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COMFAR TRAINING COURSE

ZIMBABWE DEVELOPMENT BANK, HARARE
2 - 20 JUNE 1986

UNIDO TEAM:

David Sussman
Wojciech Hubner
Robert Novak

FINAL REPORT

DATE: JUNE   1986

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1.0   PROJECT BACKGROUND:

   1.1   Purpose:

          The primary purpose of the mission decribed herein
          was to train 22 participants from the Zimbabwe
          Development Bank (ZDB), Harare and other central
          administration institutions in Zimbabwe in the
          practical application of UNIDO's Computer Model
          for Feasibility Analysis and Reporting (COMFAR).

   1.2   Sponsor:

          The project was sponsored by the Zimbabwe Development
          Bank (ZDB) as part of a six month programme of
          training for entering and junior   staff of the
          various development institutions.

   1.3   Location:-

          The seminar was held at the offices of the ZDB in
          Harare at the address indicated in Section 2.0.

2.0   DESCRIPTION OF SPONSORING INSTITUTION:

       The Zimbabwe Development Bank is a development finance
       institution which was incorporated under the Zimbabwe
       Development Bank Act No. 7 promulgated on 6th May, 1983.
       ZDB is governed by a Board of Directors consisting of
       eleven members of whom six are appointed by the Minister
       of Finance Economic Planning and Development and five
       are appointed by the external institutional shareholders

       The main objective of the ZDB is to assist in and promote
       the economic development of Zimbabwe. The Bank is
       mobilizing internal and external resources for economic
       development and finance projects in all sectors of the
       economy.

       The purposes of ZDB are:

       -      to mobilize internal and external resources of
              economic development and to finance projects in all
              sectors of the economy.

       -      to provide capital needed for expansion or
              modernization of existing enterprises or the
              creation of new enterprises.

       -      to engage alone or with other persons/institutions
              in financing loans and bonds, guaranteeing loans,
              underwriting and other related activities.

The Bank gives priority to projects which most closely comply with national development objective. Enterprises in the public and private Sector, locally owned, joint venture or foreign-owned are eligible for ZDB funding. It is 51% government owned, the other shareholders comprised of African and European institutions concerned with development.

ZDB staff and facilities are located at:

> Legal and General Building
> Julius Nyerere Way/Baker Avenue
> P.O. Box 1720
> Harare, Zimbabwe.

The Bank's principle officers are:

R.G.T.	Eich	Managing Director
X.M.	Kadhani	Senior Executive Officer
J.	Sorgenicht	Corporate Business Manager
J.	James	Assistant Corporate Businees Manager
R.	Jaravaza	Assistant Finance Manager

3.0   SEMINAR ORGANISATION AND TRAINING METHOD:

The training course covered the following main topics:-

1. Contents of financial analysis in a feasibility study.

2. Investment cost, production cost and financing plan. Activity flow chart for the financial analysis.

3. Configuration of the input data for the COMFAR system.

4. Configuration of the output schedules of COMFAR.

5. Assessment of a project on the basis of required financial statements in accordance with the COMFAR configuration.

6   Investment profitability analysis and financial project appraisal with application of COMFAR software.

7. Basic instructions on hardware usage and Disc Operating System.

8. Selected problems of the social cost-benefit evaluation and possible application of COMFAR in this field.

4.0 TRAINING METHOD:

The training course consisted of lectures and instructions given by the UNIDO experts team as well as practical exercise on personal computers and COMFAR software package.

Special attention was paid to practical exercises and individual work with the participants. Lectures were delivered during plenary sessions for all the participants. For the purpose of practical exercises participants were divided into 10 smaller team groups (2 - 3 persons) with a direct access to personal computers. Most of the instructions concerning hardware and COMFAR were made on individual basis.

The COMFAR system was used by the participants to prepare financial analysis for two local case studies: Sisal Bag Factory Project (Case I), Solvent Extraction Project (Case II).

Following the request of the Managerial Staff of Zimbabwe Development Bank the programme of the course was extended to cover selected problems of social cost - benefit evaluation and some aspects of application of existing COMFAR software package for this purpose.

5.0 PROGRAMME WORK SCHEDULE:

The UNIDO COMFAR Course was part of a comprehensive training six month programme for industrial development personnel organized by ZDB with assistance from UNDP (see Appendix No I).

The course programme was developed in consultation with Senior Executive Officer, X.M. Kadhani and is shown in Appendix No II.

A detailed description of the programme is given below as a possible model for future efforts of this type as the organization and sequence appeared to be highly appropriate.

DATE	SESSION	TIME	TOPICS
2/6/86	I	8.30-1030	Introduction to COMFAR Structure, Subsystems, Linkage Between Subsystems Tables and Schedules Role of COMFAR in Feasibility Analysis
	II	1100-1300	Hardware Requirements and Components MS/DOS Commands
	III	1400-1600	Practical Exercise Start-up. Basic DOS Operations General Presentation of COMFAR system.
3/6/86	I	0830-1030	Financial Analysis - Activity Flow Chart Aspects of financial analysis and their relation to COMFAR Input Table - Initial Investment, current investment, depreciation types
	II	1100-1300	Practical Exercise - Groups 1 - 5 DOS commands - Formatting, Backup, Delete Remove ; subdirectory structure
	III	1400-1600	Practical Exercise - Groups 6 - 10 (as above)
4/6/86	I	0830-1030	Discussion of Input Table Production Cost adjustments, Standard Costs, Production and Sales Programme.
	II	1100-1300	Practical Exercise - Groups 1 - 5 Deleting and Removing COMFAR from Hard Drive Loading COMFAR to hard drive from back-up Start-up operations of COMFAR.
	III	1400-1600	Practical Exercise - Groups 6 - 10 (as above).

5/6/86	I	0830-1030	Discussion of Input Table Production and sales Programme (Continued) working capital, Source of Finance
	II	1100-1300	Practical Exercise Group 1 -5 DATEN Commands (presentation and practice) Use of DATEN with provided data.
	III	1400-1600	Practical Exercise Groups 5 - 10 (as above)
6/6/86	I	0830-1030	Discussion of Input Table Review of Investment, Production Cost, Standard Cost,Production and Sales, Working Capital (including cash vs accrual accounting as used in COMFAR) Income Taxes, Allowances. Effects of Inflation on IRR IRRE. Inflation features of COMFAR (not available for standard Costs)
	II	1100-1300	Practical Exercises Group 1 - 5 Demonstration of DATEN options, Save Recovery System Review and analysis TABI using Report System Data Entry exercise continued Discussion of CALCUL System.
	III	1400-1600	Practical Exercises Groups 1-6 (as above)
9/6/86	I	0830-1030	Discussion of Schedules Investment, Sources of Finance Working Capital Production Costs Net Income Statement
	II	1100-1300	Practical Exercise Group 1 - 5 Complete input table for test data Produce selected and complete schedules Review schedules on monitor and printer and compare with TABO, TABI Discuss and review results, computations (particularly cash flow for ı V, IRR calculations)
	III	1400-1600	Practical Exercise Groups 6 -10 (as above)
10/6/86	I	0830-1030	Complete discussion of schedules' cash flow and Balance.COMFAR implementation
	II	1100-1300	Practical Exercise Groups 1 -5 Implementation system.COMFAR adjustments and sensitivity.
11/6/86	I	0800-1200	Case Study I- Sisal Bags Group 1 -5 Review of case, Data Entry Preparation Adjustments for 10-year life.

11.6 86	II	1300-1630	Same as above, Groups 6 - 10
12/6/86	I	0800-1200	Case Study I - Groups 1 - 5 First COMFAR run-no equity input Generation of Equity, Construction Period Interest, Operating Cost and Depreciation beyond project life.
	II	1300-1630	Same as above - Groups 6 - 10
13/6/86	I	0800-1200	Case Study I Groups 1 - 5 Adjustments for construction period overdraft (interest during construction period) - capitalization; Adjustments for period beyond project life and forced overdraft during production.
	II	1300-1630	Same as above Groups 6 - 10
16/6/86	I	0800-1200	Case Study I Groups 1 - 5 Final adjustments, sensitivity, IRRE determination; Relation between IRR/IRRE (leverage effect).
	II	1300-1630	Same as above Groups 6 - 10
17/6/86	I	0800-1200	Case Study II Oil Extraction Groups 1-5 Discussion of case, preparation (DATEN), first run without equity
	II	1300-1630	Same as above Groups 6 - 10
18/6/86	I	0800-1200	Case Study II Groups 1 - 5 Construction period adjustments, production period adjustments, sensitivity analysis, effects of inflation and cutoff rate for IRR.
	II	1300-1630	Same as above Groups 6 - 10
19/6/86	I	0830-1030	Plenary Session - Intro. to Social Cost Benefit Analysis - National Parameters and Shadow Pricing.
	II III	1100-1300 1400-1600	IDCAS method - COMFAR implementation UNIDO Guidelines and Guide - COMFAR applicability.
20/6/86	I	0830-1030	Practical Exercise Group 1 - 5 SCBA using COMFAR
	II	1100-1300	Practical Exercise Group 6 - 10 (Same as above)

6.0 PARTICIPANTS:

The number and description of participants and their institutions are summarised as follows:-

INSTITUTION	NUMBER OF PARTICIPANTS
Zimbabwe Development Bank	10
Industrial Development Corporation of Zimbabwe Limited	2
Standard Chartered Merchant Bank	1
Ministry of Finance, Economic Planning and Development	2
Reserve Bank of Zimbabwe	1
Ministry of Industry & Technology	5
Merchant Bank of Central Africa	1
TOTAL NUMBER OF PARTICIPANTS	22

The educational background of the group was as follows:-

DEGREE	NUMBER OF PARTICIPANTS
B. Economics	9
B. Business Studies	5
B. Accounting	2
M. Economics	1
M.B.A.	1
Other	4
	22

The participants were mostly trainees of the various institutions above who had been involved in a six-month programme of training sponsored by the ZDB with assistance from the United Nations Development Programme of which the COMFAR training was the penultimate stage.

A list of the participants is given in Appendix No III.

7.0 FACILITIES:

7.1 Physical facilities:

The seminar was held at the offices of ZDB in Harare. Two rooms were made available, one with three computers installed and the other with two.

Plenary sessions were held in the larger room which was equipped with overhead projector and flip-chart. The larger room was about 5m x 8m.

7.3 Hardware-Situation ofter arrival:

On Friday, 30 May, a first discussion concerning
the hardware-facilities of the Zimbabwe development
Bank took place in the office of the Director
General, Mr. Eich. The bank made available to the
programme 5 Wang-PC all equipped with IBM -
Emulation Card. The memory-capacity of all
machines was at the time 256 KB which is normally
not enough for running COMFAR. Additional
memory had been ordered and to be delivered
within the next few days. On the same day COMFAR
2.0 was loaded on one of the machines. During the
loading procedure the additional memory arrived,
so that the memory-capacity problem had been solved
on the same day. After configuration the IBM
Emulation Cards COMFAR 2.0 was executed on
the machines of ZDB.

Additionally it should be mentioned that the
support from ZDB was excellent, so that from the
hardware-side those few problems that existed were
readily resolved.

7.3 Hardware -Training during the COMFAR Seminar:

It was agreed with ZDB that at the beginning of the
seminar a training with the IBM-Disk operating system
MS/DOS should be held to give the participants a
basic background. Two problems occurred concerning
this training. The WANG-DOS was not compatible
to the IBM-DOS. IBM-DOS was loaded in addition to
the WANG-DOS to solve this problem. The second
problem was the number of participants. The
number increased from the 15 announced participants
to 22. At first access to the computers for such
a large group was difficult. On the second day the
participants were split into two groups, so that on
every computer two or maximum of three people
worked as a team. One group was trained before,
and the other group after the lunch break. For
the hardware - training two days excluding the first
day were used. At the beginning all basic
operations such as copying , deleting, formatting,
etc were introduced in theory and practiced on the
machines. At the end of this introduction to DOS
these operations were used in relation to the needs
concerning the installation and back-up of
COMFAR so that the participants would be prepared
to deal with basic problems that might arise
concerning system software. Additionally a handout
was prepared which covers the contents of the above
described DOS-training.

