$, in the case that the well-pump station is designed in a cabin with dimensions of $2 \times 2 \times 2$ m, and that electromechanical equipment (400 V and 50,000 W) is installed.

The costs of an electrical submersible pumps are estimated at 3,400 to 5,100 US\$, in the case that the pumping heads are 25 to 50 m and the pump capacity is 10 l/sec. The electrical pumps require regular maintenance to be done by a mechanic.

3) Pipeline (PVC: Polyvinyl Chloride)

PVC (polyvinyl chloride) pipe is generally adopted in village water supply systems.

- Main pipeline (225 or 125 mm in diameter, 10 or 6-bar waterproof) :5 km
- Secondary pipeline (75 mm in diameter, 6-bar waterproof) :3 km

It is understood that terminal facilities including faucets and pipes in the houses from the secondary network pipelines can be set up by consumers or village people.

The cost of the PVC pipeline network with a diameter of 225 mm is estimated at 13.9x10⁶ MKD, in the case that main pipelines are designed to be 5 km in length, and that secondary pipelines are designed to be 3 km. The cost of the PVC pipeline network with a diameter of 125 mm is estimated at 2.5x10⁶ MKD, in the case that main pipelines are designed to be 1 km in length, and that secondary pipelines are designed to be 1.5 km. The unit prices of pipelines per meter for each diameter are estimated as follows:

Diameter of pipes (mm)	103 MKD/m
75	0.8
125	1.3
225	2.3

4) Reservoir

The capacities of reservoirs are designed to be 20 % of daily maximum water supply volume, which is generally adopted in village water supply systems in Macedonia, to adjust daily unevenness of water demand.

Population of water supply	Capacity (m³)	10 ⁶ MKD
450	50	1.4
1320	130	2.6
5820	350	4.0

5) Filter station

There is no need to construct a filter station in village water supply system in the case that spring water can be utilized as a water source. In the cases of a well/borehole and a river intake as a water source, however, a filter station should be designed to remove iron and manganese and chlorination facility should be necessary for disinfection.

Population of water supply	Capacity (m³/hr)	10 ⁶ MKD
450	10	1.65
1320	20	2.0
5820	40	2.5

(3) Cost Estimate for Water Resources Management Plan

Approximate cost for implementation of the Water Resources Management Plan that is recommended in the Master Plan was estimated preliminarily considering the project scale, amount of instruments and required engineering services for planning/design, etc as shown in Table M.1.

M.2.2 Estimate of Economic Cost

The economic cost was estimated by multiplying the shadow factor (= 0.9) to the direct construction costs obtained as above.

M.3 Estimate of Economic Benefit

(1) Economic benefit for municipality and industrial water supply was estimated based on water tariff.

The market price of water charge is estimated at 18 MKD/m³ for a financial analysis and an economic shadow price of water charge is also estimated at 16.2 MKD/m³.

(2) Economic benefit for agricultural water supply was excluded.

The price of water charge is not accounted in economic analysis, because it is not expected as economic benefit. The details are shown in Annex 19.

(3) Economic benefit for power generation water supply was estimated based on water tariff as shown in Annex 18.

- (4) Economic benefit for rural water supply was estimated as follows.
 - a) Water charge for economic analysis

According to the results of "Water Utilization Survey" by the JICA Study, the willingness to pay for water consumption is 1.5 to 2 times as high as the present average water charge (12 MKD/m³). Therefore, a market price of water charge is estimated at 18 MKD/m³ for a financial analysis and an economic shadow price of water charge is also estimated at 16.2 MKD/m³.

b) Reduction in water-borne diseases

The benefits to the sufferers of water-borne diseases are the estimated reduction in water-borne diseases and the estimated increase in working chance. The benefits from the viewpoint of economic analysis are estimated and calculated as follows,

- Average sufferers of water-borne diseases: 0.15 % of total population
- Average daily earnings: 500 MKD/person
- An average annual business suspension: 7 days/year
- c) Direct income compensation to farmers and foresters

The farmers and foresters, who are working for food and forest production in mountainous and isolated areas, play a great part for environmental protection and conservation of forests and natural landscapes. From the viewpoint of public economy, the farmers and foresters should be compensated for their uncountable contribution to environmental protection and green tourism which urban dwellers will spend in mountainous and agricultural areas. The idea of this compensation to the farmers and foresters has been widely spread in European countries and the policy of the compensation finance or direct income compensation (negative income tax) finance, was accepted by EC countries in 1975.

The benefits of direct income compensation from the viewpoint of economic analysis are estimated and calculated as follows,

- An average family size: 5 persons
- An average amount of direct income compensation: 200 MKD/month/person

(This amount is equivalent to approximately 10% of an average monthly income of one farmer's family.)

These are based on the village water supply inventory as shown in Annex 20.

Results of estimate of economic benefits are shown in Annex 11 for "Financial and Economic Analysis of Projects" for development projects

except for rural water supply projects, and in Annex 12 for those of the rural water supply projects.

M.4 Estimate of Financial Benefit

(1) Financial revenue for municipality and industrial water supply was estimated based on water tariff.

The market price of water charge estimated at 18 MKD/m³ is adopted as the unit financial revenue for financial analysis.

(2) Financial revenue for agricultural water supply was estimated based on water tariff.

The market price of water charge varied by kinds of crops, which are ranging from 4,000 MKD (wheat) to 24,000 MKD (peppers) per hectare, is adopted as the unit financial revenue for financial analysis. The details are shown in Annex 19.

- (3) Financial revenue for power generation water supply was estimated based on water tariff as shown in Annex 18.
- (4) Financial revenue for rural water supply was estimated same as that for municipal and industrial water supply.

Results of estimate of financial benefits are shown in Annex 11 for "Financial and Economic Analysis of Projects" for development projects except for rural water supply projects, and in Annex 12 for those of the rural water supply projects.

Table M.1 Preliminary Cost Estimate of Water Resources Management Plan

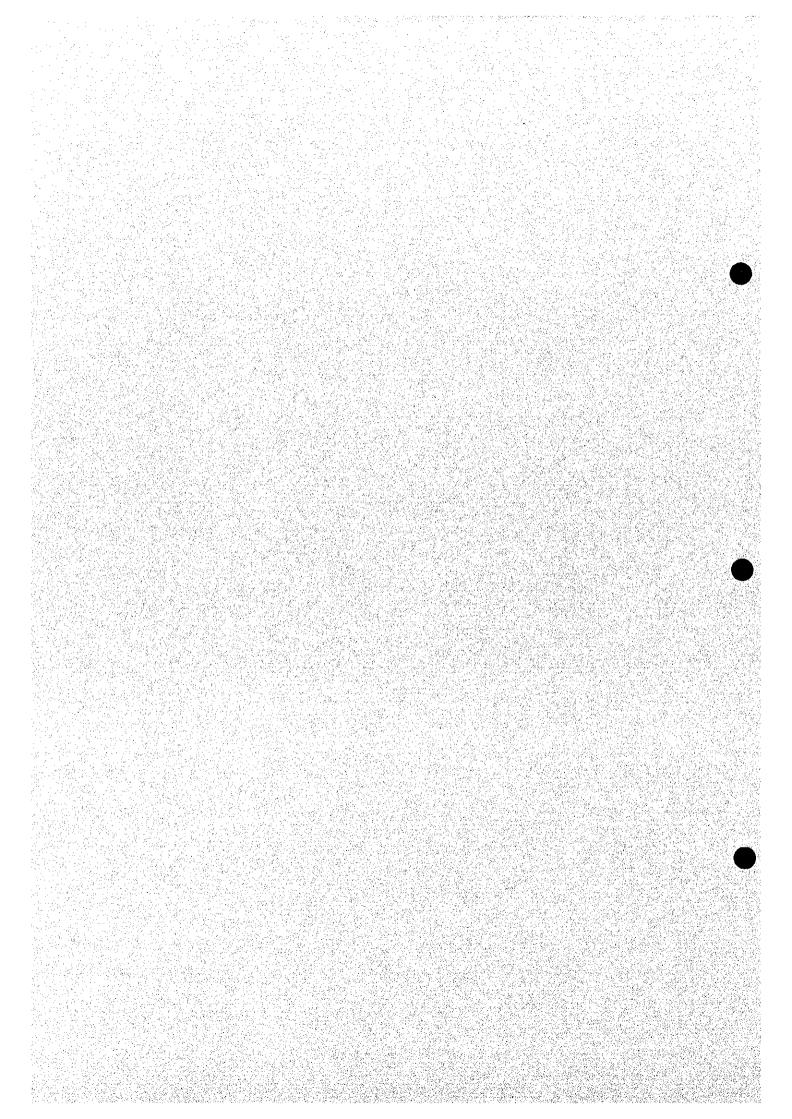
Unit:US\$ mil.

			Unit:US\$ mil.
Plan	Quantity	Unit cost	Amount
1 Water Quality Conservation Plan	-	<u>.</u> ·	217.00
2 Watershed Conservation Plan	19 projects	10.0	190.00
3 Surface Water and Groundwater Monitoring			
System Improvement Plan			
(a) Water Level Monitoring Network			·
Improvement and Expansion Plan			
·Limunigraph (including installation cost)	12nos.	0.025	0.30
Preparation of data bank system	-	L.S.	1.00
•Development of software	•	L.S.	0.50
•Engineering services (for planning/design)	30M/M	0.02	0.60
Subtotal			2.40
(b) Flood Forecasting and Warning System			
Enhancement Plan			
•Telemetering gauging stations	28nos.	0.025	0.70
•Transmission and telecomunication facilities	•	L.S.	5.00
• Development of software	· =	L.S.	0.50
•Engineering services (for planning/design)	100M/M	0.02	2.00
Subtotal	<u> </u>		8.20
(c) Surface Water Quality Monitoring			
Network Enhancement Plsn			
· Water quality monitoring instruments	10sets	0.02	0.20
•Engineering services (for planning/design)	30M/M	0.02	0.60
Subtotal			0.80
(d) Groundwater Monitoring Network Enhancement Plan		L.S.	50.00
Total			61.40
4 Water-related Facilities Operation and Mainten	ance Improvem	ent Plan	
(a) Operation and Maintenance Manual of Water Supply Facilities	20 M /M	0.02	0.40
(b) Operation and Maintenance Manual of	30M/M	0.02	0.60
Dam and Appurtenant Structures (c) Operation and Maintenance Manual for	30M/M	0.02	0.60
Irrigation Facilities			
Total			1.60
Grand total			470.00

Remarks: M/M, mon-month

Appendix N

Project Evaluation



Appendix N PROJECT EVALUATION

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Appendix N PROJECT EVALUATION

N.1 Guideline of Evaluation

The selected projects were firstly evaluated from the six following aspects:

- (1) Economic aspect
- (2) Financial aspect
- (3) Technical aspect
- (4) Social Aspect
- (5) Institutional aspects, as well as
- (6) project priority previously given by the Macedonian side through the Program for Public Sector Investment in the Republic of Macedonia 1998 – 2000 (PIP).

Then with the above results, the comprehensive evaluation was conducted to understand the general trend and to detect abnormal factors through a rough rating of the project based on the results of the six aspects evaluation. The selected projects were tentatively prioritized (called as "First/tentative prioritization" hereinafter) following the results of the comprehensive evaluation.

The rural water supply projects, to be developed in a mountainous and/or border area far from the urban area, were evaluated separated from the other projects, considering their service in the interest of the public to meet needs in the communities and relatively low-level performance of the economical and financial evaluation. Further, BHN was given the top priority in the social aspect, which is the main criteria in the evaluation.

44 projects as evaluated through the "First/tentative prioritization" hereinafter), were further reviewed from viewpoints of consistency with outputs in the PCM workshops, results of the Initial Environmental Examination (IEE; if Environmental Impact Study or EIS will be required for the next step or not), objectives of the Water Quality Conservation Plan – one of the Water Resources Management Plan – so as to harmonize the projects with environment, and so on (called as "Final prioritization").

The evaluation criteria is tabulated below;

Evaluation Criteria

1. First/tentative prioritization

No.	Aspect	Criteria	Ranking
(1)	Economical	EIRR more than 15% (8%)	Α
` '		EIRR 8 – 15% (4 - 8%)	В
		EIRR less than 8 % (4%)	С
(2)	Financial	FIRR more than 15% (8%)	Α
` '	·	FIRR 8 – 15% (4 - 8%)	В
		FIRR less than 8 % (4%)	С
(3)	Technical	Difficulty of technique adopted in construction	A/B/C
		-judged through common sense internationally recognized	
(4)	Social	1) Social contribution/satisfying development need (except for Rural Water Supply Project)	A/B/C
		2) Satisfying Basic Human Need (BHN) (for Rural Water Supply Project)	A/B/C
(5)	Organizational	Current organization/reinforcement/new organization/combination of organization	A/B/C
(6)	Priority in Macedonia	1) Listed up in PIP	A/B/C

Note: Figures of EIRR and FIRR in parentheses are those for rural Water Supply Projects

2. Final prioritization

No.	Viewpoints	Criteria	Ranking
(1)	First Evaluation	1) Results of 1.	
(2)	Output in PCM Workshop	2) Consistency with output from PCM Workshop	_
(3)	IEE	3) Necessity of EIS in the next steps	_
(4)	Water Quality Conservation Plan	4) Harmony with environment	_
(5)	Others	5) Donors' activity, and so on	~

In preparation of the table, criteria adopted by other donor's such as the World Bank were referred to.