8.0   TEACHING MATERIALS:

Teaching materials used during the training course included:-

- COMFAR Manual
- Case I - Sisal bag project
- Case II - Solvent extraction plant
- Handouts (See Appendices No IV - X).
- Transparencies for an overhead projector.

9.0   THE UNIDO TEAM:

The composition of the UNIDO team was particularly suited for this programme.

In a COMFAR training course it is important that the following aspects be adequately covered by the UNIDO team:-

- Computer Hardware requirements
- Operating systems software
- COMFAR characteristics
- Technical aspects of project preparation

This team comprised the necessary skills and worked extremely effectively as a unit. UNIDO's purposes in regard to this type of training would be well-served by organizing teams to the greatest extent possible who possess the necessary composite skills and who also, ideally, have experience in working together as a team.

10.0   LOGISTICS ASPECTS:

Upon arrival, a problem was confronted concerning the visa of Dr. Hübner. Despite two telex messages from Vienna to UNDP, Zimbabwe, requesting that a visa be available upon arrival, the visa was not issued. Immigration officials at the airport communicated with UNDP, which then proceeded to arrange for a visa that was delivered to the airport about four hours later. As the UNDP office is officially closed on Friday afternoon, the day of arrival, it was only through the fortuitous presence of a UNDP official that a serious consequence was averted.

11.0   TEAM . RECOMMENDATIONS FOR FOLLOW-UP:

11.1   COMFAR Characteristics:

Several characteristics of COMFAR are indicated below which may require attention by the system analysts.

1.   Interest generated on loans during the construction period are included in pre-operational expense for purposes of amortisation, but are retired only by inclusion in non-interest bearing forced overdraft with funds

generated during production period. These amounts not only do not carry interest on interest, but also are not included in total assets investment which constitutes a distortion for IRR calculations A paper enclosed (See Appendix VII) offers possible corrections, but they would better be incorporated into the system software.

2. The team was confronted with the necessity of reducing project life from 15 years required by COMFAR. The system software should be adjusted for variable project life. A paper on the necessary adjustments for the existing system is shown in Appendix VIII.

3. IRRE calculations indicate a variety of problems which make this indicator unreliable. Relevant financial flows are ignored in the computation.

4. Declared overdraft was found not to be retired by available cash; although interest amounts continued to the end of the project.

5. Absence of inflation facility to Standard Costs severely limits the usefulness of this feature.

12.0 ACKNOWLEDGEMENTS:

The team wishes to acknowledge the valued assistance of the Managerial and support staff of the ZDB, in particular Mr. Eich and Mr. Kadhani, in the planning and execution of the programme. Also of the UNDP staff, Mr. Chuma was particularly helpful in support of the team.

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	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				JAN 2	JAN 3
A.M. WEEK 1					OPENING SESSION ADMINISTRATION ARRANGEMENTS
P.M.				INTRODUCTION TO ZDB; ZDB BUSINESS ENVIRONMENT: CORPORATE BUSINESS (ZDB CADETS ONLY)	INTRODUCTION TO THE ZIMBABWEAN ECONOMY
				ZDB STAFF	Prof. A.M. Hawkins
	JAN 6	JAN 7	JAN 8	JAN 9	JAN 10
A.M. WEEK 2	THE PROJECT CYCLE: IDENTIFICATION	THE PROJECT CYCLE: APPRAISAL	THE PROJECT CYCLE: OPERATIONS	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING
	Mr. A.C. Ntowa	Mr. A.C. Ntowa	Mr. A.C. Ntowa	Mr. P. McBurney	Mr. P. McBurney
P.M.	THE PROJECT CYCLE: FORMULATION	THE PROJECT CYCLE: IMPLEMENTATION	THE PROJECT CYCLE: EVALUATION	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING
	Mr. A.C. Ntowa	Mr. A.C. Ntowa	Mr. A.C. Ntowa	Mr. P. McBurney	Mr. P. McBurney

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	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				JAN 16	JAN 17
	JAN 13	JAN 14	JAN 15		
A.M.	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING
		Mr. P. McBurney	Mr. P. McBurney	Mr. P. McBurney	Mr. P. McBurney
WEEK 3	Mr. P. McBurney				
P.M.	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING	MARKET SURVEYS AND FORECASTING
				Mr. P. McBurney	Mr. P. McBurney
	Mr. P. McBurney	Mr. P. McBurney	Mr. P. McBurney	JAN 23	JAN 24
	JAN 20	JAN 21	JAN 22		
A.M.	ACCOUNTING AND INTERPRETATION OF FINANCIAL STATEMENTS (Corporate forms; Primary records; Trial Balance; Year end Statements)	ACCOUNTING & STATEMENTS (B/S - P & L A/C - S.A.F. Statements)	ACCOUNTING & STATEMENTS (B/S - P & L A/C - SAF Statements)	ACCOUNTING & STATEMENTS (Ratio analysis; interpretation of A/cs)	ACCOUNTING & STATEMENTS (Ratio analysis; interpretation of Accounts)
			Price Waterhouse	Price Waterhouse	Price Waterhouse
WEEK 4	Price Waterhouse	Price Waterhouse			
P.M.	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)
				Price Waterhouse	Price Waterhouse
	Price Waterhouse	Price Waterhouse	Price Waterhouse		

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	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	JAN 27	JAN 28	JAN 29	JAN 30	JAN 31
A.M. WEEK 5	ACCOUNTING AND STATEMENTS (Liquidity and Working capital management)	ACCOUNTING AND STATEMENTS (Depreciation, inflation etc)	ACCOUNTING AND STATEMENTS (Fixed & working capital requirements; operating and overhead costs)	ACCOUNTING AND STATEMENTS (valuation of shares; fixed capital, goodwill)	ACCOUNTING AND STATEMENTS (Gearing and assessment capacity to bear debt)
	Price Waterhouse	Price Waterhouse	Price Waterhouse	Price Waterhouse	Price Waterhouse
P.M.	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)	ACCOUNTING AND STATEMENTS (as above)
	Price Waterhouse	Price Waterhouse	Price Waterhouse	Price Waterhouse	Price Waterhouse
	FEB 3	FEB 4	FEB 5	FEB 6	FEB 7
A.M. WEEK 6	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Financial projections)	FINANCIAL ANALYSIS (Financial ratios analysis)
	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa
P.M.	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Analysis & estimation of capital costs)	FINANCIAL ANALYSIS (Financial projections)	FINANCIAL ANALYSIS (Financial ratios analysis)
	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	FEB 10	FEB 11	FEB 12	FEB 13	FEB 14
A.M.	FINANCIAL ANALYSIS (Theory of Time value of money)	FINANCIAL ANALYSIS (Measures of Project worth)	FINANCIAL ANALYSIS (break-even and sensitivity analysis)	FINANCIAL ANALYSIS (Debt repayment schedules)	FINANCIAL ANALYSIS (Case illustration)
	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa
WEEK 7 P.M.	FINANCIAL ANALYSIS (Theory of Time value of money)	FINANCIAL ANALYSIS (Measures of Project worth)	FINANCIAL ANALYSIS (Break-even and sensitivity analysis)	FINANCIAL ANALYSIS (Sources and alternative methods of project finance)	FINANCIAL ANALYSIS (Case illustration)
	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa	Mr. Sekyere-Abankwa
	FEB 17	FEB 18	FEB 19	FEB 20	FEB 21
A.M.	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS
	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson
WEEK 8 P.M.	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS	ECONOMIC ANALYSIS
	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson	Dr. Peter Robinson

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		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		FEB 24	FEB 25	FEB 26	FEB 27	FEB 28
A.M.		PROJECT SCHEDULING	PROJECT SCHEDULING	PROJECT SCHEDULING	PROJECT SUPERVISION & MONITORING	PROJECT SUPERVISION AND MONITORING
WEEK 9		Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu
		PROJECT SCHEDULING	PROJECT SCHEDULING	PROJECT SCHEDULING	PROJECT SUPERVISION & MONITORING	PROJECT SUPERVISION AND MONITORING
		Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu	Mr. M.A. Fashanu
		MARCH 3	MARCH 4	MARCH 5	MARCH 6	MARCH 7
A.M.		CASE STUDY 1: SISAL BAG PROJECT	C S I: SYNDICATES	C S I: SYNDICATES	C S I: SYNDICATES	C S I: WRITE UPS
WEEK 10		M T OWA	M T OWA	M T OWA	M T OWA	M T OWA
P.M.		C S I: SYNDICATES	C S I: SYNDICATES	C S I: SYNDICATES	C S I: SYNDICATES	C S I: WRITE UPS
		M T OWA	M T OWA	M T OWA	M T OWA	M T OWA

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	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	MARCH 10	MARCH 11	MARCH 12	MARCH 13	MARCH 14
A.M.	DISCUSSION OF SYNDICATE REPORTS (C S I)	LEGAL CONSIDERATIONS IN PROJECT WORK	VISIT TO CONE TEXTILES	TECHNOLOGY AND EQUIPMENT	TECHNOLOGY AND EQUIPMENT
WEEK 11	Mr. T. R. Croal	Mr. B. Williams	Mr. D. James	Eng. E.D.D. Cochrane	Eng. E.D.D. Cochrane
P.M.	DISCUSSION OF SYNDICATE REPORTS (C S I)	LEGAL CONSIDERATIONS IN PROJECT WORK	FREE	TECHNOLOGY AND EQUIPMENT	TECHNOLOGY AND EQUIPMENT
	Mr. A. C. Harrison	Mr. B. Williams		Eng. E.D.D. Cochrane	Eng. E.D.D. Cochrane
	MARCH 17	MARCH 18	MARCH 19	MARCH 20	MARCH 21
A.M.	PRIVATE STUDY	PRIVATE STUDY	PRIVATE STUDY	PRIVATE STUDY	COMPREHENSIVE TEST
WEEK 12					
P.M.	PRIVATE STUDY	PRIVATE STUDY	PRIVATE STUDY	PRIVATE STUDY	FREE

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	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	MARCH 24	MARCH 25	MARCH 26	MARCH 27	MARCH 28
WEEK 13 A.M.	AGRICULTURAL SECTOR IN ZIMBABWE STRUCTURE AND ISSUES	APPRAISAL OF AGRICULTURAL PROJECTS	APPRAISAL OF AGROINDUSTRIAL PROJECTS	AGROINDUSTRIAL PROJECTS	HOLIDAY
	Mr. M. G. Hallam	Mr. M. G. Hallam	Mr. C. R. Spencer	Mr. C. R. Spencer	
P.M.	ISSUES RELATING TO VARIOUS TYPES OF AGRICULTURAL PROJECTS	APPRAISAL OF AGRICULTURAL PROJECTS	AGROINDUSTRIAL PROJECTS	AGROINDUSTRIAL PROJECTS	HOLIDAY
	Mr. M. G. Hallam	Mr. M.G. Hallam	Mr. C.R. Spencer	Mr. C. R. Spencer	
	MARCH 31	APRIL 1	APRIL 2	APRIL 3	APRIL 4
WEEK 14 A.M.	HOLIDAY	NATIONAL ACCOUNTS	NATIONAL ACCOUNTS	BUDGET	BALANCE OF PAYMENTS
		KADHANI	Mr. X.M. Kadhani	Mr. D. Matongwazi	Mr. O.E. Hove
P.M.	HOLIDAY	NATIONAL ACCOUNTS	NATIONAL ACCOUNTS	BUDGET	BALANCE OF PAYMENTS
		KADHANI	Mr. X. M. Kadhani	Mr. D. Matongwazi	Mr. O.E. Hove

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	APRIL 7	APRIL 8	APRIL 9	APRIL 10	APRIL 11
A.M.	R. B. Z. Role & Activities	MERCHANT BANKING	MONEY & CAPITAL MARKET INSTITUTIONS	INVESTMENT APPRAISAL; INTEREST RATES	INSURANCE & PENSION FUNDS
WEEK 15	Mr. R. Wilde (R.B.Z.)	Mr. F. Mhwati (M.B.C.A)	BARD	BARD	Mr. Z. Ratisai (Old Mutual)
P. M.	Z. S. E: How does it work?	COMMERCIAL BANKING	MOBILISATION OF FINANCIAL RESOURCES.	FREE	INSURANCE AND PENSION FUNDS
	Mr. R. Wilde (R.B.Z.)	P. Wood(Barclays)	BARD		Mr. Z. Ratisai (Old Mutual)
	APRIL 14	APRIL 15	APRIL 16	APRIL 17	APRIL 18
A.M.	MANUFACTURING: BROAD CHARACTERISTICS; RAW MATERIALS	MANUFACTURING: CAPITAL GOODS	MINING	FREE	HOLIDAY
WEEK 16	Dr. D. Ndhlela	Dr. D. Ndhlela	M. Wakatama		
P.M.	MANUFACTURING: DOMESTIC AND EXPORT MARKETS.		MINING	FREE	HOLIDAY
	Dr. D. Ndhlela		M. Wakatama		

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	APRIL 21	APRIL 22	APRIL 23	APRIL 24	APRIL 25
A.M.	VISIT TO ZINCOSTEEL	DMB - Kadoma	WILLOWVALE MOTORS	VISIT TO AN OIL PROCESSING PLANT	CASE STUDY II SYNDICATES
WEEK 17				PROF. RWEGASIRA	PROF. RWEGASIRA
P.M.	LANCASHIRE STEEL	Kadoma SPINNERS WEAVERS	DAHMAR	INTRODUCTION TO CASE STUDY II	CASE STUDY II SYNDICATES
				PROF. RWEGASIRA	PROF. RWEGASIRA
	APRIL 28	APRIL 29	APRIL 30	MAY 1	MAY 2
A.M.	CASE STUDY II SYNDICATES	CASE STUDY II SYNDICATES	CASE STUDY II SYNDICATES	HOLIDAY	CASE STUDY II WRITE - UPS
WEEK 18	RWEGASIRA	RWEGASIRA	RWEGASIRA		RWEGASIRA
P.M.	CASE STUDY II SYNDICATES	CASE STUDY II SYNDICATES	CASE STUDY II SYNDICATES	HOLIDAY	CASE STUDY II WRITE - UPS
	RWEGASIRA	RWEGASIRA	RWEGASIRA		RWEGASIRA

ZIMBABWE DEVELOPMENT BANK: TRAINING PROGRAMME FOR PROJECT OFFICERS, JANUARY – JUNE, 1986

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	MAY 5	MAY 6	MAY 7	MAY 8	MAY 9
A.M.	C S IV: PRESENTATION & DISCUSSION OF SYNDICATE REPORTS.	EXCHANGE CONTROL	FOREX ALLOCATION SYSTEM	CORPORATE TRANSACTION IN INVESTMENT	FREE
WEEK 19	RWECHUNGURA	Mr. C Chikaura	CHITANJE		
P.M.	C S II: PRESENTATIONS AND DISCUSSION OF SYNDICATES REPORTS	GVT. ECONOMIC & FINANCIAL COMMITTEES	PIC and FOREIGN INVESTMENT	C. S. O.	FREE
	RWECHUNGURA	Kadhani	? Harr	Dr. Mandishona	
	MAY 12	MAY 13	MAY 14	MAY 15	MAY 16
A.M.	CASE STUDY III: SYNDICATES	CASE STUDY III SYNDICATES	CASE STUDY III SYNDICATES	CASE STUDY III: SYNDICATES	CASE STUDY III:
WEEK 20					
P.M.	CASE STUDY III SYNDICATES	CASE STUDY III SYNDICATES	CASE STUDY III SYNDICATES	CASE STUDY III SYNDICATES	CASE STUDY III

GENERAL DEVELOPMENT OF BASIC TRAINING PROGRAMME FOR PROJECT OFFICERS, JANUARY – JUNE, 1986

		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		MAY 19	MAY 20	MAY 21	MAY 22	MAY 23
WEEK 21	A.M.	CASE STUDY III:			(in class of 2)	
	P.M.	CASE STUDY III:			(in class of 2)	
		MAY 26	MAY 27	MAY 28	MAY 29	MAY 30
WEEK 22	A.M.	HOLIDAY	COMMUNICATION SKILLS	WORD PROCESSING	WORD PROCESSING	WORD PROCESSING
			D. Young (Grp)			
	P.M.	HOLIDAY	COMMUNICATION SKILLS	WORD PROCESSING	WORD PROCESSING	WORD PROCESSING
			D. Young (Grp)			

PAGE 11

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	JUNE 2	JUNE 3	JUNE 4	JUNE 5	JUNE 6
A.M.	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
WEEK 23	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO
P.M.	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO
	JUNE 9	JUNE 10	JUNE 11	JUNE 12	JUNE 13
A.M.	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
WEEK 24	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO
P.M.	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO

ZIMBABWE DEVELOPMENT BANK: TRAINING PROGRAMME FOR PROJECT OFFICERS, JANUARY – JUNE, 1986

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
JUNE 16	JUNE 17	JUNE 18	JUNE 19	JUNE 20
USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
U N I D O	U N I D O	U N I D O	U N I D O	U N I D O
USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS	USE OF COMPUTERS
U N I D O	U N I D O	U N I D O	U N I D O	U N I D O
JUNE 23	JUNE 24	JUNE 25	JUNE 26	JUNE 27
INTERVIEWING TECHNIQUES	INTERVIEWING	WORKSHOP	WORKSHOP	COURSE EVALUATION CLOSING SESSION
Mr. David Wilson	Mr. David Wilson	Mr. David Wilson	Mr. David Wilson	
INTERVIEWING	INTERVIEWING	WORKSHOP	WORKSHOP	

COMFAR SEMINAR: ZIMBABWE DEVELOPMENT BANK FROM 2ND - 20TH JUNE 1986

WEEK 1	SESSION	MONDAY - 02	TUESDAY - 03	WEDNESDAY - 04	THURSDAY - 05	FRIDAY - 06
	I 08.30-10.30	Intro. to Comfar (W.H/D.S)	Intro. Financial Analysis Investment Cost, Production Cost (W.H./D.S)	Production Cost; Working Capital; Sources of Finance; Capital Structure Repayment Schedule (W.H/D.S)	Dept. & Residual Value Financial Statements Inflation (W.H./D.S)	Investment Appraisal methods Uncertainty (sensitivity) (W.H./D.S)
	II 11.00-13.00	Hard are Req'ts. & Components IBM DOS (R.N.)	Exercise:Group 1-5 DOS Basic COMFAR Operations	Exercise: Group 1-5 DOS Basic COMFAR Operations	Exercise Group 1-5 DATEN	Exercise: Group 1-5 CALCUL/REPORT
	III 14.00-16.00	Exercise: Basic COMFAR Operations	Exercise:Group 6-10	Exercise:Group 6-10	Exercise:Group 6-10	Exercise: Group 6 -10
WEEK 3	SESSION	MONDAY - 09	TUESDAY -10	WEDNESDAY - 11	THURSDAY - 12	FRIDAY - 13
	I 08.30-10.30	Summary-Comfar Input Table/Output Table (W.H/D.S)	Summary of Schedules Implementations & Sate recovery (R.N)	08.00 CASE STUDY I SISAL BAG DROS Group 1 - 5 12.00	CASE STUDY I SISAL BAG DROS Group 1 - 5	CASE STUDY I SISAL BAG DROS Group 1 - 5
	II 11.00-13.00	Exercise: Group 1 - 5 CALCUL/REPORT	Exercise: Group 1 - 5 Implementation & Sate Recovery	13.00 CASE STUDY I	CASE STUDY I	CASE STUDY I
	III 14.00-16.00	Exercise: Group 6-10	Exercise Group 6 -10	Group 6 - 10	Group 6 - 10	Group 6 - 10
	17.00			17.00		
WEEK 3	SESSION	MONDAY - 16	TUESDAY - 17	WEDNESDAY - 18	THURSDAY - 19	FRIDAY - 20
	I	9800 CASE STUDY II SOLVENT EXTRACTION Group 1 -5	CASE STUDY II SOLVENT EXTRACTION Group 1 - 5	CASE STUDY II SOLVENT EXTRACTION Group 1 - 5	0830 INTRO. TO SCBA (D.S)	GUIDELINES METHOD (D.S)
	II	13.00 CASE STUDY II SOLVENT EXTRACTION Group 6 - 10	CASE STUDY II SOLVENT EXTRACTION Group 6 - 10	CASE STUDY II SOLVENT EXTRACTION Group 6 - 10	1030 13.00 14.00 IDCAS METHOD (W.H.)	GUIDELINES/COMFAR & OTHER METHODS (D.S.)
	III	17.00			IDCAS/COMFAR (W.H.) 16.00	DISCUSSION (W.H./D.S.)
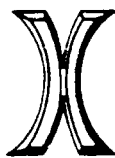
ZDB TRAINING PROGRAMME FOR PROJECT OFFICERS

02 JANUARY — 27 JUNE, 1986

COMFAR PROGRAMME: ATTENDANCE LIST

ZIMBABWE DEVELOPMENT BANK:

MR YONA BANDA

Year of Birth: 1960; BSc. Econ. (1984); previously worked as Accounts Clerk and Secondary School Teacher.

MR. GODFREY S. BVUTE

Year of Birth: 1961; BSc.Econ. (1985); previously worked as a clerk in Insurance, Taxes and a Secondary School Teacher.

MR. PINIEL CHIPATO:

Year of Birth:1961; B.Acc (1984); previously worked as a Secondary School Teacher, and Taxes Department.

MISS RUMBIDZAI CHIPERE:

Year of Birth: 1963; BSc.Econ. (1985); previously worked as a pensions clerk and secondary school teacher.

MISS LETWINA FUSHAI:

Year of Birth: 1961; BBS (1982); several years banking experience.

MR. PETER GWENZI:

Year of Birth: 1959; B.Acc (1984); several years banking experience

MR. NYASHA J. MAKUVISE

Year of Birth: 1962; BSc.Econ. (1984); previously worked as a teacher and Field Enumarator.

MR. MACMASTER KWARAMBA

YEAR OF BIRTH: 1963; BBS (1985).

MR. CRISPEN ZHARARE

Year of Birth: 1961; BSc.Econ. (1983); former teacher.

MR. ARTHUR ZIHANZU

Year of Birth: 1959; BSc.Econ. (1984); previously worked as a Bank Teller and Management Trainee.

INDUSTRIAL DEVELOPMENT CORPORATION OF ZIMBABWE LIMITED

MR. PHANUELL M.T. SIBANDA

Year of Birth: 1955; MSc. Econ.; previously worked for Ministry of Trade and Commerce as an Import planner; currently Project Officer.

MR. MONDAY D. MOYO

Year of Birth: 1953; MBA. ; currently working as a Financial Analyst.

STANDARD CHARTERED MERCHANT BANK

MR. BRUCE EESON

Year of Birth: 1957; BBS (1982); previously worked as Marketing Manager; Now Economic Officer.

MINISTRY OF FINANCE ECONOMIC PLANNING AND DEVELOPMENT:

MR. C. MHLOPE

BSc. Econ. (1984); currently Admin Officer in FEPD.

MR. DAVID MAKOMBE NGULUBE

Year of Birth: 1960; BSc. Econ. (1983); previously employed as a Teacher, now Administrative Officer in FEPD.