N.2 First/tentative Prioritization

N.2.1 Economical Evaluation

The economical viability was checked with EIRR calculated based on the economic cost and benefit as obtained in Appendix M. The results are shown in Annex 11 for development projects except for rural water supply project, and in Annex 12 for development projects for rural water supply project.

N.2.2 Financial Evaluation

The financial viability was checked with FIRR calculated based on the economic cost and benefit as obtained in Appendix M. The results are shown in Annex 11 for development projects except for rural water supply project, and in Annex 12 for development projects for rural water supply project.

N.2.3 Technical Evaluation

Technical evaluation was made based on the difficulty of techniques adopted in construction, which was judged through common sense internationally recognized, and so on. The results are shown in Annex 13.

N.2.4 Social Evaluation

Social evaluation was made based on social contribution/satisfying development need except for rural water supply project, and so on. Satisfying Basic Human Need (BHN) was given the top priority in the evaluation of rural water supply project. The results are shown in Annex 14.

N.2.5 Institutional Evaluation

Institutional evaluation was made based on if the project can be managed by the current organization or not, and so on. The results are shown in Annex 15.

N.2.6 Government Priority in PIP

Development projects were checked whether it they are listed up in the PIP or not. Among the 44 development projects, the following projects are listed up in PIP (1998 - 2000);

- 1) A part of the Rechani Multipurpose Dam Project (A2-3: code in the Master Plan)
- 2) Studencica Supplemental Water Supply Project (A3-7: do -)

These projects (1 to 2) are provided with the foreseen financing

- 3) Patishka Reka Water Supply Project (A1-5)
- 4) Zletovica multipurpose dam project (A2-4: do -)
- 5) Konsko Dam Project (A3-10: do -)
- 6) Construction of By-pass Channel Raven Rechica (A1-4: do -)
- 7) Construction of Irrigation Sub-system Shtipsko Pole, left side (A2-5)

These projects (3 to 7) have not been provided with the financing yet.

N.2.7 Results of First Prioritization

44 projects were comprehensively evaluated and classified into in three ranks of A (high: 13 projects), B(medium: 19 projects) and C (low: 12 projects) as shown in Table N.1, then they were put into the final prioritization.

N.3 Final Prioritization

Final prioritization was carried out from view points of (i) consistency with output from PCM workshop, (ii) Necessity of EIS (Environmental Impact Study) based on results of IEE (Initial Environmental Examination), (iii) Harmony with environment so as to conform the Water Quality Conservation Plan, one of the Water Resources Management Plan, and so on. Further, Village Water Supply Program 1998-2000 by MCIC (Macedonian Center for International Cooperation), as sown in Annex 21, are also referred to for final prioritization of the rural water supply project.

As the results of the final prioritization as shown in Table N.1, the following projects are ranked as "A" with high priority and will be proposed to be implemented in the PHASE I (1999 -2005).

Development Projects Ranked "A" and Proposed in PHASE I (1999 - 2005)

River Basin	Project Name (No.)	Purpose
Vardar River Upper Reach	1) Water Supply Project for Tetovo - River Pena Intake(1)	M&I
	2) Kichevsko Pole Area Irrigation Rehabilitation Project(2)	RI
	3) Patishka Reka Water Suply Project (3)	M
	4) Slupchanka Dam Project (4)	M
	5) Treska River Upper Reach Rural Water Supply Project(34)	RS
	6) Skopje Circle Rural Water Supply Project(35)	RS
	7) Kriva Palanka/Kumanovo Circle Rural Water Supply Project(36)	RS
2. Vardar River Middle Reach	1) Zletovica Multipurpose Dam Project	M&I
3. Vardar River Lower Reach	1) Valandovo Area Irrigation Rehabilitation Project (6)	RI
	2) Pelagonia Circle Rural Area Water Supply Project (37)	RS
4. Crn DrimRiver	1) Irrigation System Bettrement Project in Resen (30)	RI
5. Strumica River	1) Oraovica Dam Project (34)	M&E

(M:Municipal water, I:Industrial water, RI:Irrigation rehabilitation, RS: Rural water supply,

Among 44 projects, the Oraovica Dam Project ranked as "B" in the first prioritization was advanced to rank "A" because of its contribution to environmental conservation in the Strumica river, which is polluted as severe as BOD more than 20, while 2 rural water supply projects – regional water supply "Petrovec" and that "Medztlija" were incorporated into the Skopje Circle Rural Water Supply Project and Pelegonia Circle Rural water Supply Project respectively, considering their almost same ranking, adjacent situation and small size of the former comparing with the latter one (ref. Table N.2).

P: Water supply for power generation, E: Water supply for environmental conservation)

Table N.1 Result of Project Evaluation (1/2)

Municipal, industrial, agricultural water and hydropower development project

Ivauricipus, in		, <u> 6'</u>	cultural water and nyuropower development project					Initial Evaluation	on .			Second Evaluation		
River Name	No.	Code No.	Project Name	Purpose	Economic	Financial	Technical	Institutional	Social	Priority in Macedonia	Overail	РСМ	Environme ntal (IEE)	Final
Vardar River	1	A1-1	Water Supply Project for Tetovo - River Pena Intake	M&I	Α	A	В	В	A	С	A			A
Upper Reach	2	A1-2	Studena Voda Groundwaer Development Project	M	В	В	A	В	A	С	В			<u>B</u>
Oppor Roses	3		Kichevsko Pole Area Irrigation Rehabilitation Project	RJ	A	A	В	В	В	<u> </u>	A			A
	4	A1-4	Construction of By-pass Channel Raven Rechica	A	С	С	С	В	С	В	<u> </u>		_	<u>C</u> _
	5		Patishka Reka Water Supply Project	М	Α	В	A	В	A	В	A	A		A
	6		Paligrad Multipurpose Dam Project	M & 1,A,P	В	С	A	В	A	С	В	<u> </u>		В
	7		Slupchanka Dam Project	M	Α	В	A	Α	Α	C	A	A		A
•	8	A1-8	Lipkovo - Glaznja Area Irrigation Rehabilitation Project	RI	В	В	В	В	В	С	В	A		В
	9		Kiselichka Dam Project	M&A	В	В	B	В	Α	C	B	A	EIS	В
	10		Vakuf Maltipurpose Dam Project	M & 1, A,P	В	В	В	C	A	<u> </u>	В	A	EIS	В
	11		Pelince Dam Project	A	С	С	С	В	B	С	С		<u> </u>	С
Vardar River	12		Razlovci Dam Project	M&I, A	В	В	В	В	A	C	В			В
Middle Reach	13		Blartec Dam Project	M & I, A	С	С	В	В	<u>B</u>	<u> </u>	<u>C</u>	A	EIS	C
Alddio Acoon.	14		Rechani Multipurpose Dam Project	M & 1, P	С	С	В	<u>C</u>	Α	A	B	A	_	В
	15		Zletovica Multipurpose Dam Project (Phase I)	M&I	В	В	A	A	A	В	<u>A</u>	A	_	A
	16		Construction of Irrigation Sub-system Shtipsko Pole, left side	A	A	В	В	В	В	В	В			В
Vardar River	17		Krapa Dam Project	M & I, A	С	C	С	В	В	C	C	B	EIS	C
Lower Reach	18		Zhvan Dam Project	A	В	В	C	С	С	C	С	A	EIS	C
201121 200001	19		Obednik Dam Project	A	С	С	C	С	C	C	C	A	EIS	<u> </u>
	20		Kochishte Dam project	Α	С	С	C	C	C	c	C	Α	EIS	C
	21		Zhurche Dam Project	A	С	С	С	С	<u> </u>	С	<u>C</u>	A	EiS	<u>c</u>
	22	A3-7	Konjarka Dam Project	A	В	С	С	В	С	С	<u> </u>	A	EIS	<u>c</u>
	23	A3-8	Studencica Supplemental Water Supply Project	M & I	С	С	В	B	В	A	В	A		В
	24	A3-9	Petrushka Dam Project	A	В	С	С	В	С	C	C	A	EIS	<u>C</u>
	25	A3-10	Kovanska Dam Project	Α	C.	С	В	В	В	C	В	A	EIS	В
	26	A3-11	Konsko Dam Project	M & I, A	В	С	В	В	A	В	В	A	EIS	В
	27	A3-12	Valandovo Area Irrigation Rehablitaion Project	RI	A	A	В	В	В	C	A	В	-	A
Crn Drim	28	A4-1	Irrigation System Betterment Project in Resen	RI	A	A	A	В	В	C	A			A
River Basin	29		Ohrid Area Irrigation Rehabilitation Project	RI	В	В	В	В	В	<u> </u>	В			В
Strumica River	30	A5-1	Podares Dam Project	M & I,	С	C	В	В	B	C	<u> </u>	Α	EIS	<u>C</u>
Basin	31	A5-2	Oraovica Dam Project*)	M&E	В	В	A	В	A	C	В			A
	32	A5-3	Mantovo Area Irrigation Rehabilitation Project	RJ	В	В	В	В	В	C	<u>B</u>	A		В
	33		Strumica Area Irrigation Rehabilitation Project	RI	В	В	B	B	A	C	В	<u> </u>		В

^{*):} Aming at abatement of pollution in the international river that is deteriorating water quality and at harmonizing with river environment, the Rahk B was raised to Rank A.

^{#,} Relation with the "Program for Public Sector Investment of Macedonia 1998 - 2000".

EIS: Environmental Impact Survey to be conduced as the result of the Initial Environmental Examination (IEE)

M: Municipal, I: Industrial, A: Agricultural, P: Power, E: Environmental, RI: Irrigatin rehabilitation

Table N.1 Result of Project Evaluation (2/2)

Rural water supply project

Rural water s	Suppry	proje		·	1			Initial Evaluation	on			Sec	ondary Evalua	stion
River Name	No.	Code No.	Project Name	Purpose	Economic	Financial	Technical	Institutional	Social	Priority in Macedonia	Overall	РСМ	Environme ntal (IEE)	Final
Vardar River	34	B1-1	Vardar River Upper Reach Rural Water Supply Project	RS	Α	С	В	С	В	С	В			В
			Treska River Upper Reach Rural Water Supply Project	RS	С	С	В	c i	Α	С	A	A	_	A
Upper Reach	35			RS	Α	C	A	С	В	A	A	A	T -	A 1)
	36		Petrovec Rural Water Supply Project*1)	RS	T A	<u> </u>	В	c ·	A	С	A	A		A
	37	B1-5	Skopje Circle Rural Water Supply Project		В	-	В	Č	A	c	A	A		A
	38	B1-6	Kriva Palanka/Kumanovo Circle Rural Water Supply Project	RS	<u> </u>		<u>D</u>			 				
Vardar River Middle Reach	39	B2-1	Bregalnica River Basin Rural Water Supply Project	RS	С	С	В	С	A	С	В	A	_	В
Vardar River	40		Pelagonija Circle Rural Water Supply Project	RS	С	С	В	C ·	Α.	С	A	A	_	A
Lower Reach	40		Medzitlija Rural Water Supply Project*2)	RS	С	С	В	С	B	A	Α	Α		A*2)
Vardar River	41		Vardar River Lower Reach/Strumica River Basin Rural Water Supply Project		В	С	В	С	В	В	В	A	_	В
Lower Crn Drim River	43	B4-1	Southwest Mountains Area Rural Water Supply Project	RS	С	С	В	С	В	В	В	-		В
Nationwide	44		Nationwide Rural Water Supply Extension/Improvement Project	RS	Α	· c	В	С	С	С	C		<u> </u>	С

^{*1):} Considering the size of the project, this is integrated in (B1-5). (The result of the initial evaluation is "A")





^{*2):} Considering the size of the project, this is integrated in (B3-1). (The result of the initial evaluation is "B")