RESERVE BANK OF ZIMBABWE

MR. RAPHAEL GODFREY NYADZAYO

Year of Birth: 1952; B.Com. (UNISA) (1984); previously worked as a Teacher and now Assistant to the General Manager.

3/...........

MINISTRY OF INDUSTRY AND TECHNOLOGY

MR. JOHN HUROYIMWE GUSHA

Year of birth: 1939; currently employed as Under Secretary - Light Industries Section.

MR. RICHARD VIAJI

Year of Birth: 1954; BA Economics; currently employed as Assistant Secretary.

MR. K. CHITIMA:

Year of Birth: 1961; BBS. HONS, currently employed as Admin. Officer.

MISS MARILYN C. CHOGUYA

Year of Birth: 1959; HND Business Studies; currently employed as a Senior Admin. Officer.

MISS MAUREEN MAGUMEDE NCUBE

Year of Birth: 1957; currently employed as Senior Administrativ-Officer.

MERCHANT BANK OF CENTRAL AFRICA

MR. CHARLES CHIWARA

Year of Birth: 1957; B.A. Modern Studies, previously worked for Zimbabwe Banking Corporation, currently employed by Merchant Bank of Central Africa Limited.
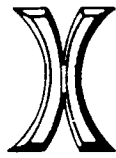
ZDB TRAINING PROGRAMME FOR PROJECT OFFICERS

02 JANUARY — 27 JUNE, 1986

Configuration and

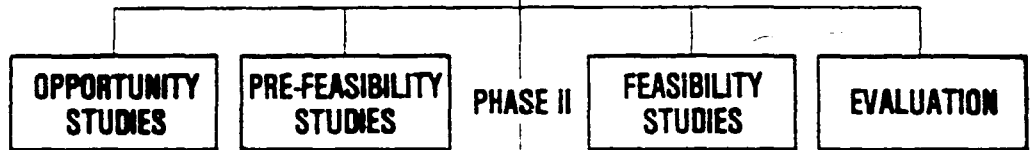Application of COMFAR

CONTENTS OF A FEASIBILITY STUDY:

1 Executive summary

2 Project **background** and history

3 Market **and plant** capacity

4 Material inputs

5 Location and site

6 Project engineering

7 Plant organization and overhead costs

8 Manpower

9 Project implementation

11 Financial **and** economic evaluation

Annexes

UNIDO - FEAS

```
                    ┌─────────────────────────┐
                    │       INVESTMENT        │
                    │   PROJECT DEVELOPMENT   │
                    │         CYCLE           │
                    └─────────────────────────┘
                                │
                            PHASE I
                    ┌─────────────────────────┐
                    │      PRE-INVESTMENT     │
                    └─────────────────────────┘
```

| OPPORTUNITY STUDIES | PRE-FEASIBILITY STUDIES | PHASE II | FEASIBILITY STUDIES | EVALUATION |

| SUPPORT STUDIES | SUPPORT STUDIES |

```
                    ┌─────────────────────────┐
                    │       INVESTMENT        │
                    └─────────────────────────┘
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| ENGINEERING DESIGNS | NEGOTIATING CONTRACTING | CONSTRUCTION | TRAINING | PLANT COMMISSIONING |
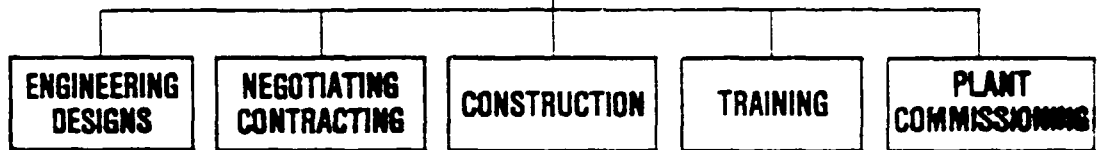
PHASE III