Table N.2 Projects in Water Resources Development

hase	River Basin	No.	Project Name (Code)	Purpose
	pt Rural Water Supp	ly Proj	ject)) / O. I
I	Vardar River	1 W	Vater Supply Project for Tetovo - River Pena Intake (A1-1)	M&I
	Upper Reach	2 K	ichevsko Pole Area Irrigation Rehabilitation Project (A1-3)	RI
			atishka Reka Water Supply Project (A1-5)	M
		4 S	lupchanka Dam Project (A1-7)	M
	2. Vardar River	5 Z	lletovica Multipurpose Dam Project (Phase I) (A2-4)	M&I
	Middle Reach		The Control Delication Designs (A2.11)	RI
	Vardar River Lower Reach	6 V	alandovo Area Irrigation Rehabilitation Project (A3-11)	Ki
	4. Cm Drim	77.	rrigation System Betterment Project in Resen (A4-1)	RI
	5. Strumica		Praovica Dam Project (A5-2)	M&E
	01 011 -111111	- 00	Studena Voda Groundwater Development Project (A1-2)	M
II	1. Vardar River		Paligrad Multipurpose Dam Project (A1-6)	M&I,A,P
	Upper Reach	10 1	ipkovo - Glaznja Area Irrigation Rehabilitation Project (A1-8)	RI
:		111	ipkovo - Glaznja Area irrigation Kenaomation Project (A1-6)	M&I,A
		12 K	Kiselichka Dam Project (A1-9)	M&I,A,P
			Vakuf Multipurpose Dam Project (A1-10)	M&I,A
	Vardar River		Razlovci Dam Project (A2-1)	
	Middle Reach	15 F	Rechani Multipurpose Dam Project (A2-3)	M&I, P
			Construction of Irrigation of Sub-system	A
		H	Shtipsko Pole", left side (A2-5)	
	3. Vardar River	17 5	Studencica Supplemental Water Supply Project (A3-7)	M&I
	Lower Reach	181	Kovanska Dam Project (A3-9)	A
			Konsko Dam Project (A3-10)	M&I,A
	4. Crn Drim	20 0	Ohrid Area Irrigation Rehabilitation Project (A4-2)	RI
	5. Strumica	21 1	Mantovo Area Irrigation Rehabilitation Project (A5-3)	RI
	J. Strumoa	22 5	Strumica Area Irrigation Rehabilitation Project (A5-4)	RI
III	1. Vardar River	23 (Construction of By-pass Channel Raven - Rechica (A1-4)	A
111			Pelince Dam Project (A1-11)	A
	Upper Reach 2 Vardar River		Blatec Dam Project (A2-2)	M&I,A
	Middle Reach	23	Blatec Dail Froject (A2-2)	,
	3. Vardar River	26	Krapa Dam Project (A3-1)	M&I,A
	LowerReach		Zhvan Dam Project (A3-2)	Α
	HOW CITCULON		Obednik Dam Project (A3-3)	Α
			Kochiste Dam Project (A3-4)	A
			Zhurche Dam Project (A3-5)	A
			Konjarka Dam Project (A3-6)	Α
			Petrushka Dam Project (A3-8)	A
ļ	A. C. D.	32	retiustika Datii i Toject (135 0)	-
	4. Cm Drim	22	Podares Dam Project (A5-1)	M&I,A
	5. Strumica	33	rodates Dain Floject (A3-1)	, ,
(Ru	। ral Water Supply Pro	oject)		
1	1. Vardar River	34	Treska River Upper Reach Rural Water Supply Project (B1-2)	RS
ĺ	Upper Reach	35	Skopje Circle Rural Water Supply Project (B1-4)*1)	RS
		36	Kriva Palanka/Kumanovo Circle Rural Water Supply Project (B1-5)	RS
	3. Vardar River	37	Pelagonia Circle Rural Water Supply Project (B3-1)*2)	RS
	Lower Reach	[]		
II	1. Vardar River	38	Vardar River Upper Reach Rural Water Supply Project (B1-1)	RS
111	Upper Reach	"	Traduct 10 to to opport 100000 100000 100000 100000 100000 1000000	
	2. Vardar River	1 30	Bregalnica River Basin Rural Water Supply Project (B2-1)	RS
	Middle Reach	"	ProButtion rates proper years a select a solution of	
İ		40	Vardar River Lower Reach/Strumica River Basin (B3-3)*3)	RS
	3/5. Vardar	40	Address Mact Towel Medell Principle Mater Desir (D2-2)	
1	River Lower		•	
1	Reach/Strumica	i i		
			Tall 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	4. Crn Drim	41	Southwest Mountainous Area Rural Water Supply Project (B4-1)*4)	RS
III	4. Crn Drim	41	Southwest Mountainous Area Rural Water Supply Project (B4-1)*4) Nationwide Rural Water Supply Extension/Improvement Project (B6-1)	RS

Remark: M: Municipal, I: Industrial, A: Agricultural, P: Power, E: Environmental, RI: Irrigation Rehabilitation

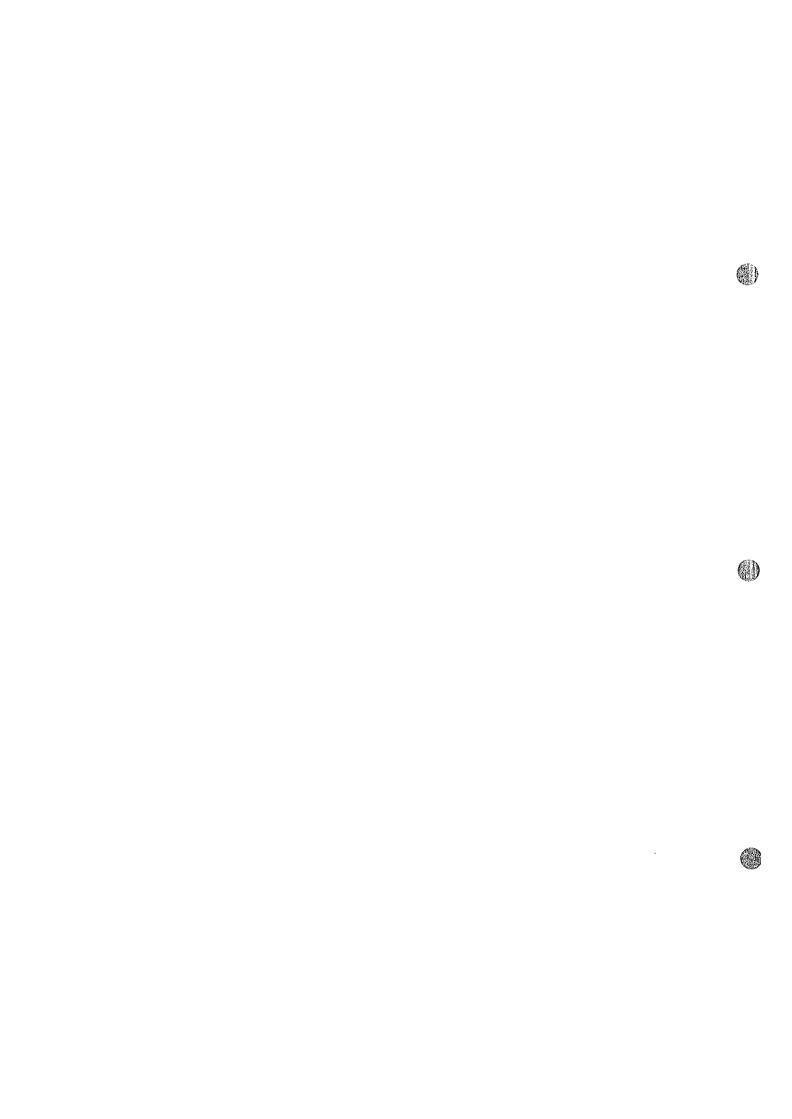
^{*1):} includes Regional Water Supply "Petrovec" (B1-3)

RS: Rural Water Supply

^{*2):} includes Regional Water Supply "Medzitlija" (B3-2)

^{*3):} includes Regional Water Supply "a part of Grvgelija, Bogdanci, Dojran and Valndovo"

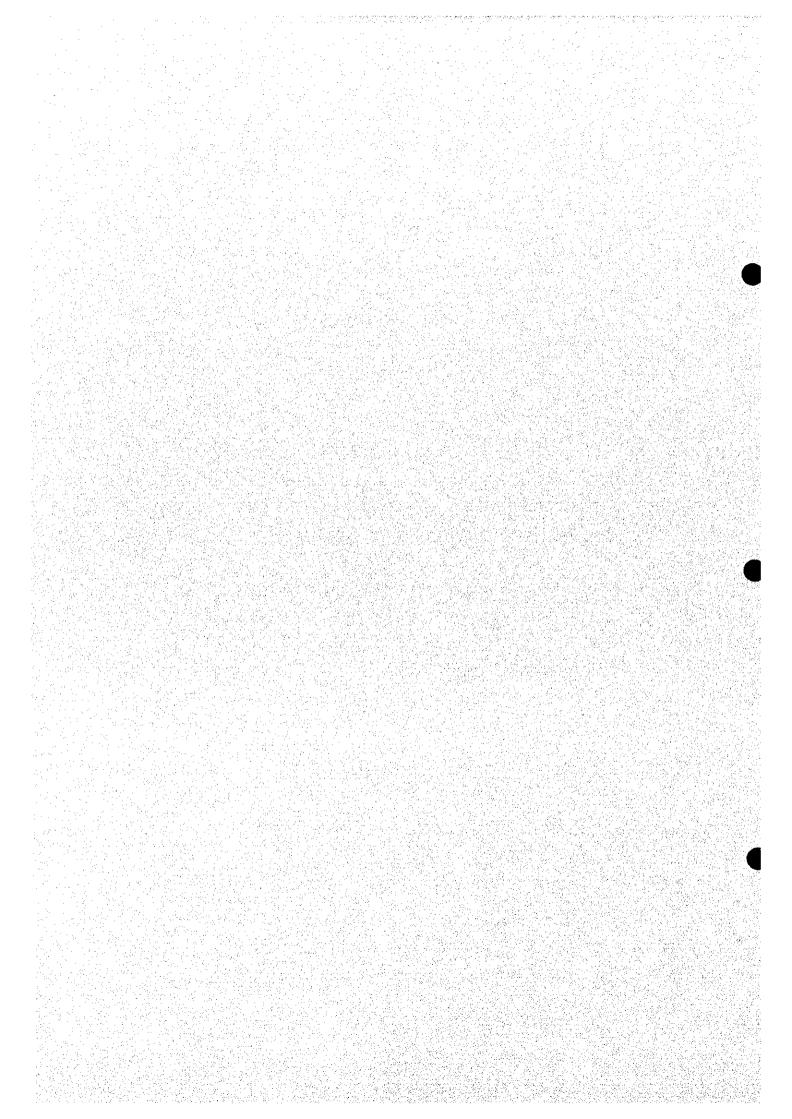
^{*4):} includes Regional Water Supply "Belchista"



Annex 11

Financial and Economic Analysis

(Except for Rural Water Supply Project)



								Sheet No.	<u> </u>
Name of Project:	Water Supply F	roject for	Teto	vo - River P	ena Intake	,			
COST		Work qua	ntity	Unit p	orice	Am		Total a	
Item		Amount	Unit	D/C (MKD)	F/C (USS)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
1. Direct construction co	st								
1.1 Civil work]			
1.1.1 Preparatory worl							!		
1.1.2 Main construction									
(1) Tyrolean intake (Q	(=400lit/s)	lno.						i 1	71
(2) Filter station(Q=20	Olit/s)	lno.					,		1,160
(3) Pipeline		10.0							305
(4) Power supply and	control		L.S.						7
(5) Labolatory		lno.						ŀ	457
Sub-total (Civil work co	ost)								2,000
									100
1.2 Mechanical work									100
1.3 Electrical work									2 100
Sub-total (Direct construction	on cost)							 	2,100
	·	<u> </u>	ļ	ļ		<u></u>		 	1.051
Indirect cost (50% of	Direct construction	cost)	<u>l</u>	<u> </u>		ļ		 	1,050
(including land acquis			ering to	ee,		 	ļ	 	
administration cost an		lingencies)				1		1 .	21/
3 Annual O/M cost (10	% of C/W cost)	<u> </u>	├ —					 	3,150
nancial cost			1						2,83
			<u>i </u>	(Jan.15, 199	9 by The Na	tional Bank)			
nditions: a. Exchage rate: US\$1.	0= MKD52	Unit rate		Quantity	9 by The Na	tional Bank)			umount
nditions: a. Exchage rate: US\$1.0 BENEFT Item	0= MKD52				9 by The Na	tional Bank)		Total a	
a. Exchage rate: US\$1.0 BENEFT Item Economic benefit	0= MKD52 T	Unit rate		Quantity	9 by The Na	tional Bank)			umount
a. Exchage rate: US\$1.0 BENEFI Item Economic benefit Water charge (CE Te	0= MKD52 T	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.)	amount (US\$10 ³)
nditions: a. Exchage rate: US\$1.0 BENEFT Item Economic benefit	0= MKD52 T	Unit rate		Quantity		tional Bank)			amount (US\$10 ³)
a. Exchage rate: US\$1.0 BENEFI Item Economic benefit Water charge (CE Te	0= MKD52 T	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.)	amount (US\$10 ³)
a. Exchage rate: US\$1.0 BENEFI Item Economic benefit 1 Water charge (CE Tetal) 1.1 Domestic water	0= MKD52 T	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.)	amount (US\$10 ³)
BENEFT Item Economic benefit Water charge (CE Tell.) 1.1 Domestic water	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.)	amount (US\$10 ³)
BENEFT Item Economic benefit Water charge (CE Tell 1.1 Domestic water Sub-total Financial benefit (rev	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.)	amount (US\$10 ³)
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.)	umount (US\$10 ³) 71
a. Exchage rate: US\$1.0 BENEFT Item Economic benefit 1 Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit 1 Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev 1 Water charge (CE Te 1.1 Domestic water	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10 ³ m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te	0= MKD52 T tovo)	Unit rate (MKD/m³)		Quantity (10³m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71'
BENEFI Item Economic benefit Water charge (CE Teters) 1.1 Domestic water Sub-total Financial benefit (revolution of the control of the	0= MKD52 T tovo) enue) tovo)	Unit rate (MKD/m³) 16.2		Quantity (10³m³/year) 2,300		tional Bank)		(MKD.mil.) 37.3	umount (US\$10 ³) 71'
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te 1.1 Domestic water Total	0= MKD52 Tovo) enue) tovo)	Unit rate (MKD/m³) 16.2 18.0		Quantity (10 ³ m³/year) 2,300 2,090				(MKD.mil.) 37.3	umount (US\$10 ³) 71'
BENEFI Item Economic benefit Water charge (CE Te 1.1 Domestic water Sub-total Financial benefit (rev Water charge (CE Te 1.1 Domestic water	0= MKD52 T tovo) enue) tovo)	Unit rate (MKD/m³) 16.2 18.0 18.0	5 US\$	Quantity (10 ³ m³/year) 2,300 2,090		÷ 2,54	us\$10 ³	(MKD.mil.) 37.3	umount (US\$10 ³) 71'

B-C: B/C: EIRR:

2

COST			velopment l	10,000				
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Work qua	ıntity	Unit	ргісе	An	out	Total a	mount
Item	Amount	Unit	D/C (U\$\$)	F/C (USS)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work 1.1.1 Preparatory works (10% of C/W) 1.1.2 Main construction works					·			
(1) Construction of dam	0	10 ³ m ³	I			•		
(2) Construction of irrigation facilities(3) Construction of water supply facilitya. Exploration of well (4 nos.)	0							
b. Pipeline (D=180 mm, Q=50 l/sec) c. Pumping station	24,000 1,800	m l/sec	5.4	12.6	130 180	302 420	i I	43 60
Sub-total (Civil work cost)					310	722	54	1,03
1.2 Mechanical work (included in C/W 1.3 Electrical work (included in C/W Sub-total (Direct construction cost)					310	722	54	1,03
	1	_		ļ				
2. Indirect cost	ļ	ļ						
Included in Direcet construction cost	1	ļ					ļ	
3 Annual O/M cost								1,0
conomic cost (90% of financial cost)							<u> </u>	92
Conditions: a. Exchage rate: US\$1.0= MKD52								
b			(Jan. 15, 199	9)				
b. BENEFIT	Unit rate		Quantity	9)				amount
b. BENEFIT Item)		9)			Total (MKD.10 ³)	
b. BENEFIT Item Economic benefit 1 Irrigation benefit	Unit rate)	Quantity	9)				
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total	Unit rate		Quantity					(US\$10
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total Financial benefit (revenue) Irrigation benefit	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)				(MKD.10 ³)	(US\$10 ³
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2. Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total I. Financial benefit (revenue)	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)				(MKD.10 ³)	(US\$10
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total Financial benefit (revenue) Irrigation benefit Water supply benefit Water supply benefit Domestic water supply (Q=200 lit/s) Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year) 630,720				(MKD.10³)	(US\$10
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total Financial benefit (revenue) Irrigation benefit Water supply benefit Water supply benefit Sub-total Note:	Unit rate (MKD/m³)	0	Quantity (10 ³ m ³ /year) 630,720				(MKD.10³)	(US\$10
b. BENEFIT Item Economic benefit Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total Financial benefit (revenue) Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=200 lit/s)	Unit rate (MKD/m³) 16.2 18.4 JATION	2 0 3 US\$	Quantity (10 ³ m ³ /year) 630,720			3 US\$10 ³	(MKD.10³)	(US\$10

Benefit and Cost Estimate

	Бепен	it anu	COST ESTIB	liate			Sheet No.	3
Name of Project: Kichevsko Pole	Irrigation	n Sys	tem Rehabil	itation Pro	ject			
COST	Work qua	intity	Unit	price	Am	out	Total a	mount
Item	Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work								
1.1.2 Main construction works Rehabilitation of irrigation System	1450	ha		2000				2,900
Sub-total (Civil work cost)								2,900
1.2 Mechanical work (5% of C/W) 1.3 Electrical work Sub-total (Direct construction cost)			·					
		ļ						
	 	 			 	 	 	
2 Annual O/M cost (5% of C/W cost)					ļ .			290
Financial cost Economic cost (90% of financial cost)								2,900 2,610
BENEFIT	Unit rate	:	Quantity	<u> </u>				amount
Item	(MKD/m³)		(10 ³ m ³ /year)				(MKD.mil.)	-
I . Economic benefit (Ref.Appendix) 1 Water charge 1.1 1.2 (50 % increase of current tariff)								842
Sub-total II. Financial benefit							 	823
II. Financial benefit 1 1.1 1.2 (considering inflation during construction) Sub-total								
Note:	:							
Total					•			
RESULT OF ECONOMIC/FINANCIAL EVALUES B-C B/C FIRE	: 3,338 : 1.65	8 US\$ 5	10 ³	B-C B/C FIRR	: 1.4:			

D/C (MKD)

F/C (US\$)

Construction of By-pass Channel Raven-Rechica

Work quantity

Amount Unit

Name of Project:

1. Direct construction cost

Sub-total (Civil work cost)

Sub-total (Direct construction cost)

Economic cost (90% of financial cost)

1.2 Mechanical work1.3 Electrical work

Financial cost

1.1 Civil work

COST

Item

1.1.1 Preparatory works (10% of C/W) 1.1.2 Main construction works

Indirect cost (50% of Direct construction cost)

Annual O/M cost (10% of C/W cost)

(including land acquisition and compensation, engineering fee, administration cost and physical/price contingencies)

		Sheet No.	4
Am	оut	Total a	unount
D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
		vil. a	44,000
			44,000
.7			
:			4,400
			44,000 39,600

BENEFIT Item Economic benefit	Unit rate (MKD/m³)	Quantity (10 ³ m ³ /year)		Total ar	
		(to mrsken)		(MKD.mil.)	(US\$10 ³)
1 Irrigation benefit					6,875
Sub-total					7,121
Irrigation benefit 1 Water charge					7,121
Sub-total					
ote:					
·			N ₁ .		
Total				0.0	

	EX	onomic/1	гшап	ciai Anaiys	is or reale	:Ct		Sheet No.	5
Name of Project:	Patishka Reka V	Vater Sup	ply Pr	oject					
COST		Work qua		Unit			iout	Total a	
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$10')	(MKD.mil.)	(US\$10 ³)
Direct construction co L1 Civil work	st								
1.1.1 Main construction (1) Construction of da									
(2) Construction of in (3) Construction of wa a. Filter station b. Pipelines and aw (escalation is consider 1995 price)	eter supply facility	90 45,000	l/sec m						325 2,924
Sub-total (Civil work co	ost)								3,249
1.2 Mechanical work 1.3 Electrical work									
Sub-total (Direct construction	on cost)				· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>		3,249
2. Indirect cost (50% of	direct construction co	ost)			· ·				0
3 Annual O/M cost									325
Financial cost Economic cost (90% of finan	cial cost)								3,249 2,924
Conditions: a. Exchage rate: US\$1.6 b.				(Jan.15, 199	9)				
BENEFI	Pageate Carrieria (Carrier	Unit rate		Quantity			· · · · · · · · · · · · · · · · · · ·	Total a	mount
<u>Item</u>		(MKD/m ³)		(m³/year)				(MKD,10 ³)	(US\$10 ³)
I . Economic benefit I Irrigation benefit									0
Water supply benefit 2.1 Domestic water suppl Sub-total		16.2		3,405,888				55,175	1,061 1,061
II. Financial benefit (rev 1 Irrigation benefit	enue)								0
Water supply benefit 2.1 Domestic water suppl Sub-total	y (Q=90 lit/s)	18.0		2,951,770				53,132	1,022 1,022
Note:	·			·					
RESULT OF ECONOMIC/F	INANCIAL EVALU	ATION		<u></u>	<u>L</u> .			I	· · · · · ·
e de la company de la comp La company de la company de	B-C: B/C:	3,411	US\$1	03	B-C B/C	•			
		16.5%			FIRR	13.8%			

Sheet No. _____6

	urpose Da							
COST Item	Work qua	ntity Unit	Unit p	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$10 ³)	Total an	(US\$10 ³)
Direct construction cost	Amount	Onit	D/C (033)	170 (033)	D/C (00310)	170 (00310 7	(MICO.MIII.)	(00010)
1.1 Civil work							,	
1.1.1 Preparatory works (10%of C/W)								
1.1.2 Main construction works			Ì					
(1) Construction of Paligard dam	1,677	1033	6.3	14.7	10,580	24,687	1,834	35,267
(1) Construction of Pangard dam	1,077	10 111	0.5	1 17	10,550	21,907		,
(2) Construction of irrigation facilities	1,800	ha	1,500	3,500	2,700	6,300	468	9,00
(3) Construction of water supply facility	1,000	""	1,500	5,500	2,. 00	3,500		-,
a. Tyrolean intake	0	1/sec						
b. Pipeline (D=180 mm, Q=50 1/sec)	24,000	1 1	5,4	12.6	130	302	22	433
c. Filter station	1,800			12.0	180		31	60
· ·	1				63	147	11	21
d. Service reservoir	0	m	•			177	. 11	21
(4) Hydropower facilities	L.S.	['			1			2,60
Sub-total (Civil work cost)	1 2.0.				13,653	31,856	2,366	48,10
1.2 Mechanical work (included in C/W	cost)					1		
1.3 Electrical work (included in C/W								
Sub-total (Direct construction cost)					13,653	31,856	2,366	48,10
Direct Constitution Cost,	†	1						
2. Indirect cost		1	-					
Included in Direcet construction cost		1						
							i	
3 Annual O/M cost	1	<u> </u>						2,60
inancial cost								48,10
conomic cost (90% of financial cost)				<u> L</u>		<u> </u>	<u> </u>	43,29
Conditions:						•		
a. Exchage rate: US\$1.0= MKD52	<u>.</u>		(Jan.15, 199	9)	•			
b.								
BENEFIT	Unit rate		Quantity				Total a	
Item	(MKD/m ³)	(10 ³ m ³ /year)				(MKD.10 ³)	(US\$10 ³
. Economic benefit								
1 Irrigation benefit								3,87
2 Water supply benefit			1 .	Ļ				
2.1 M&I water supply (Q=50 lit/s)	16.	2	1,103,760)			17,881	34
3 Hydropower benefit			ľ	1	-			2,50
Sub-total				<u></u>				6,7
							j	
 Financial benefit (revenue) 								3,64
I. Financial benefit (revenue) 1 Irrigation benefit				l l				
							i	
1 Irrigation benefit	18.	0	1,103,760	D			19,868	
1 Irrigation benefit2 Water supply benefit	18.	0	1,103,760				19,868	2,8
 Irrigation benefit Water supply benefit Domestic water supply (Q=50 lit/s) 	18.	0	1,103,760	D)		·	19,868	2,8
 Irrigation benefit Water supply benefit Domestic water supply (Q=50 lit/s) Hydropower benefit 	18.	0	1,103,760)			19,868	
1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) 3 Hydropower benefit Sub-total	18.	0	1,103,760	0		· · · · · · · · · · · · · · · · · · ·	19,868	2,8
 Irrigation benefit Water supply benefit 1 Domestic water supply (Q=50 lit/s) Hydropower benefit Sub-total 	18.	0	1,103,760				19,868	2,8
Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) Hydropower benefit Sub-total lote:			1,103,760)			19,868	2,8
Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) Hydropower benefit	UATION						19,868	2,8
Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) Hydropower benefit Sub-total Note: RESULT OF ECONOMIC/FINANCIAL EVAL B-	UATION	ı US \$		B-(1 US \$ 10 ³	19,868	2,8
Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) Hydropower benefit	UATION: C: 7,09 C: 1.1	01 US\$			D: 0.9	4	19,868	2,8

Sheet No. Name of Project: Slupchanka Dam Project COST Work quantity Unit price Amout Total amount Amount Unit Item D/C (US\$) F/C (USS) D/C (US\$103) F/C (US\$103) (MKD.mil.) (US\$103) Direct construction cost 1.1 Civil work 1.1.1 Preparatory works (10% of C/W) 1.1.2 Main construction works 270 10³m 2,185 5,097 379 7,282 (1) Construction of Slupchanka dam 8.1 18.9 (2) Construction of irrigation facilities ha 1,500 3,500 0 0 (3) Construction of water supply facility a. Tyrolean intake 1/sec b. Pipeline (D=250 mm, Q=100 l/s) m 21.0 49.0 0 0 0 0 c. Filter station (existing) 1/sec m^3 o 0 0 d. Service reservoir (existing) Sub-total (Civil work cost) 7,282 (included in C/W cost) 1.2 Mechanical work (included in C/W cost) 1.3 Electrical work 7,282 Sub-total (Direct construction cost) Indirect cost Included in Direcet construction cost Annual O/M cost 364 7,282 Financial cost Economic cost (90% of financial cost) 6,554 Conditions: MKD52. a. Exchage rate: US\$1.0= (Jan.15, 1999) BENEFIT Unit rate Quantity Total amount (MKD.10³) (US\$10³) (10³m³/year) Item (MKD/m³) Economic benefit Irrigation benefit Water supply benefit 89,960 1,730 2.1 M&I water supply (Q=260 lit/s) 16.2 8,199,360 Sub-total Financial benefit (revenue) II. 0 Irrigation benefit Water supply benefit 2.1 Domestic water supply (Q=260 lit/s) 18.0 8,199,360 75,920 1,460 Sub-total Note: RESULT OF ECONOMIC/FINANCIAL EVALUATION 4,403 US\$103 6,714 US\$103 B-C: B-C: B/C: 1.43 B/C: 1.72

FIRR:

13.1%

EIRR:

16.0%

Benefit and Cost Estimate

								Sheet No.	8
Name of Project:	Lipkovo-Glaznja A	rea Ir ri gati	on reh	abilitation Pro	ject				
COST		Work qua	intity	Unit	orice	Am	out	Total a	mount
Item		Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD,mil.)	(US \$ 10 ³)
Direct construction cost Civil work 1.1.1 Preparatory works	,								
1.1.2 Main construction (1) Irrigation area:	works	10,820	ha		2,000				21,640
		÷							
Sub-total (Civil work cos	t)								
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction	cost)								
· · · · · · · · · · · · · · · · · · ·			ļ				 		
2. Indirect cost (50% of I			Ļ	<u> </u>		ļ		ļ	
(including land acquisit			ering to	ec, 1	ļ		ļ		
administration cost and 3 Annual O/M cost (5% of		ngencies)							1,082
Financial cost Economic cost (90% of financi	al cost)								21,640 19,476
BENEFIT		Unit rate		Quantity	1			Total	amount
ltem		(MKD/m³)		(10 ³ m ³ /year)				(MKD.mil.)	
I. Economic benefit I Irrigation benefit (net return)	(Ref.Appendix)								5,669
Sub-total									
II. Financial benefit 1 1.1							. *		5,478
1.2 Sub-total				·				1	
Note:	· · · · · · · · · · · · · · · · · · ·								
Total									
RESULT OF ECONOMIC/FI	NANCIAL EVALU B-C B/C EIRR	14,41 1.3	1 US\$: 4	10 ³	B-C B/C FIRR	: 1.1			