```
                    ┌─────────────────────────┐
                    │       OPERATION/        │
                    │       PRODUCTION        │
                    └─────────────────────────┘
```

What it is?

COMFAR = The COMPUTER MODEL for FEASIBILITY ANALYSIS and REPORTING.

> A software package for personal computers designed for project analysis & investment decisions.

> A cash-flow oriented model to compute the financial tables required for opportunity, pre-feasibility and feasibility studies

> A tool for financial analysis based on the UNIDO Manual

> A user **friendly** and dialogue oriented computer model, easy to learn and operate.

THE **COMFAR** © MODEL

is a DIALOQUE SYSTEM
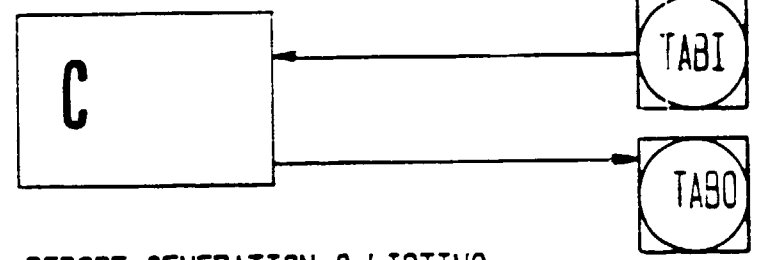it has 3 SUB-SYSTEMS:

COMFAR

DATEN ... Data Entry System
CALCUL .. Calculation System
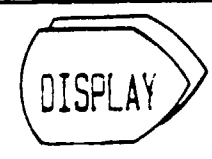REPORT .. Report Generation
and Listing

COMFAR 3/83

THE USE OF COMFAR

DATA ENTRY

D	I
	U

- TABI → new TABLE
- TABI → old TABLE
- TABI → new TABLE

CALCULATION

C

- TABI
- TABO
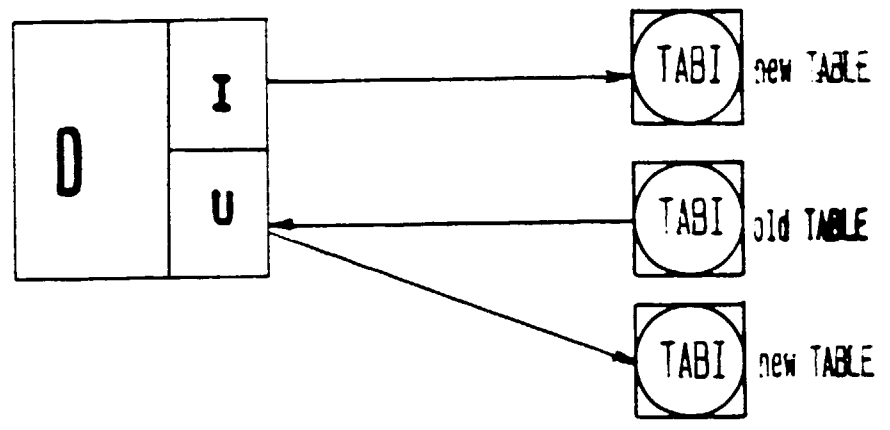
REPORT GENERATION & LISTING

R

- TABO
- TABI

DISPLAY
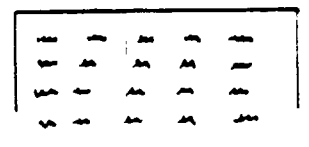
PRINT
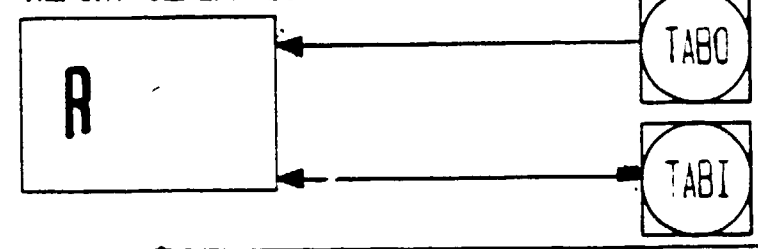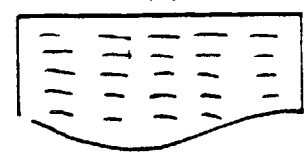
TABLE (S)

SCHEDULES

A. Text variables:

1. Project Name
2. Date + Time
3. Remarks
4. Accounting currency
5. Product Name (up to 6)

B. General variables

1. Foreign currency convertion rate.
2. Local currency convertion rate
3. Duration of construction, years
4. Planning during construction.
5. Cashflow discounting rates.
6. Equity / Subsidy conditions.
7. Loan Conditions.

C. INPUT TABLE (TABI)

INPUT TABLE: TAB1

	C1 C2 C3 ...	..C19
L1	foreign	
L24	INITIAL INVESTMENT	
	local	
L25	foreign	
L48	CURRENT INVESTMENT	
	local	
L51	foreign	
L107	PRODUCTION COSTS	
	local	
L110	foreign	
L181	PRODUCTION and SALES PROGRAMME	
	local	
L182	foreign	
L190	WORKING CAPITAL REQU.	
	local	
L191	foreign	
L204	SOURCE of FINANCE	
	local	
L205	INCOME TAX, USE of INCOME	
L213		

COMFAR 3/83

OUTPUT TABLE   TABO (+TABW)

C1 C2 C3 ...   .. C18

L1	**foreign** consolidated + (local) — INITIAL INVESTMENT
L53	**foreign** local + (consolidated) — FINANCE (INITIAL INVESTMENT)
L56 / L105	**foreign** local + Total — SALES 6 PRODUCTS
L106 / L148	**foreign** consolidated — PRODUCTION COSTS 6 PRODUCTS
L151 / L182	**foreign** consolidated + (local) — CURRENT INVESTMENT
L185 / L220	**foreign** local + (consolidated) — FINANCE (DURING PRODUCTION)
L221 / L240	INCOME TAXATION / DISCOUNTED CASHFLOW

COMFAR 3/83

$\boxed{\text{COMFAR}}$ produces the schedules as described in chapter $\overline{X}$ of the UNIDO manual:

- INITIAL FIXED INVESTMENT COST

- TOTAL INVESTMENT COST DURING PRODUCTION

- TOTAL PRODUCTION COSTS

- WORKING CAPITAL REQUIREMENT

- SOURCES OF FINANCE

- CASH - FLOW TABLES
  - FOR FINANCIAL PLANNING
  - DISCOUNTED CASH FLOW
    (NPV , IRR)

- NET INCOME STATEMENT

- PROJECTED BALANCE SHEET

{ TOTAL INITIAL INVESTMENT /
{ TOTAL CURRENT INVESTMENT

CONTENTS OF
COMFAR SCHEDULES:

TOTAL
INVESTMENT COSTS

Year

{ Land
Buildings and civil works
Auxiliary and service facilities
Incorporated fixed assets
Plant machinery and equipment

> Total <u>fixed</u> Investment

> Pre-production capital expenditures
> Working Capital

Total investment costs
Of if foreign, in %

CONTENTS OF COMFAR SCHEDULES:

TOTAL PRODUCTION COSTS

Year

% of nom. capacity (single product only)
Raw material A
Other raw materials
Energy
Utilities
Labour, direct
Repair
Spares
Factory overheads

Factory costs
Administrative overheads
Indir. costs, sales and distribution
Direct costs, sales and distribution ⟶ OPER.COS
Depreciation
Financial costs

Total manufacturing costs

Costs per unit (single product)
Of it foreign, %
Cf it variable, %
Of it direct, %
Total labour

CONTENTS OF COMFAR SCHEDULES:

NET WORKING CAPITAL

Coverage
Year

Current assets &
  ⟩Accounts receivable
  ⎧Inventory and materials
  ⎪Energy
⟩⎨Spares
  ⎪Work in progress
  ⎩Finished products
⟩Cash in hand
Total current assets
Current liabilities and
Accounts payable

Net working capital
Increase in working capital

Net working capital, local currency
Net working capital, foreign currency

CONTENTS OF
COMFAR SCHEDULES:

SOURCE OF FINANCE

Year

> Equity, ordinary
  Equity, preference
> Subsidies, grants

     Loan AF ⎫
     Loan BF ⎬
     Loan CF ⎭
   ⎧ Loan AL
   ⎨ Loan BL
   ⎩ Loan CL

  Total loan
  ─────────────

> Current liabilities
  Bank overdraft

  Total funds available
  ─────────────────────

  retained profit not included

CONTENTS OF
COMFAR SCHEDULES:

CASHFLOW TABLES

Year

Total CF-inflow

- Financial resources
- Sales

Total CF-outflow

- Total assets
- Operating costs
- Debt service and interest
- Repayment
- Corporate tax
- Dividends paid

Surplus (deficit)
Cumulated cash balance
Inflow local currency
Outflow local currency
Surplus (deficit) local currency
Inflow foreign currency
Outflow foreign currency
Surplus (deficit) foreign currency

NET
-CASH-FL -> NPV calculation

CONTENTS OF COMFAR SCHEDULES:

NET INCOME STATEMENT

Year

Total sales, including sales tax
Less: variable costs, including sales tax

Variable margin
As % of total sales

— Non-variable costs, including depreciation

Operational margin
As % of total sales

— Cost of finance

> Gross profit
Allowances
Taxable profit
. Tax

> Net profit

— Dividends paid
Undistributed profit
Accumulated undistributed profit

> Gross profit, % of total sales
{ Net profit, % of total sales
{ Net profit, % of equity
Net profit + interest, % of investment

CONTENTS OF
COMFAR SCHEDULES:

PROJECTED
BALANCE-SHEET

Year

Total assets

Fixed assets, net of depreciation
Construction in progress
Current assets
Cash, bank
Cash surplus, finance available

Total liabilities

Equity capital
Reserves, retained profit
Profit (loss)
Long and medium term debt
Current liabilities
Bank overdraft, finance required
Total debt

Equity, % of liabilities

COMMERCIAL PROFITABILITY

INVESTMENT PROFITABILITY

- SIMPLE METHODS
  - SIMPLE RATE OF RETURN
  - PAY-BACK PERIOD

- DISCOUNTED CASH-FLOW METHODS
  - NET PRESENT VALUE
  - INTERNAL RATE OF RETURN
  - BENEFIT-COST RATIO

FINANCIAL ANALYSIS

- LIQUIDITY ANALYSIS
- CAPITAL STRUCTURE ANALYSIS

  - Long-term debt/equity
  - Current ratio
  - Return on sales
  - Debt-service ratio
  - Inventory turnover

NPV — NET PRESENT VALUE

$$NPV = NCF_0 + NCF_1 \cdot a_1 +$$

$$NCF_2 \cdot a_2 \quad \ldots \ldots + NCF_t \cdot a_t$$

$NCF \rightarrow$ Net Cash Flow in year t

DEPENDS on:
- Discount rate
- Distribution of income
- Life period

+ ABSOLUTE MEASURE OF
          SURPLUS GENERATED

(DCF)
- depends on choice of disc. r.
- limitation in comparing.
- how far from the margin
    of acceptability to

IRR → discount rate at which PV inflows = PV out

$$IRR = i_1 + \frac{\overset{+}{PV}(i_2 - i_1)}{\overset{+}{PV} + NV}$$
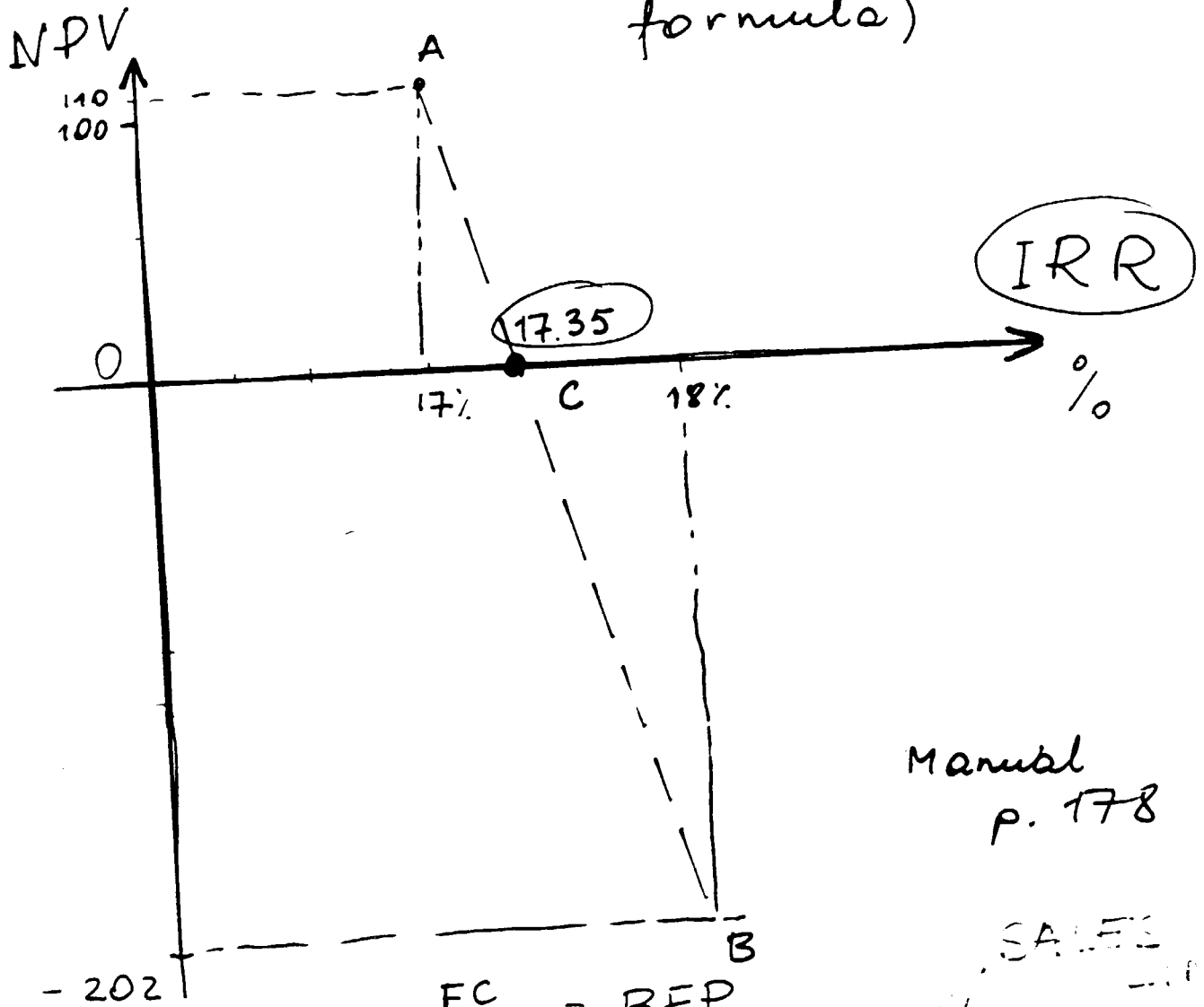
(linear interpolation)$^{(-)}$

PROCEDURE

1) — Back to NPV

2) — USE HIGHER disc.

3) FIND a discount rate with negative NPV

+COMPARABLE with INTEREST RATE

— no indication of size

— may be severe

— inconsistant with

IRR - GRAPHICAL METHOD

(linear interpolation formula)

NPV

A

110
100

IRR

17.35

0

17%   C   18%   %

Manual
p. 178

B

- 202

$$\frac{FC}{SP - VC} = BEP$$

SALES LINE

INCOME, COST

RECEIPT

TOTAL COST

BREAK-EVEN

VARIABLE COST area

VARIABLE COST

LOSSES

FIXED COST LINE

FIXED COST AREA

QUANTITY
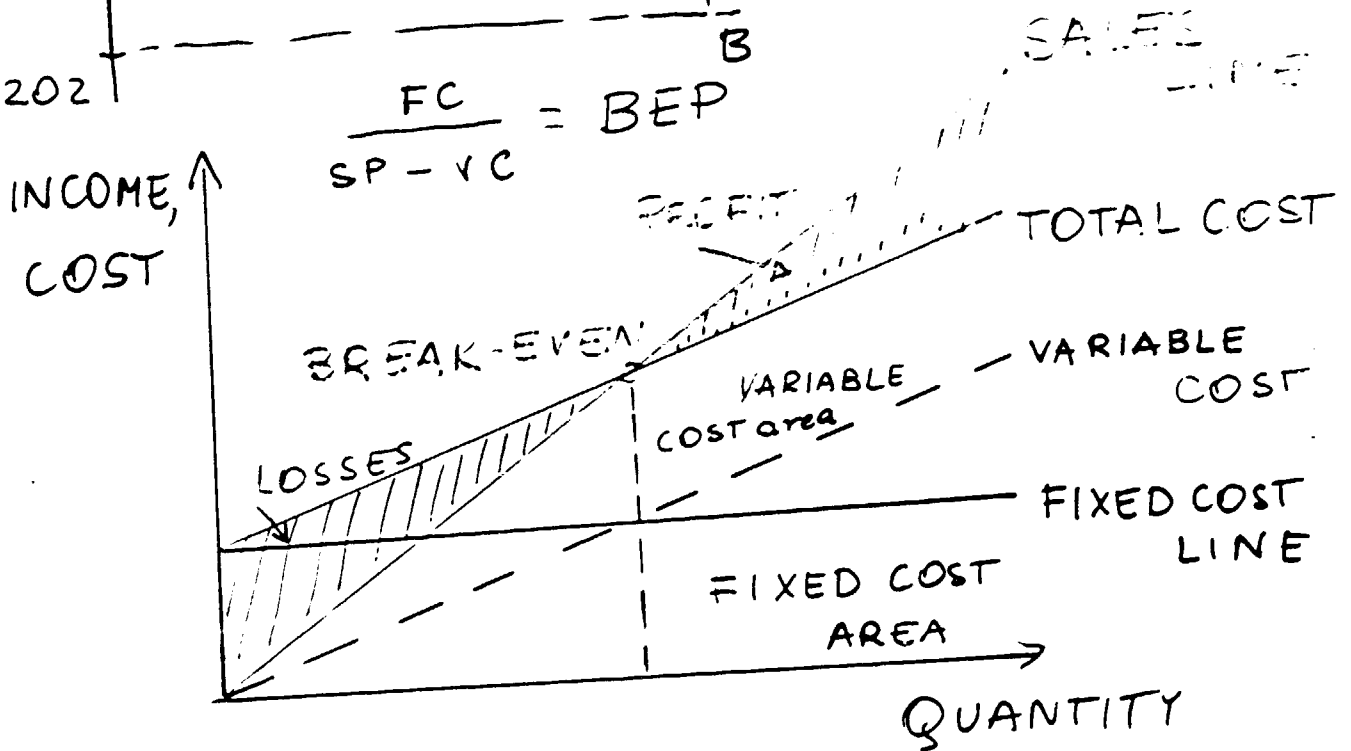
BREAK - EVEN POINT

$$\frac{B}{C} = \frac{P.V. \text{ of all receipts}}{P.V. \text{ of capital cost} + \text{oper. cos}}$$

where:

RECEIPTS = Revenues minus cost
plus depreciation

$$\boxed{\text{Net B/C ratio}} = \frac{P.V. \text{ of Receipts} - P.V \text{ op. co}}{P.V. \text{ of capital cost}}$$
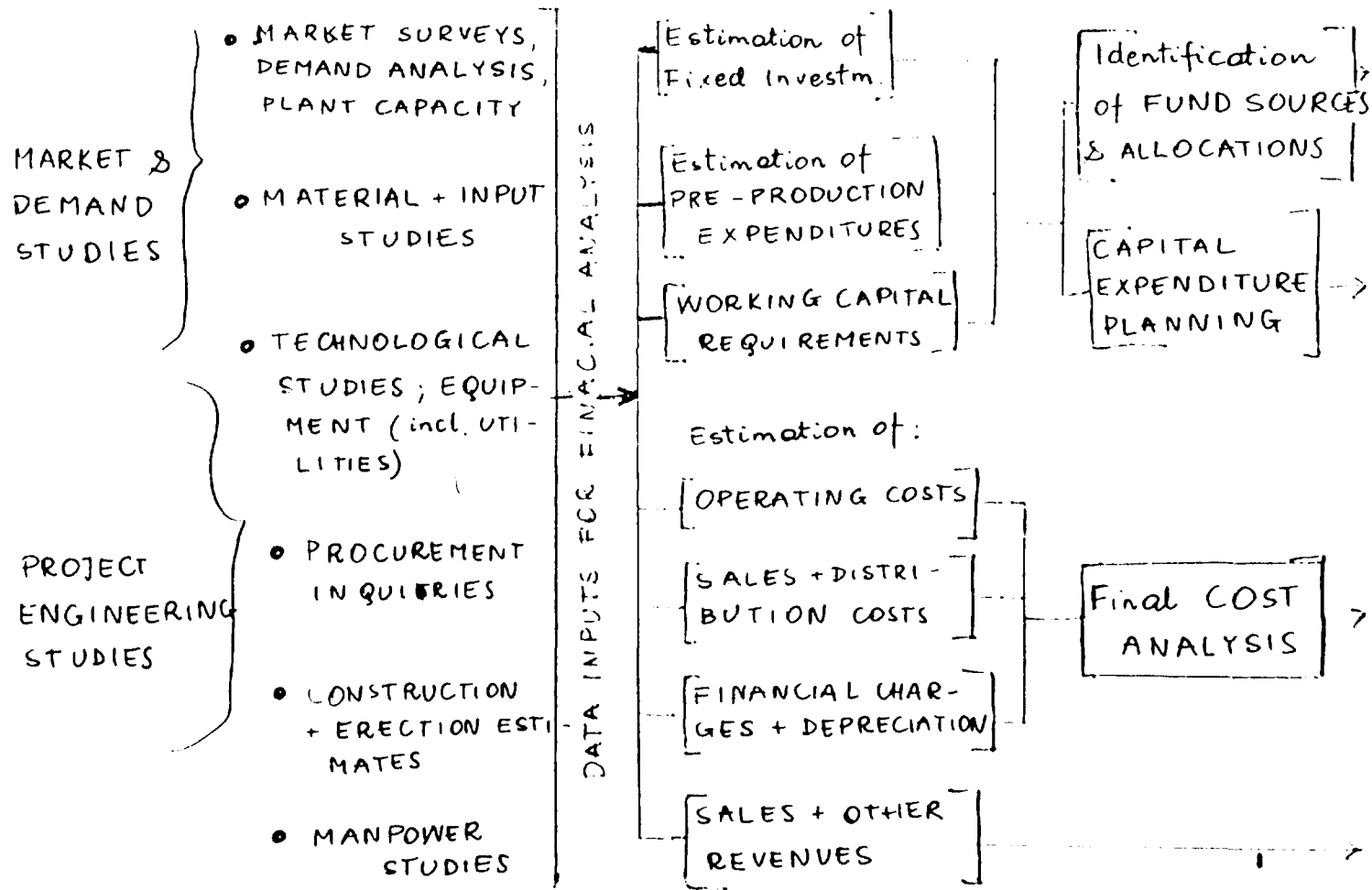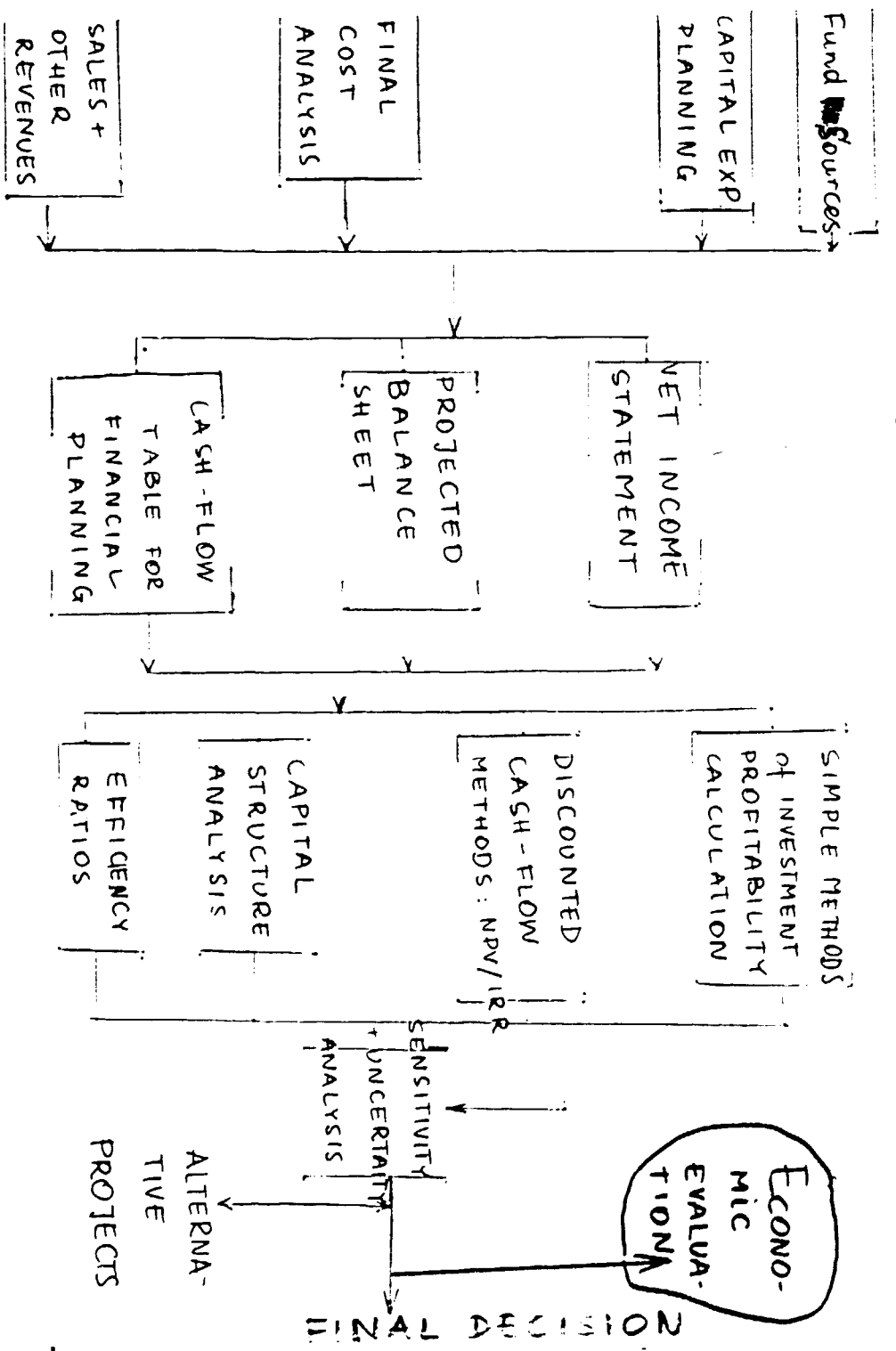
$B/C = 1$ indicates: $NPV = $ zero

for a given discount rate, which
is IRR of the project

Project acceptability: YES for:

› NPV → projects with positive NP

› IRR → IRR > opportunity cost

› $\frac{B}{C}$ — $\frac{B}{C} > 1$

MARKET & DEMAND STUDIES
- MARKET SURVEYS, DEMAND ANALYSIS, PLANT CAPACITY
- MATERIAL + INPUT STUDIES
- TECHNOLOGICAL STUDIES ; EQUIPMENT (incl. UTILITIES)

PROJECT ENGINEERING STUDIES
- PROCUREMENT INQUIRIES
- CONSTRUCTION + ERECTION ESTIMATES
- MANPOWER STUDIES

DATA INPUTS FOR FINANCIAL ANALYSIS

Estimation of Fixed Investm.

Estimation of PRE-PRODUCTION EXPENDITURES

WORKING CAPITAL REQUIREMENTS

Estimation of :
- OPERATING COSTS
- SALES + DISTRIBUTION COSTS
- FINANCIAL CHARGES + DEPRECIATION
- SALES + OTHER REVENUES

Identification of FUND SOURCES & ALLOCATIONS

CAPITAL EXPENDITURE PLANNING

Final COST ANALYSIS

Fund Sources→

CAPITAL EXP PLANNING

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ZDB TRAINING PROGRAMME FOR PROJECT OFFICERS

02 JANUARY — 27 JUNE, 1986

INTRODUCTION TO THE USE OF THE COMFAR SYSTEM

1. General introduction

The Computer Model for Feasibility Analysis and Reporting (COMFAR) was prepared by the Feasibility Studies Section of the Industrial Operations Division of UNIDO and is based on the UNIDO Manual for the Preparation of Industrial Feasibility Studies.