	Ec	onomic/	Finan	cial Analys	is of Proje	ct		Sheet No.	9
Name of Project:	Kiselichka Dam	Project				<u> </u>			
COST	Paragraph Print	Work qua	intity	Unit p	orice		iout	Total a	mount
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction co. I.1 Civil work I.1.1 Preparatory worl I.1.2 Main construction	ය (10‰f C/W)								
(1) Construction of Ki	selichka dam	955	10 ³ m ³	7.2	16.9	6,898	16,096	1,196	22,994
(2) Construction of irr (3) Construction of wa a. Tyrolean intake	iter supply facility	4,500 -	ha l/sec	1,500	3,500	6,750	15,750	1,170	22,500
b. Pipeline (D=200	mm, Q=70 l/sec)	6,000	m	6.0	14.0	ľ	84		120
 c. Filter station (ex. 	isting)	70	1/sec			180	420	31	600
d. Service reservois	(existing)	3,000	m ³			63	147	11	210
Sub-total (Civil work co	ost)					13,927	32,497	2,414	46,424
1.2 Mechanical work 1.3 Electrical work	(included in C/W c	•				12.027	32,497	2,414	46,424
Sub-total (Direct construction	on cost)	ļ	 			13,927	32,497	2,414	40,424
Indirect cost									
Included in Direcet co	nstruction cost								
3 Annual O/M cost									3,043
Financial cost Economic cost (90% of finan									46,424 41,782
Conditions: a. Exchage rate : US\$1.0 b.				(Jan.15, 199	9)				
BENEFI	Length of the contract	Unit rate		Quantity					amount
Item	 	(MKD/m ³)	<u> </u>	(10 ³ m ³ /year)	<u> </u>			(MKD.10 ³)	(US\$10 ³)
I Economic benefit 1 Irrigation benefit									7,741
2 Water supply benefit 2.1 M&I water supply (Q Sub-total	•	16.2	· 	1,103,760				17,881	344 8,085
II. Financial benefit (rev 1 Irrigation benefit	enue)			- -					7,301
2 Water supply benefit 2.1 Domestic water supp Sub-total	iy (Q=70 lit/s)	18.0)	1,103,760			<u></u>	19,868	382 7,683
Note:			-						
RESULT OF ECONOMIC/F	And the forest over the second of the control of the second of the secon			1			3		
	B-C B/C EIRR	: 1.2		10°	B-C B/C FIRR	1.05			

	Ec	onomic,	. 162 6617	ciai Anaiys	is of x toje			Sheet No.	10
Name of Project:	Vakuf Multipurp	ose Dan	Proj	ect					
COST		Work qua	ntity	Unit	orice		nout	Total a	mount
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$103)
Direct construction co Construction co Construction co Construction construction Construction construction	ks (10%of C/W)					. * .			
(1) Construction of V		1,560	10 ³ m ³	0.0	22.5	0	35,100	1,825	35,100
(2) Construction of ir (3) Construction of w a. Tyrolean intake		22,000	ha I/sec	1,500	3,500	33,000	77,000	5,720	110,000
b. Pipeline (D=18) c. Filter station) mm, Q=50 l/sec)	24,000 50	ļ ,	5.4	12.6	130 180	1 .	1 1	432 600
d. Service reservoi (4) Construction of p	1	2,160	m³ L.S			63	147		210 18,000
Sub-total (Civil work of			ļ			33,373	112,969	7,610	164,342
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction	(included in C/W c (included in C/W c					33,373	112,969	7,610	164,342
2. Indirect cost	on cost)					30,510	1.2,707	-,,,,,	
Included in Direcet c	onstruction cost			<u> </u>					
3 Annual O/M cost									10,679
Financial cost Economic cost (90% of finan	ucial cost)								164,342 147,908
Conditions: a. Exchage rate: US\$1. b.				(Jan.15, 199	9)				
BENEF	The fifther w	Unit rate		Quantity			.:	Total	unount
Item		(MKD/m³)	•	(10 ³ m ³ /year)				(MKD, 10 ³)	(US\$10 ³)
I . Economic benefit 1 Irrigation benefit									28,411
Water supply benefit 2.1 M&I water supply ((Power benefit Sub-total		16.2	2	788,400			· ·	12,772	246 700 29,357
II. Financial benefit (re l Irrigation benefit	venue)								28,669
Water supply benefit Domestic water supply Power benefit Sub-total		18.0)	788,400				14,191	273 1,700 30,642
Note:									
RESULT OF ECONOMIC/	FINANCIAL EVALU B-C B/C EIRR	73,46	2 US\$ 3	10 ³	B-C B/C FIRR	1.1			

				iciai Anaiys	-			Sheet No.	11
Name of Project:	Pelince Dam Pro	oject							
COST		Work qua	ntity	Unit	orice	Ал	10Ut	Total a	mount
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction co 1.1 Civil work 1.1.1 Preparatory wor 1.1.2 Main construction	ks (10%of C/W)								
(1) Construction of da		5,200	10 ³ m ³	1.8	4.3	9,603	22,406	1,664	32,00
(2) Construction of in (3) Construction of w a. Tyrolean intake		5,000		1,500	3,500	7,500	17,500	1,300	25,00
b. Pipeline (D450) c. Filter station d. Service reservoi		2,000 0 0	(25.5	59.5	51	119	9	17
Sub-total (Civil work of		,	111			17,154	40,025	2,973	57,17
1.2 Mechanical work 1.3 Electrical work	(included in C/W c					11,147	10,025	2,570	27,17
Sub-total (Direct construction		<u> </u>			·	17,154	40,025	2,973	57,17
2. Indirect cost									
Included in Direcet co	onstruction cost								
3 Annual O/M cost			ļ						3,61
inancial cost conomic cost (90% of finan	cial cost)								57,17 51,46
Conditions: a. Exchage rate: US\$1.6 b.	0= MKD52.			(Jan.15, 199	9)				
BENEFI	Tariffa i de la companio	Unit rate		Quantity					mount
Item		(MKD/m³)		(10 ³ m ³ /year)				(MKD.10 ³)	(USS10 ³
Economic benefit l Irrigation benefit					_				7,60
2 Water supply benefit 2.1 M&I water supply Sub-total		16.2		0				0	7,60
I. Financial benefit (rev 1 Irrigation benefit	enue)								7,60
2 Water supply benefit 2.1 Domestic water supp Sub-total	ly	18.0	·	0				0	7,6
lote:									
RESULT: OF ECONOMIC/F	INANCIAL EVALU B-C: B/C: EIRR	-3,506 0.96	US\$1	03	B-C: B/C: FIRR:	0.85			

Sheet No.

Name of Project: Razlovci Dam		·····	,					
COST	Work qua		Unit		An D/C (US\$10 ³)	F/C (US\$10 ³)	Total a	
Item 1. Direct construction cost 1.1 Civil work 1.1.1 Preparatory works (10% of C/W)	Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10)	1/C (US\$10*)	(MKD.mil.)	(US\$10 ³)
1.1.2 Main construction works (1) Construction of Razrovci dam	940	10 ³ m ³	0.0	22.5	0	21,150	1,100	21,15
(2) Construction of irrigation facilities (3) Construction of water supply facility	4,000	ha	1,500	3,500	6,000	14,000	1,040	20,00
a. Tyrolean intake b. Pipeline (D=250 mm, Q=100 l/sec) c. Filter station	10,000	1/sec	7.5	17.5	75 180 81		31	25 60 27
d. Service reservoir (4) Construction of power facilities Sub-total (Civil work cost)	4,320	L.S	·	· · · · · · · · · · · · · · · · · · ·	6,336		,	42,27
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction cost)					6,336	35,934	2,198	42,27
2. Indirect cost				,				
· Included in Direcet construction cost	<u> </u>	 						
3 Annual O/M cost inancial cost conomic cost (90% of financial cost)								2,77 42,27 38,04
Conditions: a. Exchage rate: US\$1.0= MKD5: b.	2.		(Jan.15, 199	9)				
BENEFIT	Unit rate		Quantity					mount
Item	(MKD/m³))	(10 ³ m ³ /year)		_ 		(MKD,10 ³)	(US\$10
Economic benefit 1 Irrigation benefit								6,8
 Water supply benefit 2.1 M&I water supply (Q=50 lit/s) Power benefit Sub-total 	16.2	2	788,400				12,772	24 76 7,82
II. Financial benefit (revenue) 1 Irrigation benefit								6,4
 Water supply benefit 2.1 Domestic water supply (Q=50 lit/s) Power benefit Sub-total 	18.0	0	788,400				14,191	2 1,7 8,4
Note:								
RESULT OF ECONOMIC/FINANCIAL EVAL B- B/	C: 21,52	7 US\$ 7	10 ³	B-C B/C FIRR	1.2		:	

								Sheet No.	13
Name of Project:	Blatec Dam Proj	ject						<u> </u>	
COST	ska septimi telephinene Se septimi	Work qua	intity	Unit :	price	An	iout	Total a	untount
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$103)	F/C (US\$103)	(MKD.mil.)	(USS10 ³)
Direct construction co 1.1 Civil work 1.1.1 Preparatory wor 1.1.2 Main construction	ks (10‰f C/W)								
(1) Construction of Bl		2,979	10 ³ m ³	3.2	7.4	9,533	22,045	1,642	31,577
(2) Construction of irr (3) Construction of war a. Tyrolean intake		1,000	ha l/sec	1,500	3,500	1,500	3,500	260	5,000
b. Pipeline (D=250	mm)	12,000	m	7.5	17.5	90	210	16	300
c. Filter station		100	1 .			231	539	40	770
d. Service reservoir		4,320	m ³			71	165	12	235
Sub-total (Civil work co	ost)			·		11,424	26,458	1,970	37,882
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction	(included in C/W of (included in C/W of on cost)				·	11,424	26,458	1,970	37,882
2. Indirect cost		·							
Included in Direcet co	netraction cost								
	iisu uction cost						· · · · · · · · · · · · · · · · · · ·		2.100
3 Annual O/M cost Financial cost	;							<u> </u>	2,109 37,882
Economic cost (90% of finan-	cial cost)								34,094
Conditions: a. Exchage rate : US\$1.0 b.)= MKD52.			(Jan.15, 199	9)				
BENEFT		Unit rate		Quantity				Total a	unount
Item	· · · · · · · · · · · · · · · · · · ·	(MKD/m³)		(10 ³ m ³ /year)		·		(MKD.10 ³)	(US\$103)
I . Economic benefit 1 Irrigation benefit	(A=1,000 ha)								3,485
Water supply benefit 1 M&I water supply (Q Sub-total		16.2		1,576,800				25,544	491 3,976
II. Financial benefit (reve 1 Irrigation benefit	enue)								3,606
Water supply benefit 2.1 Domestic water suppl Sub-total	y (Q=100 lit/s)	18.0	,	1,576,800				28,382	546 4,152
Note:									·
RESULT OF ECONOMIC/F	INANCIAL EVALU B-C:	and a supplied to the supplied	•		B-C:	_15,027	US\$10 ³		
	B/C; EIRR:	0.77			B/C: FIRR:	0.72			
	Luut.	7.2/0			* ******	2.770			

heet No.	 14

COST	11/0-1		Unit t	rice	A -	out .	Tarel .	unount
Item	Work qua	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)		(MKD.mil.)	(US\$10 ³)
Direct construction cost	VIIIOMIL	Oill	DIC (MIXD)	170 (033)	וייר (ואנאט)	170 (033)	(1417-711111-)	(00310)
1.1 Civil work								
1.1.1 Preparatory works	**							
1.1.2 Main construction works		'						50,30
(1) Rechani dam								30,30
(includeing appurtenant structure)			i . I			,		
(includeing appurenant sutteture)	ļ							
	.							
Sub-total (Civil work cost)		, ,	ļ					
Sub-total (Civil work cost)					<u> </u>			
1.2 Mashaniaal words (59% of C/W)								
1.2 Mechanical work (5% of C/W) 1.3 Electrical work								
Sub-total (Direct construction cost)								
Sub-total (Direct construction cost)					ļ	<u> </u>		
2. Indirect cost (50% of Direct construction of								
			<u></u>					
(including land acquisition and compensation		Ting ie	ee,		 			· · · · · · · · · · · · · · · · · · ·
administration cost and physical/price contin	ngencies)							2.51
3 Annual O/M cost (5% of C/W cost) inancial cost		├ ──		<u></u>	 	 	<u> </u>	2,51 50,30
conomic cost (90% of financial cost)			1		1			30,30 45,27
onditions:								
BENEFIT	Unit rate		Quantity	ž †				amount
Item . Economic benefit	(MKD/m³)		(10 ³ m ³ /year)				(MKD.mil.)	(US\$10 ³)
								l.
1 Water charge	160							
1		4	15 205				247.0	4.70
2 Parambara 64	16.2		15,295	-			247.8	
2 Power benefit	16.2		15,295		÷		247.8	
	10.2		15,295				247.8	1,10
Sub-total	16.2		15,295				247.8	1,10
Sub-total 1. Financial benefit (revenue)	10.2		15,295				247.8	1,10
Sub-total						· · · · · · · · · · · · · · · · · · ·		1,10 5,86
Sub-total I. Financial benefit (revenue) 1 Water charge	18.0		15,295				247.8	1,10 5,86 5,29
Sub-total I. Financial benefit (revenue)								1,10 5,86 5,29
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								1,10 5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit								4,76 1,10 5,86 5,29 90 6,19
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit Sub-total							275.3	5,86 5,29 90 6,19
Sub-total Financial benefit (revenue) Water charge Power benefit								5,86 5,29 90 6,19
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit Sub-total Total	18.0)					275.3	5,86 5,29 90
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit Sub-total Total RESULT OF ECONOMIC/FINANCIAL EVALUE	18.0		15,295	P.C	-10.755	5 116¢103	275.3	5,86 5,29 90 6,19
Sub-total I. Financial benefit (revenue) 1 Water charge 2 Power benefit Sub-total	18.0 ATION -6,985) 5 US\$1	15,295	B-C B/C		3 US\$10 ³	275.3	5,86 5,29 90 6,19

Sheet No. Name of Project: Zletovica Multipurpose Dam Project COST Work quantity Unit price Amout Total amount D/C (MKD) F/C (US\$) (MKD.mil.) (US\$103) Item D/C (MKD) F/C (US\$) Amount Unit Direct construction cost 1.1 Civil work 1.1.1 Preparatory works 1.1.2 Main construction works 68,200 (1) Knezovo dam and water supply facility (2) Irrgation facility (3) Power facility Sub-total (Civil work cost) 68,200 1.2 Mechanical work (5% of C/W) 1.3 Electrical work Sub-total (Direct construction cost) Indirect cost (50% of Direct construction cost) (including land acquisition and compensation, engineering fee, administration cost and physical/price contingencies) 1,500 Annual O/M cost (5% of C/W cost) 68,200 Financial cost 61,380 Economic cost (90% of financial cost) Conditions: (Jan. 15, 1999 by The National Bank) a. Exchage rate: US\$1.0= MKD52. BENEFIT Quantity Total amount Unit rate (MKD.mil.) (US\$10³) Item (MKD/m³) (10³m³/year) Economic benefit Water charge 188,260 3,050 58,650 1.1 Domestic water (Q=1,474lit) 16.2 2 Irrigation benefit Power benefit 58,650 Sub-total П. Financial benefit (revenue) Water charge 1 209,178 3,765 72,408 18.0 1.1 Domestic water 2 Irrigation benefit 3 Power benefit 72,408 Sub-total Note: Total RESULT OF ECONOMIC/FINANCIAL EVALUATION 1,649 US\$103 875 US\$103 B-C: B-C: B/C: 1.03 B/C: 1.01

EIRR:

8.3%

FIRR:

8.1%

Sheet	No.		1

Name of Project: Construction of	Trrigation	n Sub	-system "Sh	tipsko Pol	e"			
COST	Work qua	antity	Unit	price	Ал	out	Total :	mount
Item	Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work 1.1.1 Preparatory works (10%of C/W)								
1.1.2 Main construction works (1) Construction of irrigation facilities (2,773 ha)							Applied in in PIP	13,900 the figure
Sub-total (Civil work cost)								
1.2 Mechanical work 1.3 Electrical work								
Sub-total (Direct construction cost)	ļ	├						
Indirect cost (50% of Direct construction (including land acquisition and compensate)	ion engine	ering f	Pe					
administration cost and physical/price con	tingencies)	I	<u>~,</u>					1,390
3 Annual O/M cost (10% of C/W cost) Financial cost Economic cost (90% of financial cost)								13,900
Conditions: a. Exchage rate: US\$1.0= MKD52 b.			(Jan.15, 199	99 by The Na	ational Bank) 	T	
BENEFIT	Unit rate		Quantity (10 ³ m ³ /year)		100	· · · ·	(MKD.mil.)	amount (US\$10 ³)
Item I. Economic benefit	(MKD/m³)	(10 m /year)		· · · · · · · · · · · · · · · · · · ·		(IVIKID.IIII).	(03\$10)
Irrigation benefit I.1 Irrigation benefit			٠.					3,514
Sub-total							ļ	2426
II. Financial benefit (revenue) 1 Irrigation benefit 1.1 1.2								3438
Note:								
·								
Total							0.	3,51
RESULT OF ECONOMIC/FINANCIAL EVAL B- B/ EIR	C: 12,74 C: 1.4	4 US 19	S10 ³	B- B/	C: 1.3			

	, Loc	OROHIIC.	ниан	ciai Anaiys	is of k roje			Sheet No.	17
Name of Project:	Krapa Dam Proj	ect							
COST		Work qua	ıntity	Unit	orice		10ut	Total a	
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cc Civil work 1.1.1 Preparatory wor 1.1.2 Main construction	ks (10‰f C/W)								
(1) Construction of K		٨	10 ³ m ³	3.2	7.4	0	0	اه	(
(2) Construction of in	•	1	nos.	5.2.	,,,	150	· ·	l * I	50
(3) Construction of br		500,000	m ³	7.2	16.7	!	1	621	11,95
(4) Construction of in (5) Construction of w	rigation facilities	8,000	ha	1,500	3,500		28,000	2,080	40,00
a. Tyrolean intake		100		10.8	25.2	1	3	0	26
b. Pipeline (D=250c. Filter station	mm)	30,000 100		7.5	17.5	225	525	39	75 77
d. Service reservoi	_	j	1 . !				·	12	23
a. Service reservoi	r ·	4,320	m					12	23
Sub-total (Civil work co	ost)					15,976	37,228	2,819	54,20
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction	(included in C/W of (included in C/W of on cost)					15,976	37,228	2,819	54,20
2. Indirect cost		ļ							
Included in Direcet co	onstruction cost		ļ					ļI	
3 Annual O/M cost	***	-							3,37
Financial cost	·		 						54,20
Economic cost (90% of finan	cial cost)	<u> </u>	<u> </u>						48,78
Conditions: a. Exchage rate : US\$1.0 b.				(Jan.15, 199	9)				
BENEFI		Unit rate		Quantity				Total a	
Item .		(MKD/m³)		(10 ³ m ³ /year)			 ,,	(MKD.10 ³)	(US\$10 ³
Economic benefit 1 Irrigation benefit	(A=8,000 ha)			·			•		7,08
2 Water supply benefit2.1 M&I water supply (QSub-total		16.2		1,576,800				25,544	49 7,57
I. Financial benefit (rev 1 Irrigation benefit	renue)					•			7,21
Water supply benefit Domestic water supply Sub-total		18.0	l	1,576,800				28,382	54 7,76
Note:									
RESULT OF ECONOMIC/F	INANCIAL EVALU	ATION				·	,		
 Leading of the second of the se	B-C :			0^{3}	B-C:	-8,274	US\$103		
	B/C:	0.97)		B/C:	0.90)		
	EIRR:	7.6%	•		FIRR:	6.5%	,		

								Sheet No.	
Name of Project:	Zhvan Dam Pro								
COST		Work qua	ntity	Unit		An		Totala	
Item		Amount	Unit	D/C (USS)	F/C (U\$\$)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$103)
Direct construction co	ost								
1.1 Civil work									
1.1.1 Preparatory wor				į	ı				
1.1.2 Main constructi									20.00
(1) Construction of Z	hvan dam	1,465	10 ³ m ³	6.6	15.3	9,669	22,415	1,668	32,08
	A 111.	10,000		1 500	2 600	20 500	66,500	4,940	95,00
(2) Construction of in	rigation facilities	19,000	ha	1,500	3,500	28,500	00,300	4,540	93,00
Sub-total (Civil work c	ant)	1							127,08
Sub-total (CIVII WOLK C	031)		 						
1.2 Mechanical work	(included in C/W	ost)							
1.3 Electrical work	(included in C/W								
Sub-total (Direct constructi			1		· ·				127,0
2. Indirect cost									1 1 1
Included in Direcet co	onstruction cost								
3 Annual O/M cost			1						9,2
in amoint post									1 1 1 7 1
inancial cost Economic cost (90% of finan	ncial cost)								
	ncial cost)								
conomic cost (90% of finar				(Jan.15, 199	9)				
conomic cost (90% of finar Conditions: a. Exchage rate : US\$1. b.	0= MKD52.				9)				127,08 114,37
conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b.	0= MKD52.	Unit rate		Quantity	9)				114,37
Conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEFI	0= MKD52.				9)			Total (MKD.10 ³)	114,37
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item . Economic benefit	0= MKD52.	Unit rate		Quantity	9)				114,3
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI	0= MKD52.	Unit rate		Quantity	9)				114,3
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item . Economic benefit	0= MKD52.	Unit rate		Quantity	9)				114,3
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item . Economic benefit	0= MKD52.	Unit rate		Quantity	9)				114,3
conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit Irrigation benefit	0= MKD52.	Unit rate		Quantity	9)				amount (US\$10 21,8
conomic cost (90% of finar Conditions: a. Exchage rate: US\$1.b. BENEFI Item Economic benefit I Irrigation benefit	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8
Conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit I Irrigation benefit Sub-total I. Financial benefit (rev	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8
Conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEF Item Economic benefit Irrigation benefit Sub-total I. Financial benefit (rev	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item . Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (rev	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (rev	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (rev	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (reconstruction of the condition of the	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (reconstruction of the content of the	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (reconstruction of the content of the	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (reconstruction of the content of the	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
conomic cost (90% of finar conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit 1 Irrigation benefit Sub-total I. Financial benefit (reconstruction of the content of the	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0
Conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit I Irrigation benefit Sub-total I. Financial benefit (red)	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				114,3
Conomic cost (90% of finar Conditions: a. Exchage rate: US\$1. b. BENEFI Item Economic benefit Irrigation benefit Sub-total I. Financial benefit (recompleted) Irrigation benefit Sub-total	0= MKD52. T (A=19,000 ha)	Unit rate		Quantity	9)				amount (US\$10 21,8 22,0

Sheet No. 19

Name of Project: Obednik Dam P	Toject							
COST	Work qua	intity	Unit	price	An	out	Total a	mount
Item	Amount	Unit	D/C (US \$)	F/C (USS)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cost								
1.1 Civil work								
1.1.1 Preparatory works								
1.1.2 Main construction works								
(1) Construction of Obdenik dam	1.631	10 ³ m ³	6.4	14.9	10,385	24,231	1,800	34,616
(x) Constitution of Constitution	1,001		0		10,500	- 1,	,,000	0.,020
(2) Construction of irrigation facilities	2,000	ha	1,500	3,500	3;000	7,000	520	10,000
Sub-total (Civil work cost)					13,385	31,231		44,616
1.2 Mechanical work				, ;				,
1.3 Electrical work			į					
The state of the s								44,616
Sub-total (Direct construction cost)	ļ							+4,010
2. Indirect cost								
2. Indirect cost Included in Direcet construction cost				-				
included in Direcet construction cost	ļ							
3 Annual O/M cost					12.000	21.021		2,531
Financial cost					13,385			44,616
Economic cost (90% of financial cost)	L	لـــــا	· · · · · · · · · · · · · · · · · · ·		12,046	28,108	Ĺ	40,155
a. Exchage rate: US\$1.0= MKD52.			(Jan.15, 1999	9)				
	Unit rate		(Jan.15, 1999	9)			Total a	umount
a. Exchage rate: US\$1.0= MKD52. b.			·	9)			Total a	amount (US\$10 ³)
a. Exchage rate : US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit	Unit rate		Quantity	9)				
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT Item	Unit rate		Quantity	9)	· · · · · · · · · · · · · · · · · · ·			(US\$10 ³)
b. BENEFIT Item I. Economic benefit	Unit rate		Quantity	9)	· · · · · · · · · · · · · · · · · · ·			
a. Exchage rate : US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit	Unit rate		Quantity	9)				(US\$10 ³)
a. Exchage rate : US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit	Unit rate		Quantity	9)				(US\$10 ³)
a. Exchage rate : US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit	Unit rate		Quantity	9)				(US\$10³) 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue)	Unit rate		Quantity	9)				(US\$10³) 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT. Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total	Unit rate		Quantity	9)				(US\$10 ³)
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue)	Unit rate		Quantity	9)				(U\$\$10 ³) 4,956 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue)	Unit rate		Quantity	9)				(U\$\$10 ³) 4,956 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue)	Unit rate		Quantity	9)				(U\$\$10 ³) 4,956 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue)	Unit rate		Quantity	9)				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT. Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit	Unit rate		Quantity	9)				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total	Unit rate		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total	Unit rate		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total	Unit rate		Quantity))				(U\$\$10 ³) 4,956 4,956
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total	Unit rate		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT: Item I. Economic benefit 1 Irrigation benefit (A≃2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total	Unit rate		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0	Unit rate		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit 1 Irrigation benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total Note:	Unit rate (MKD/m ³)		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT Item I. Economic benefit 1 Irrigation benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue) 1 Irrigation benefit Sub-total Note:	Unit rate (MKD/m ³)		Quantity))				(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0= MKD52. b. BENEFIT. Item Economic benefit (A=2,000 ha) Sub-total II. Financial benefit (revenue) I Irrigation benefit Sub-total Note:	Unit rate (MKD/m³)		Quantity (10 ³ m³/year)		-18.396	US\$10 ³		(US\$10 ³) 4,956 4,956 4,898
a. Exchage rate: US\$1.0	Unit rate (MKD/m³) ATION -11,463	US\$1	Quantity (10 ³ m³/year)	B-C: B/C:		US\$10 ³		(US\$10 ³) 4,956 4,956 4,898

Sheet No.