The model was written in PASCAL computer language and implemented for the first time on Apple III personal computer in May 1983. The software package of COMFAR includes some 25000 program statements. The updated COMFAR (November 1984) has been released for the Apple III and IBM-PC/XT personal computer. This release includes a number of extensions and useful amendments.[1]

What is COMFAR?

The program package of COMFAR is an important tool for the project analyst, who wants to prepare and evaluate industrial investment projects and to use computer power for the preparation of cashflow tables, balance and income statement projections, following the guidelines described in the UNIDO manual.[2]

The computer novice can easily learn to use the full power of COMFAR because the program package is designed to operate in a DIALOGUE mode and to guide the user through the three following phases:

* data entry
* computation of results table, and
* printing of schedules (reports).

The program will check data input and subsequent computation and warn in case of input errors. The program may even stop operation in case of fatal errors and send a prompting message, thus protecting the work against unintentional change or loss of data.

COMFAR is a cashflow-oriented model and the user can simulate the inflows and outflows of cash of an industrial investment project in accordance with the methods described in the UNIDO manual. During the

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1/ The system analysis and design of the model were made by P.M.Hawranek, who also supervised the programming work of Ch. Nowak, R. Nowak and A. Scherney.

2/ The UNIDO Manual for the Preparation of Industrial Feasibility Studies (ID/206) was first published in 1978 in New York, and since than over 50 000 copies have been distributed.

DATA ENTRY phase COMFAR rejects wrong answers and ensures that all basic
data required for subsequent computations are saved on an external data
file (on floppy disc). This file can be updated as modified and used
again for computation of alternatives and sensitivity analysis.

Starting from the data file COMFAR produces a complete cashflow-oriented
result table including:

> * initial and current investment
> * sales and production program
> * cost accounting
> * scheme of financing
> * balance and income statement
> * cashflow discounting.

COMFAR is a very flexible tool for economic and financial analysis of
industrial projects. It includes features such as separate planning of
local and foreign cashflows, distinction between local and foreign
currencies, half-yearly planning of cashflows during the construction
phase of a project, automanic computation of finance scheme based on few
essential input data.

During the REPORT phase COMFAR reads data from the results table
produced by the module programs and produces schedules in accordance with
the UNIDO manual.

■ COMFAR structure

Content of the INPUT TABLE = DATA ENTRY MODULE

The complete Input Table holds the following data:

1) Text variables
2) General variables
3) A sheet containing values – a matrix of 213 lines and 19 columns.

Text variables:: serve to save on a discette text information together
with the values contained in the matrix

   1. Project Name
   2. Date + Time
   3. Remarks
   4. Accounting Currency
   5. Product Name (up to 6)

General Variables : are valid throughout the input table, they describe the
following values (the values shown are offered by COMFAR
as default values)

   1. Foreign currency conversion rate   1.000
   2. Local currency conversion rate   1.000
   3. Duration of construction, years   1
      – minimum duration is 1 year
      – maximum 4 years, if half – yearly; otherwise 8 –
        yearly or half yearly

4. Planning during construction

5. Cashflow discounting rates

6. Equity subsidy conditions

7. Loan conditions

TABI: is the name of the Input Table (matrix of 213 lines 19 columns each)
· used by the computer.

sub-table ranges

1) Initial Fixed Investment, foreign	... L	1 to 12	
	local ... L	13 to 24	
2) Current Fixed Investments, foreign	... L	25 to 36	
	local ... L	37 to 48	
3) Production Costs,	empty ... L	49 to 51	
	foreign ... L	52 to 77	
depreciation (f/l)	... L	78	
	empty ... L	79 to 81	
	local ... L	82 to 107	
	empty ... L	108 to 109	
4) Production + Sales Program, foreign	... L	110 to 145	
	local ... L	146 to 181	
5) Working Capital Requirements, foreign and			
	local ... L	182 to 190	
6) Source of Finance,	foreign ... L	191 to 197	
	local ... L	198 to 204	
7) Income, Tax, Cashflows,	... L	205 to 213	
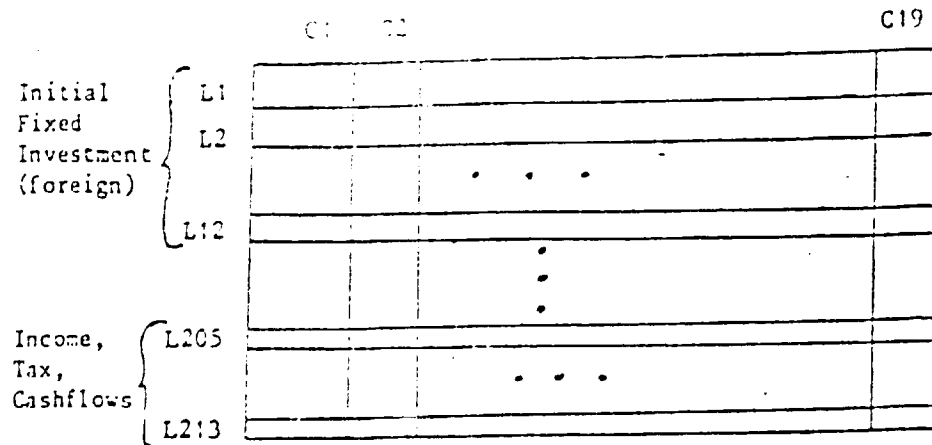
Fig. 2. The matrix structure of the Input Table (TABI)

Lines, Columns: Each line contains a data array and each column (item
of a line) represents one element of this array. A line
contains parameters used for program control (e.g. type
of depreciation), descriptive values valid for this line
(e.g. depreciation rate, inflation rates, tax rates etc.),
as well as cashflow values and cost/benefit figures for
the project and period analysed with COMFAR.

Descriptions : The REPORT system allows to print and display on the
Monitor line and column descriptions of the tables
together with the values (items) of the tables.

Example of Detailed Input Entry: Initial Fixed Investment

Initial Fixed

Investment   Subtable::line 1-24, column 1 to 12
                  (UNIDO Manual, schedules 5, 6 and 10.1 and 10.2)

Columns: for line 1 to 24   -
                  description of depreciation and investment
                  (cashflow array)

C1 ...   Depreciation rate in % per year

C2 ...   Type of depreciation, 1 = straight line (default)
                                 2 = linear to residual value
                                 3 = accelerated depreciation

C3 ...   Scrap value, salvage value in % of investment.

C4 ...   Depreciation period in years (rate and type valid for
         this per' d)

C5 to C12   Amount invested, by period "P" (P1 to P8)
            (One may invest by half-yearly periods during preproduction.
            In this case the duration of construction is limited to
            4 years. Lenght of preproduction period is optional,
            maximum is eight periods (years or half-years)

Lines: for columns 1 to 12
            depreciation C1 to C4, investment items C5 to C12
            (f)oreign L1 to L12, (l)ocal L13 to L24.

(i)	(ii)	
L1	L13	Land
L2	L14	Site preparation and development
L3	L15	Structures and civil engineering (a)
L4	L16	Structures and civil engineering (b)
L5	L17	Incorporated fixed assets (a), construction, transport
L6	L18	Incorporated fixed assets (b), technology, startup
L7	L19	Incorporated fixed assets (c), others
L8	L20	Plant machinery and equipment ... (a)
L9	L21	Plant machinery and equipment ... (b)
L10	L22	Auxiliary and service facilities
L11	L23	Pre-production expenditures
L12	L24	Inventory

Note: You have the possibility of distinguishing between different
types of Civil Engineering, and other assets, which is very
useful if different depreciation periods must be computed.

Calculation Module of COMFAR

After all necessary (appropriate for the project) data have been
introduced into the computer the COMFAR System allows the user to save
it on the discette in External Disk Drive. This saved Input Table may
be of course subject to modification and updating before the computation
module execution. The computation module of COMFAR produces the output
table called TABO. Input Table TABI and Output Table TABO together make
possible for COMFAR to produce REPORTS.

The Content of the Output Table

TABO: is the name used by the computer for the Output Table. The
complete Output Table holds the results computed by COMFAR-CALCUL
module and has a size of 243 lines and 18 columns. The table
TABO is devided into 7 sub-tables and two annexed tables (a total
production cost table TABC and working capital requirements table
TABW).

The seven sub-tables are :

1) Initial fixed investments
2) Financing of initial fixed investments

3) Sales for each product and total sales

4) Production costs

5) Investment during production

6) Financing during production

7) Income and taxation, cashflow, tax rate, tax paid and total investment costs by year.

TABC: is the sub-table for intermediate storage of results, computed for each product separately (e.g. lost of production). The content of TABC is not saved and can be listed only during execution of the CALCUL module.

TABW: is the sub-table for working capital requirements computed during execution of COMFAR-CALCUL, and the results are recorded on a separate output table TABW. Contrary to TABC, this table is saved on discette and can be listed by using COMFAR-REPORT module.
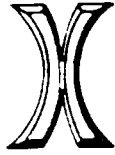
ZDB TRAINING PROGRAMME FOR PROJECT OFFICERS

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COMFAR 2.0 HARDWARE:
Description of the Hardware Components of Comfar 2.0

PREPARED FOR ZDB BY D. SUSSMAN, W. HUBNER & R. NOVAK.

Description of the hardware-components of COMFAR 2.0