Name of Project:	Kochishte Dam	Project							
COST		Work qu	antity	Unit	price	Am	out	Total a	mount
Item		Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work 1.1 Preparatory works 1.1.2 Main construction	·								
(1) Construction of Koo		2,500	10 ³ m ³	5.3	12.3	13,166	30,721	2,282	43,888
(2) Construction of irrig	ation facilities	4,500	ha	1,500	3,500	6,750	15,750	1,170	22,500
Sub-total (Civil work cos	t) ·					19,916	46,471		66,388
1.2 Mechanical work 1.3 Electrical work					:				
Sub-total (Direct construction	cost)								66,388
Indirect cost Included in Direcet con	struction cost						2.4		<u> </u>
3 Annual O/M cost									3,994
Financial cost Economic cost (90% of financi	al cost)					19,916 17,925			66,388 59,749
	= MKD52.	Unit rate		(Jan.15, 199 Quantity	9)	<u>.</u>	: .		amount
Item		(MKD/m ³))	(10 ³ m ³ /year)	· · · · · · · · · · · · · · · · · · ·			(MKD.10 ³)	(US\$10 ³)
Economic benefit Irrigation benefit	(A=4,500 ha)								7,964
Sub-total									7,964
II. Financial benefit (rever l Irrigation benefit	iue)								8,120
Sub-total			· · · · · · · · · · · · · · · · · · ·			·			8,120
Note:			·						
								.	
RESULT OF ECONOMIC/FI	NANCIAL EVALU	JATION		1				* · · · · · · · · · · · · · · · · · · ·	
	B-C B/C			10 ³	B-C B/C		4 US\$10 ³		
		5.79	6		FIRE				

								Sheet No.	2
Name of Project:	Zhurche Dam Pi	roject			_				
COST		Work qua	ıntity	Unit	orice		nout	Total a	
Item	·	Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$103)	(MKD,mil,)	(US\$10 ³)
Direct construction co Civil work 1.1.1 Preparatory wor 1.1.2 Main construction	ks								
(1) Construction of Zl		544	10^3m^3	7.7	18.1	4,213	9,830	730	14,04
(2) Construction of irr	igation facilities	1,500	ha	1,500	3,500	2,250	5,250	390	7,50
Sub-total (Civil work co	ost)					6,463	15,080		21,54
1.2 Mechanical work 1.3 Electrical work	(included in C/W of (included in C/W of			!					
Sub-total (Direct construction	on cost)				· · · · · · · · · · · · · · · · · · ·				21,54
2. Indirect cost									
Included in Direcet co	nstruction cost		-						
3 Annual O/M cost									1,30
Financial cost Economic cost (90% of finan	cial cost)					6,463 5,816			21,54 19,38
a. Exchage rate: US\$1.0 b. BENEFT		Unit rate	· · · ·	(Jan.15, 1999	<u></u>			Total	mount
Item	The state of the s	(MKD/m³)		(10 ³ m ³ /year)			•	(MKD.10 ³)	(US\$10 ³
Economic benefit 1 Irrigation benefit	(A=1,500 ha)								2,65
Sub-total									2,65
Financial benefit (rev Irrigation benefit	enue)							:	2,70
Sub-total									2,70
Note:					· · · · · · · · · · · · · · · · · · ·				
		l		L	<u></u> .			<u>. </u>	L
RESULT OF ECONOMIC/F	INANCIAL EVALU B-C:	CONTROL OF THE STREET	•	-3	B-C:		US\$10 ³	l	<u> </u>

FIRR:

4.8%

EIRR:

	EC	OHOIII.C.		cial Analys				Sheet No.	22
Name of Project:	Konjarka Dam F	roject							
COST	esugios sumo	Work qua	ntity	Unit p	orice		iout	Total a	mount
Item		Amount	Unit	D/C (USS)	F/C (USS)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction co	st								
1.1 Civil work									
1.1.1 Preparatory work	ks			1					
1.1.2 Main construction	on works								
(1) Construction of K	onjarka dam	356	10 ³ m ³	8.0	18.6	2,842	6,630	493	9,472
(2) Construction of in	igation facilities	3,000	ha	1,500	3,500	4,500	10,500	780	15,000
Sub-total (Civil work co	ost)					7,342	17,130		24,472
1.2 Mechanical work 1.3 Electrical work	(included in C/W of included in C/W of						٠.		24 472
Sub-total (Direct constructi	on cost)		\vdash						24,472
2 Indiana								 	
Indirect cost Included in Direcet co	netruction cost	 	 		-	 			
included in Direcel Co	Distruction cost	 				 		· · · · · ·	
3 Annual O/M cost						1			1,674
Financial cost	w.,					7,342	17,130	,	24,472
Economic cost (90% of finan	cial cost)					6,607			22,025
a. Exchage rate : US\$1. b. BENEFI		Unit rate	·	(Jan.15, 199 Quantity					amount
<u>Item</u>		(MKD/m ³)		(10 ³ m ³ /year)				(MKD.10 ³)	(US\$10 ³)
I . Economic benefit 1 Irrigation benefit	(A=3,000 ha)			-					3,874
Sub-total			٠						3,874
II. Financial benefit (rev	renne)	 						<u> </u>	,,,,,
l Irrigation benefit	cinacy								3,584
		l			1			i	ľ
			•	Ì	ŀ				2 50
Sub-total	,,		· · · · · · · · ·				·		3,584
			· 						3,584
	· · · · · · · · · · · · · · · · · · ·						·		3,584
	· .		<u></u>				·		3,584
	· .		<u></u>				·		3,584
Sub-total Note:							·		3,584
									3,58
									3,584
	FINANCIAL EVALU	JATION							3,584
Note:	FINANCIAL EVALU B-C	a de la companya de l	6 US \$	103	B-C	: -4,40	1 US\$10 ³		3,584
Note:	and the state of t	: 2,07	6 US\$	103	B-C B/C		8		3,584

								Sheet No.	23
Name of Project:	Studenchca Sup	plementa	Wate	er Supply Pr	oject				
COST		Work qua	ntity	Unit	nice		out	Total a	mount
Item		Amount	Unit	D/C (US\$)	F/C (USS)	D/C (US\$103)	F/C (US\$103)	(MKD.mil.)	(US\$10 ³)
 Direct construction cost 									
1.1 Civil work									
1.1.1 Preparatory works									
1.1.2 Main construction	works								
(1) Construction of dan	ì		10 ³ m ³						
(2) Construction of irrig			ha						
(3) Construction of wat	er supply facility								
 Tyrolean intake 		-	I/sec						
b. Pipeline (D=800 t	nm)	7,000	m	245	105	1,715	735	127	2,450
c. Filter station		-	l/sec	1					
 d. Service reservoir 		-	m³						
Sub-total (Civil work cos	it)								2,450
				:			*		
1.2 Mechanical work				ŀ					
1.3 Electrical work	4								2.450
Sub-total (Direct construction	1 cost)								2,450
2. Indirect cost									
Included in Direcet con	struction cost								
Biologou in Directive	SA GOLON GOST								
3 Annual O/M cost (5% o	of main construction	cost)							123
Financial cost									2,450
Economic cost (90% of financi	ial cost)		i i						2,205
0									
Conditions: a. Exchage rate : US\$1.0=	= MKD52.		•	(Jan.15, 1999	יי		•		
b.				(Jan. 15, 155.	′)	*			
BENEFIT	Signatural Species	Unit rate		Quantity				Total a	ımount
Item		(MKD/m³)		(10 ³ m ³ /year)				(MKD,10 ³)	(US\$10 ³)
I . Economic benefit						·			
 Irrigation benefit 	(A-4,000 ha)							}	
		1						1 1	
2 Water supply benefit		1						1	
2.1 M&I water supply (Q=	250 lit/s)	1.62		7,884,000				12,772	
2.1 M&I water supply (Q= Sub-total		1.62		7,884,000				12,772	
2.1 M&I water supply (Q= Sub-total I. Financial benefit (rever		1.62		7,884,000				12,772	
2.1 M&I water supply (Q= Sub-total		1.62		7,884,000				12,772	
2.1 M&I water supply (Q= Sub-total II. Financial benefit (rever 1 Irrigation benefit		1.62		7,884,000				12,772	
2.1 M&I water supply (Q= Sub-total II. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit	nue)								246 246
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever) 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply	nue)	1.62		7,884,000				12,772	246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total	nue)								246
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever) 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total	nue)								246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total	nue)								246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever) 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply	nue)								246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever) 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total	nue)								246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total Note:	(Q=200 lit/s)	1.8							246 273
2.1 M&I water supply (Q=Sub-total II. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total Note:	nue) (Q=200 lit/s) NANCIAL EVALU	1.8		7,884,000		-1 043	US\$10 ³		246 273
2.1 M&I water supply (Q=Sub-total I. Financial benefit (rever 1 Irrigation benefit 2 Water supply benefit 2.1 Domestic water supply Sub-total	(Q=200 lit/s)	1.8 ATION -896	US\$1	7,884,000	B-C: B/C:		US\$10 ³		246 273

•	economic.	rjnan	cial Analys	as of Floje	ect .		Sheet No.	24
Name of Project: Petrushaka Da	m Project					···		
COST	Work qua	ıntity	Unit	orice		Amout		mount
Item	Amount	Unit	D/C (US\$)	F/C (USS)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cost 1.1 Civil work 1.1.1 Preparatory works 1.1.2 Main construction works							:	
(1) Construction of Petrushka dam	2,079	10 ³ m ³	5.8 ³	13.5	12,058	28,135	2,090	40,192
(2) Construction of irrigation facilities	5,000	ha	1,500	3,500	7,500	17,500	1,300	25,000
Sub-total (Civil work cost)					19,558	45,635		65,192
Mechanical work Sub-total (Direct construction cost)								65,192
2. Indirect cost					<u> </u>			 -
Included in Direcet construction cost						-		
3 Annual O/M cost								4,010
Financial cost Economic cost (90% of financial cost)					19,558 17,602	1		65,192 58,673
b. BENEFIT Item	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)				Total (MKD.10 ³)	amount (US\$10 ³)
1 Economic benefit 1 Irrigation benefit (A=5,000 ha)	(WIKD/III)		(to mayea)					9,690
Sub-total						**		9,690
II. Financial benefit (revenue) l Irrigation benefit						-		9,435
Sub-total								9,435
Note:								
	-C: 3,41 /C: 1.0	8 US\$ 4	10 ³	B-C B/C FIRF	C: 0.9			·

				cial Analys				Sheet No.	2
Name of Project:	Kovanska Dam	Project							
COST		Work qua	untity	Unit	orice		out	Total a	
Item		Amount	Unit	D/C (USS)	F/C (USS)	D/C (US\$103)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³
Direct construction of Civil work 1.1.1 Preparatory wor 1.1.2 Main construction	·ks								
(1) Construction of K	ovanska dam	903	10 ³ m ³	7.3	17.0	6,582	15,358	1,141	21,9
(2) Construction of in	rigation facilities	2,000	ha	1,500	3,500	3,000	7,000	520	10,00
Sub-total (Civil work c	ost)					9,582	22,358		31,9
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct constructi	on cost)								31,9
2. Indirect cost								1	
Included in Direcet of	onstruction cost								
3 Annual O/M cost									1,8
inancial cost conomic cost (90% of finar	icial cost)					9,582 8,624	22,358 20,123		31,9 28,7
onditions: a. Exchage rate: US\$1. b.	0= MKD52.			(Jan.15, 199	9)	·			
BENEFI	Tika	Unit rate		Quantity					mount
Item		(MKD/m³)		(10 ³ m³/year)				(MKD.10 ³)	(US\$10
Economic benefit 1 Irrigation benefit	(A=6,690 ha)								4,1
Sub-total	•								4,1
Financial benefit (rev I Irrigation benefit	venue)								3,7
Sub-total		ļ		· · · · · · · · · · · · · · · · · · ·			y	 	3,
Note:		1			1				l

RESULT OF ECONOMIC/FINANCIAL EVALUATION

B-C: -3,096 US\$10³
B/C: 0.93
EIRR: 6.9%

-11,475 US\$10³ 0.75 4.1%

B-C: B/C: FIRR:

Sheet No. 26

Name of Project: Konsko Dam	Project							
COST	Work qu	antity	Unit p	rice		out	Total a	mount
Item	Amount	Unit	D/C (US\$)	F/C (U\$\$)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work 1.1.1 Preparatory works 1.1.2 Main construction works								
(1) Construction of Konsko dam	1,500	10 ³ m ³	6.5	15.2	9,800	22,866	1,699	32,666
(2) Construction of irrigation facilities	6,690	ha	1,500	3,500	10,035	23,415	1,739	33,450
Sub-total (Civil work cost)					19,835	46,281		66,116
1.2 Mechanical work (included in C/\) 1.3 Electrical work (included in C/\)								
Sub-total (Direct construction cost)		ļ						66,116
Indirect cost Included in Direct construction cost								
3 Annual O/M cost			·					4,309
Financial cost Economic cost (90% of financial cost)					19,835 17,851			66,116 59,504
a. Exchage rate: US\$1.0= MKD b. BENEFIT	Unit rate		(Jan.15, 199 Quantity (10 ³ m³/year)				Total	amount (US\$10 ³)
1. Economic benefit 1 Irrigation benefit (A=6,690 ha)	(MKD/m)	(10 m /year)				(MKD.10)	9,974
Sub-total								9,974
II. Financial benefit (revenue) 1 Irrigation benefit								10,099
			ļ					
Sub-total			<u> </u>			··		10,099
Sub-total Note:								10,099
								10,099
	ALUATION:							10,099

Benefit and Cost Estimate

Sheet No. 27

					143				
Name of Project:	Valandovo Area	Irrigatio	n Re	habilitation	Project				
COST	l de la la deservición	Work qua		Unit		Am	อนเ	Total a	mount
Item		Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
Direct construction cost Civil work 1.1.1 Preparatory works									
1.1.2 Main construction Consruction of irrigation		3,624	ha	,	2,000				7,254
•									
Sub-total (Civil work cost))								7,254
1.2 Mechanical work (5% of 1.3 Electrical work Sub-total (Direct construction	-								
2. Indirect cost (50% of D	ireact construction	coet)				<u></u>			
(including land acquisition	on and compensation	on, engine	L	J ee.					
administration cost and p	ohysical/price conti	ngencies)	Cinig I			<u> </u>			
3 Annual O/M cost (5% of									363
Financial cost Economic cost (90% of financia								,	7,254 6,529
Conditions: a. Exchage rate: US\$1.0=				(Jan.15, 199	9 by The Nat	ional Bank)			į.
BENEFIT	2. 1. c. strati doctas. 14.08	Unit rate		Quantity					arnount
Item		(MKD/m³)		(10 ³ m ³ /year)	<u> </u>			(MKD.mil.)	(US\$10 ³)
Economic benefit Water charge 1.1 1.2	(Ref.Appendix)							.	2,250
(50 % increase of curren	nt tariff)								
Sub-total II. Financial benefit (revent	ue)				<u> </u>				2,320
1.1 1.2		ž							
Sub-total									
Note:									
Total									
RESULT OF ECONOMIC/FIN	ANCIAL EVALU B-C: B/C:	9,996 5.60	 5 US \$:).	10 ³	B-C B/C	: 1.66			. :

Eco							Sheet No.	28
Name of Project: Irrigation Sysyt	em Bette	rment	Project in F	Resen			· · · · · · · · · · · · · · · · · · ·	
COST	Work qua	antity	Unit	orice	Am	out	Total a	mount
Item	Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD,mil.)	(US\$10 ³)
Direct construction cost								
1.1 Civil work			1]	
1.1.1 Preparatory works			. 1					
1.1.2 Main construction works		l			<u> </u>			
(1) Rehabilitation cost	5,955	ha						4,262
(2) Equipment cost	LS							228
(3) Post-harvest facility cost	LS	Ì					}	2,49
(4) Secondary/tertiary network		km						8,06
(1) occonda ji corda ji notiron		1,411		•				.,,,,,
Sub-total (Civil work cost) ,								15,04
	;							
1.2 Mechanical work							·	
1.3 Electrical work			i					
Sub-total (Direct construction cost)		<u> </u>					<u> </u>	
	<u> </u>	L						
2. Indirect cost (50% of Direct construction							<u> </u>	7,52
(including land acquisition and compensati	ion, engine	ering f	ee,		1 1 1			
administration cost and physical/price cont	ingencies)					7		
3 Annual O/M cost (10% of C/W cost)						,		1,50
inancial cost								22,57
conomic cost (90% of financial cost)]	i					20,31
Conditions: a. Exchage rate : US\$1.0= MKD52. b.		1	(Jan.15, 199	9)	x -			
onditions: a. Exchage rate : US\$1.0= MKD52. b. BENEFIT	Unit rate	· · · · · ·	Quantity	9)				amount
Conditions: a. Exchage rate : US\$1.0= MKD52. b. BENEFIT Item				9)			Total (MKD.mil.)	amount (US\$10 ³)
Conditions: a. Exchage rate : US\$1.0= MKD52. b. BENEFIT	Unit rate		Quantity	9)				
Conditions: a. Exchage rate: US\$1.0= MKD52. b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha)	Unit rate		Quantity	9)				(US\$10 ³)
onditions: a. Exchage rate: US\$1.0= MKD52. b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit 1 Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s)	Unit rate		Quantity	9)				(US\$10 ³) 5,92
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Enancial benefit (revenue)	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92
Conditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92 5,92
Conditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total I. Financial benefit (revenue) 1 Irrigation benefit	Unit rate (MKD/m³)		Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92
conditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total I. Financial benefit (revenue) I Irrigation benefit Water supply benefit	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Domestic water supply (Q=100 lit/s)	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Use Total Water supply benefit Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit URL Water supply (Q=100 lit/s) Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Use Total Water supply benefit Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Use Total Water supply benefit Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Use Total Water supply benefit Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	(US\$10 ³) 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Use Total Water supply benefit Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
enditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit User Sub-total Economic benefit (P=100 lit/s) Sub-total Note:	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52.b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit URL Water supply (Q=100 lit/s) Sub-total	Unit rate (MKD/m³)	2	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Domestic water supply (Q=100 lit/s) Sub-total Note:	Unit rate (MKD/m³))	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit 2.1 Dornestic water supply (Q=100 lit/s) Sub-total Note: Total	Unit rate (MKD/m³))	Quantity (10 ³ m ³ /year)	9)			(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit Domestic water supply (Q=100 lit/s) Sub-total Note: Total RESULT OF ECONOMIC/FINANCIAL EVALUE	Unit rate (MKD/m³) 16.2 18.0		Quantity (10 ³ m³/year)		; 31.660	US\$10 ³	(MKD.mil.)	5,92 5,92 5,92 6,38
onditions: a. Exchage rate: US\$1.0= MKD52 b. BENEFIT Item Economic benefit I Irrigation benefit (A=5,955 ha) Water supply benefit 2.1 M&I water supply (Q=100 lit/s) Sub-total Financial benefit (revenue) I Irrigation benefit Water supply benefit Water supply benefit User Sub-total Sub-total Water supply benefit Sub-total Note:	Unit rate (MKD/m³) 16.2 18.0 1.3 1.4 1.5 1.6 1.6 1.6 1.6 1.6 1.6 1.6	4 US\$	Quantity (10 ³ m³/year)	B-C B/C		US\$10 ³	(MKD.mil.)	5,92 5,92 5,92 6,38

Benefit and Cost Estimate

							Sheet No.	29
Name of Project: Ohrid Area Irrigation	on Rehabil	litation	Project					
COST	Work qu	antity	Unit	price	Amout		Total a	mount
ltem	Amount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
Direct construction cost 1.1 Civil work 1.1.1 Preparatory works 1.1.2 Main construction works (1) Irrigation area:	4,100	ha		2,000				8,200
Sub-total (Civil work cost)	4,100			2,000				0,200
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction cost)								
2. Indirect cost (50% of Direct construction	cost)	†						
(including land acquisition and compensation		ering f	ee,					
administration cost and physical/price conti 3 Annual O/M cost (5% of C/W cost)								410
Financial cost		1						8,200
Economic cost (90% of financial cost)			ŀ					7,380
Conditions: a. Exchage rate: US\$1.0= MKD52.			(Jan.15, 199	9 by The Nat	ional Bank)			
BENEFIT	Unit rate		Quantity	·				mount
Item	(MKD/m³)		(10 ³ m ³ /year)				(MKD.mil.)	(US\$10 ³)
Economic benefit Irrigation benefit (Ref.Appendix) (net return) Sub-total								4,845
II. Financial benefit 1 1.1 1.2 Sub-total								4,736
Note:								

Ann.11 - 29

539 US\$10³ 1.01 8.2%

B-C:

B/C: FIRR:

Total

RESULT OF ECONOMIC/FINANCIAL EVALUATION

B-C:

B/C: EIRR: 6,098 US\$103

1.14 10.5%

1:	.conomic	rman	cial Analys	is of rioje			Sheet No.	30
Name of Project: Podares Dam P	roject			•				
COST	Work qua	ntity	Unit s	orice		iout	Total a	nount
Item	Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$103)	F/C (US\$103)	(MKD,mil.)	(US\$10 ³)
Direct construction cost 1.1 Civil work 1.1.1 Preparatory works (10% of C/W) 1.1.2 Main construction works					·			
(1) Construction of Podares dam	4,162	10 ³ m ³	3.2	7.4	13,318	30,799	2,294	44,117
(2) Construction of irrigation facilities (3) Construction of water supply facility a. Tylorian intake	4,000	ha 1/sec	1,500	3,500	6,000	14,000	1,040	20,000
b. Pipeline (D=250 mm)c. Filter station	30,000 200	. 1	7.5	17.5	225	525	39 60	750 1,150
d. Service reservoir	8,640	ایا					17	325
Sub-total (Civil work cost)	<u>.</u>				19,543	45,324	3,450	66,342
1.2 Mechanical work (included in C/W 1.3 Electrical work (included in C/W Sub-total (Direct construction cost)					19,543	45,324	3,450	66,342
					15,545	10,027	3,150	00,5 12
Indirect cost Included in Direcet construction cost	· · · · · · · · · · · · · · · · · · ·	<u> </u>						
3 Annual O/M cost								4,028
Financial cost Economic cost (90% of financial cost)					-			66,342 59,708
Conditions: a. Exchage rate: US\$1.0= MKD52 b.	2.		(Jan. 15, 199	9)				
BENEFIT	Unit rate		Quantity				Total a	mount
Item	(MKD/m ³)		(10 ³ m ³ /year)				(MKD.10 ³)	(US\$10 ³)
Economic benefit Irrigation benefit (A=4,000 ha)								7,103
2 Water supply benefit 2.1 M&I water supply (Q=200 lit/s) Sub-total	16.2		3,153,600				51,088	982 8,085
II. Financial benefit (revenue) 1 Irrigation benefit								6,515
Water supply benefit 2.1 Domestic water supply (Q=200 lit/s) Sub-total	18.4)	3,153,600)			56,765	1,092 7,607
Note:								
RESULT OF ECONOMIC/FINANCIAL EVAL	and a state of the first transport of the state of the st	***	<u> </u>	<u> </u>			1	
B-			10 ³	B-C		7 US\$10 ³	÷	
B/ EIR				B/C FIRR				

			iciai Anaiys	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Sheet No.	31
Name of Project: Oraovica Dam F	roject							
ALCONOMICS COST INCLUDING TO A SECOND	Work qua	intity	Unit			nout		mount
Item	Amount	Unit	D/C (US\$)	F/C (US\$)	D/C (US\$10 ³)	F/C (US\$10 ³)	(MKD.mil.)	(US\$103)
1. Direct construction cost 1.1 Civil work 1.1.1 Preparatory works (10% of C/W) 1.1.2 Main construction works								
(1) Construction of Oraovica dam	890.0	10 ³ m ³	7.3	17.0	6,502	15,172	1,127	21,674
(2) Construction of irrigation facilities (3) Construction of water supply facility a. Tyrolean intake b. Pipeline (D450 mm, Q=300 l/sec) c. Filter station d. Service reservoir	0 0 0 0	l/sec m l/sec	1,500	3,500	0	0	0	0
Sub-total (Civil work cost)							1,127	21,674
1.2 Mechanical work (included in C/W of 1.3 Electrical work (included in C/W of Sub-total (Direct construction cost)			·				1,127	21,674
2. Indirect cost								
Included in Direcet construction cost						l		
3 Annual O/M cost	,							1,084
Financial cost Economic cost (90% of financial cost)								21,674
Conditions: a. Exchage rate: US\$1.0= MKD52. b. BENEFIT	Unit rate		(Jan.15, 1999))			Toul	
Item	(MKD/m ³)		(10 ³ m ³ /year)				(MKD.10 ³)	(US\$10 ³)
I. Economic benefit l Irrigation benefit			<u> </u>					0
2 Biological minimum (Q=100 l/sec) Sub-total	47.0		3,154				148,219	2,850 2,850
II. Financial benefit (revenue) 1 Irrigation benefit								0
2 Biological minimum (Q=100 l/sec) Sub-total	51.0		3,154				160,834	3,093 3,093
Note:								
RESULT OF ECONOMIC/FINANCIAL EVALUA	ATION		· · · · · · · · ·					
	B-C:			US\$10 ³	B-C:		US\$10 ³	
	B/C: EIRR:		1.02 8.2%		B/C: FIRR:			

Benefit and Cost Estimate

								Sheet No.	32
Name of Project: Mantovo A	rea Irri	gation	Reha	bilitation Pi	oject				
COST		Work qu	antity	Unit	price	Am	out	Total a	mount
Item		Imount	Unit	D/C (MKD)	F/C (US\$)	D/C (MKD)	F/C (US\$)	(MKD.mil.)	(US\$10 ³)
1. Direct construction cost 1.1 Civil work 1.1.1 Preparatory works 1.1.2 Main construction works (1) Irrigation area:		5,581	ha		2,000				11,162
Sub-total (Civil work cost)									
1.2 Mechanical work 1.3 Electrical work Sub-total (Direct construction cost)									
Indirect cost (50% of Direct constru			<u></u>	L					
(including land acquisition and compe	ensation	, engine	ering f	ee,	ļ				
administration cost and physical/price 3 Annual O/M cost (5% of C/W cost)	conting	gencies)					!		558
Financial cost			 	1					11,162
Economic cost (90% of financial cost)									10,046
BENEFIT		Unit rate		(Jan.15, 199	99 by The Na	tional Bank)) 		amount
Item	(3	MKD/m ³)	(10 ³ m ³ /year)				(MKD.mil.)	
Economic benefit Irrigation benefit (Ref.Append (net return)	ix)								5,360
Sub-total								ŀ	
II. Financial benefit 1 1.1 1.2									5,023
Sub-total									
Note:									
Total									
RESULT OF ECONOMIC/FINANCIAL EV	VALUA	TION		. 4		,		- 	
	B-C: B/C:	11,29 1.2	6 US\$ 6	10 ³	B-C B/C	: 1.0			
	EIRR:	12.59	%		FIRE	9.39	6		