```
 XXXX    XXXX   X   X  XXXXXX   XXXX   XXXXX      XXXX       XXXX
X    X  X   X  XX  XX  X        X   X X   X    X    X      X    X
X      X    X  X XX X  X        X   X X   X         X      X    X
X      X    X  X    X  XXXXX   XXXXXX XXXX         X       X    X
X      X    X  X    X  X       X   X X  X         X        X    X
X    X X   X   X    X  X       X   X X   X       X         X    X
 XXXX   XXXX   X    X  X       X   X X    X   XXXXXX X     XXXX
```

```
X    X  XXXX   XXXXX   XXXXX   X   X   XXXX   XXXXX   XXXXXX
X    X X    X X     X X     X  X   X  X    X X     X X
X    X X    X X     X X     X  X   X  X    X X     X X
XXXXXX XXXXX  XXXX   X     X   XXXXXX XXXX  XXXXX   XXXX
X    X X   X  X    X X X XX X  X   X      X X   X        X
X    X X    X X    X X X XX X  X   X      X X    X       X
X    X X    X X    X  XXXXX  X   X   X    X X     X XXXXXX
```

Description of the hardware-components of COMFAR 2.0

Hardware - Requirements of COMFAR 2.0

I. Hardware on which COMFAR 2.0 is executable

The UNIDO - Package COMFAR 2.0 has been designed for the following hardware-configurations :

1. Apple III Computer with

- 256 kByte RAM - Memory.
- 1 internal Diskdrive.
- 1 external Diskdrive.
- 1 fixed Diskdrive (profile).
- 1 built-in RAM-Disk (available via UNIDO, Feasibility Study
                       Section).
- any parallel or (and) serial printer.
- run time resident UCSD - Pascalsystem.

2. IBM PC/XT Computer or compatible with

- 320 kByte RAM - Memory.
- 1 Diskdrive.
- 1 fixed Diskdrive (harddisk).
- any parallel or (and) serial printer.
- MS DOS 2.1 Disk operating system (or later release).

For more detailed information please contact UNIDO, Vienna, Feasibility Study Section.

II. Hardware-components of the IBM PC/XT (or compatible)

The following description gives a list of all hardware-components which are needed to execute COMFAR 2.0 on an IBM PC/XT (or compatible) :

- flexible diskdrive:

```
name              :  A:
storage capacity  :  360 kByte = 360 * 1024 Byte
use in COMFAR 2.0 :  storing device for input table (TABI) and
                     output table (TABO).
advantage         :  user has the possibility of exchanging the
                     storage-medium (=diskette).
disadvantage      :  relativly little information can be stored
                     on this device in comparison to the fixed
                     diskdrive.
```

- fixed diskdrive:

```
name              :  C:
storage capacity  :  10 MByte = 10 * 1000 kByte = 10000 * 1024
                     Byte.
use in COMFAR 2.0 :  storing device for the program and all
                     necessary run time files itself.
advantage         :  user has the possibility of storing a big
                     amount of data and information.
disadvantage      :  the storage-medium cannot be removed or
                     exchanged for another medium.
```

- keyboard:

```
name              :  CON:
use in COMFAR 2.0 :  to operate the program.
```

- printer:

COMFAR 2.0 supports both printer-types which are available:

- parallel printer:

```
name              : lpt1:
use in COMFAR 2.0 : printout - device for input table (TABI),
                    output table (TABO) or (and) schedules
                    (according to UNIDO - Manual).
advantage         : relativly fast printer-type (because of
                    parallel data-transfer).
disadvantage      : the quality of printout is normally not so
                    good as on a serial printer.
```

Description of the hardware-components of COMFAR 2.0

- serial printer:

```
name           : lpt2:
use in COMFAR 2.0 : printout - device  for input table  (TABI),
                    output table  (TABO)  or  (and)   schedules
                    (according to UNIDO - Manual).
advantage      : normally very good printout-quality (should
                 be used for final printout).
disadvantage   : relativly  slow  printer-type  (because  of
                 serial data-transfer).
```

- computer itself:

The memory of the computer is divided into two logical groups:

- ROM = Read Only Memory

This part of the memory contains predefined programs
or subroutines which give the user the possibility to
execute and operate his applications. To this part of
the memory the user has only access by reading it, not
by writing to it. The contents of this memory will
remain even when the computer is switched off (depends
not of power).

- RAM = Random Access Memory

This part of the memory holds the programs during
execution. All data which is produced by the program
are stored there until they are transferred   to
permanent storage devices (fixed or flexible disks).
The contents of this part of the memory is power-
dependent. Whenever the computer is switched off the
contents of this part of the memory will be erased and
lost. During the execution of COMFAR 2.0 this part of
the memory contains the several subsystems (DATEN,
CALCUL, REPORT) of the program. The minimum capacity
of RAM is 320 kByte (= 320 * 1024 Byte).

III. DOS - Diskoperatingsystem of the IBM PC/XT (or compatible)

The following list of the MSDOS - Commands is a subset of all available commands. Only these commands have been selected which are necessary to load and install COMFAR 2.0 on the harddisk and to get the program started. The following syntax of describing the commands have been used:

```
IBM  C:\ibmdos >command [optional parameters], or (and)
                      indispensible parameters
```

All parameters which are optional are written in brackets (=[]), all indispensible parameters are described without brackets.

1. DIR - Command (listing of stored files)

Syntax :   dir [device:][\subdirectory(s)]] [/w]   or
                                                [/p]   or
                                                [>lpt1:] or
                                                [>lpt2:]

Description : the computer lists all files which are stored on
              the specified device in the specified
              subdirectory. If you do not specify the device
              and subdirectory the computer will list for you
              the contents of the default-drive and
              subdirectory. You can also specify the layout of
              the listing and where you want to have the
              listing:
                   /w   condensed, column-oriented listing.
                   /p   line-oriented listing (computer stops
                         listing if screen is full and waits
                         for your continuation-reply.
                   >lpt1: listing will be sent to parallel
                         printer.
                   >lpt2: listing will be sent to serial
                         printer.

Examples :   dir c:\comfar.eng /p
             dir /w
             dir a:>lpt1:

2. CLS - Command   (clear screen)

Syntax   : cls

Description : This command clears the screen and displays
             the DOS-prompt in the upper left corner of the
             screen.

Example   : cls

prepared by Sussmann/Huebner/Novak   Harare, June 1986

Description of the hardware-components of COMFAR 2.0

3. COPY - Command (copy file(s))

    Syntax   : copy [sourcedevice:][sourcefilename(s)]
                        [targetdevice:][targetfilename(s)]

    Description : The copy-command copies the file(s) which is
                   (are) specified with 'sourcedevice' and
                   'sourcefilename(s)' to the   'targetfile(s)'
                   onto the storagemedium 'targetdevice'. If you
                   do not specify the source- or targetdevice the
                   system assumes the defaultdevice as specified
                   device.   If   you   do   not   specify   the
                   'targetfile(s)'   the   system   uses   the
                   sourcefilename(s) for the targetfilename(s).
                   Additionally the system allows the entering of
                   '*' to specify groups of files.

    Example(s) : copy a:comfar.bat c:comfar.bat
                   copy a:comfar.bat c:
                   copy *.bat c:
                   copy *.* c:\comfar.eng

4. DISKCOPY - Command (copy complete disk)

    Syntax   : diskcopy sourcedevice: targetdevice:

    Description : This command copies the whole contens of the
                   diskette specified with 'sourcedevice: to
                   another disk specified with 'targetdevice'.
                   The command only works between devices of the
                   same capacity (e.g.: diskdrive and diskdrive),
                   not between different storage-mediums, like
                   diskdrive (a:) and harddisk (c:).

    Example's   : diskcopy a: a:
                   diskcopy a: b: (2 - drive machine only)

5. DEL - Command (delete files)

Syntax : del [device:][\subdirectory(s)][filename(s)]

Description : This command deletes a file or a group of
files from the storage-medium specified with
'device:'. If you do not specify the device,
the system assumes the default device as
specified. As already mentioned during the
description of the copy-command it is also
possible to define a group of files by using
the '*'. A file which has been deleted with
this command cannot be recovered.

Example(s) : del a:comfar.bat
del *.bat
del c:\comfar.eng*.exe
del *.*

6. REN - Command (rename files)

Syntax : ren [device:][\subdirectory(s)]old filename(s)
new filename(s)

Description : This command changes the name(s) of the
file(s) specified with 'device:',
'...ectory(s)' and 'old filename(s)' to the
new specified with 'new filename(s)'. As
already mentioned during the description of
former DOS-Commands, the '*' can be used to
specify a group of files.

Example(s) : ren a:comfar.bat comfar1.bat
ren *.old *.new
ren c:\comfar.eng*.dir c*.bob

7. MD - Command   (make directory)

    Syntax   :   md [device:][\]subdirectoryname

    Description :   This command creates on the specified device a
                   subdirectory with the specified name. If you
                   put a '\' in front of the subdirectoryname the
                   system will create the subdirectory on the
                   first level under the root directory. No '\'
                   means that the directory will be created one
                   level under the current level.

    Examples   :   md c:\comfar.eng
                   md \doku
                   md e

8. CD - Command   (change directory)

    Syntax   :   cd [device:][\]subdirectoryname

    Description :   this command changes from one subdirectory to
                   another subdirectory. The subdirectory has to
                   exist already. The use of the '\' is exactly
                   the same as in the md - command.

    Examples   :   cd c:\comfar.eng
                   cd \doku
                   cd e

9. RD - Command   (remove directory)

    Syntax   :   rd [device:][\]subdirectoryname

    Description :   this command removes an existing subdirectory.
                   Two restrictions have to be observed : The
                   subdirectory has to be empty (containing no
                   files) and the location in the directory
                   structure must be one level above that which
                   is to be removed. The use of the '\' is
                   exactly the same as in the md-command.

    Examples   :   rd c:\comfar.eng
                   rd \doku
                   rd e

10. FORMAT - Command   (format a storage-medium)

    Syntax   : Format [device:]

    Description : this command initializes a diskette ((flexible
                  or fixed) which is specified by 'device:'. As
                  already mentioned during the COMFAR - seminar
                  this command is very dangerous. All the
                  information which has been stored on this
                  device will be deleted afterwards and there is
                  not even one theoratical way to recover it.
                  Therefore you should be 100% sure what you
                  want to do when you start this command.

                  *** Never use the command   FORMAT C:

                  This command deletes the whole contents of the
                  harddisk. The only reason for using the
                  Format command should be the initializing of a
                  ---> FLEXIBLE DISK !!!. That means, that you
                  only should use the command as FORMAT A:

    Example   : format a:

    *** This command can only be executed from the subdirectory
    \ibmdos on the wang a-star. Therefore before you enter this
    command change to \ibmdos with the command   cd \ibmdos.

IV. Structure of COMFAR 2.0 on the harddisk

The structure which will be described here is only a recommendation given by UNIDO/FEAS. As you know from the COMFAR - seminar it is also possible to use another implementation structure. On the delivered backup diskettes the following structure is implemented:

COMFAR 2.0 needs 4 subdirectories on the harddisk (c:). The names of these subdirectories are :

> \comfar.eng
> \save
> \calc
> \dokule

If these subdirectories do not exist they can be created by the following sequence of commands:

> md \comfar.eng
> md \save
> md \calc
> md \doku
> cd \doku
> md e

COMFAR 2.0 is delivered on three diskettes. The first diskette contains a program called LDCOMFAR.BAT . This program loads COMFAR 2.0 automatically onto the harddisk. You only have to mount the first diskette to the diskdrive (a:) and enter:

> a:ldcomfar

The program will guide you afterwards what you have to do to get COMFAR 2.0 transferred to the harddisk.

If you want to load the program via the keyboard the locations of the files stored on the backup diskettes are the following:

1. All files with the extensions .exe, .cfr, .bat, .com
   have to be stored in the subdirectory \comfar.eng

2. All files with the extension .cfe
   have to be stored in the subdirectory \doku\e

[illegible lines]

The COMFAR system generates interest on loans taken down during
the construction period based upon the following :

$$I_j = B_j - \frac{B_{j-1} - B_j}{2} \quad \times \; i$$

$$\frac{B_j - B_{j-1}}{2} \quad \times \; i$$

where I_j is interest in j period
B_j is entering loan balance of period j or
ending balance of period $j - 1$
i is period interest rate
COMFAR treats all flows as occurring at the end of the period.

The amounts I_j above are automatically covered by forced overdraft
which carries no interest charges.
These amounts appear as part of pre-production expenditure and are
thus depreciated (or amortized) but the (non-interest) overdraft is
retired by cash generated during production rather than being
capitalized as is usually the case.

It is recommended that the first run of a COMFAR project contain
no declared equity contributions. This will produce the following
effects :

1.1 Equity will be injected as required during the construction
     period to cover Fixed Assets and Pre-Production Expenditures.
     The CI is included in Pre-Production expenditure for
     amortization purposes, but is not covered by forced equity
     or declared loan disbursements. (see below).

1.2 CI is generated as cost of finance and is covered by forced
     overdraft that does not appear in the cash flow. Consequently,
     negative cash balances equal to the CI are shown in the cash
     flow.

1.3 In COMFAR the negative cumulative cash balances (which are
     actually covered by non-interest bearing forced overdraft)
     are retired with cash flow surpluses from operations.

2.0 There are four major distortions that must be corrected to derive a
     realistic assessment of the project :

2.1 While the CI is included as Pre-Production Expenditure and
     is amortized, the corresponding values do not appear in the
     Cash Flow for NPV/IRR determination as they should in the
     normal treatment where CI is to be capitalized.

     In effect, the CI are Pre-Production Expenditures which should
     be covered (at least) by medium-term financing and therefore
     should appear as part of the investment in assets for NPV/IRR
     calculations.

2.2 A second distortion is that the CI does not carry interest on itself in the existing COMFAR system. Normally, the financing institution would, in addition, capitalize the interest on CI.

2.3 A third factor is that negative <u>cumulative</u> cash balances appear in the cash flow during production, which is normally an indication of insolvency. Although these are actually covered by forced overdraft, they should be eliminated from the presentation.

One approach used in the past is simply to increase equity to cover these deficits, which in the construction period, actually represent the CI. However, this approach leads to a serious distortion as in 2.1 above in that the CI is not included in the total assets of the project for NPV, IRR computations.

2.4 A fourth factor is that the CI plus interest is not capitalized and included in the debt financing of the enterprise.

3.0 The above distortions can be corrected using all of the following steps :

3.1 Make normal run, without any declared equity input. This will generate CI and corresponding negative cumulative cash flows during construction period.

3.2 In second run, reduce interest on all declared loans to zero and normal interest thereafter. This will reduce generated financial costs during construction to zero.

3.3 Introduce new loan to cover CI and interest on CI. The terms of this loan should be identical to the loan covering pre-production expenditure except that the interest during construction should be set to zero and normal interest thereafter.

The amounts of disbursements for this loan can be determined in several ways depending on assumptions :

3.3.1 Financing institution charges no interest on CI. In this case the following disbursements should be included :

Construction Period	1	2	3	N
Disbursement (overdraft amount and CI)	X_1	X_2	X_3	X_n
Loan Balance at end of Period	X_1	X_1+X_2	$X_1+X_2+X_3$	$\sum$

X_1, X_2 ... X_n are amounts of overdraft generated by COMFAR in 3.1 above.

3.3.2 Interest for each period calculated on previous
balance :

Construction Period
CI & Overdraft amount
Loan Disbursement
Amount

Loan Balance at end
of Period

is period interest rate

3.3.3 Interest for each period calculated on average
balance

Construction Period
CI & Overdraft amount
Loan Disbursement
Amount

Balance at beginning
of Period $i + 1$

Notes : Normally $B_1 = 0$

$C = 1 - \ldots$

r – period interest % ÷ 100

If $B_1 = 0$, then

3.4 Introduce the purchase of an additional asset covering
CI plus interest for each period as determined in 3.3 above.
This asset should be amortized (or depreciated) in exactly
the same way as pre-production expenditures.

4.0 Correction for interest during Production Period.
The same approach as above can be used for correcting forced
overdraft during the production period. However, to the extent
that taxes are owed in the period, the <u>interest</u> portion of the
calculation must be reduced by the factor

$(1 - t$ where t is tax rate

This is necessary as the net amount of new financing required is
reduced by the amount that taxes are affected by the increased
interest expense. This approximate formula should be used only
when tax is payable for the period of interest. This will give
a value for the funding requirement slightly higher than necessary.
A more exact formula will be provided at a later date.

Adjustments to COMFAR 2.0 Program to reduce Project Life below 15 years

1.0 Adjustment for variable operating costs in PAPL[1]

> If standard costs sub-tables have been used and variations for cost elements declared which are less than 100%, costs will continue to be generated during the PAPL. These fixed operating costs will be generated in the first run. The solution is :

>> Insert negative adjustments in Production cost sub-table of TABI equal to generated costs in PAPL.

>> If only Production cost sub-table has been used, then simply eliminate any such costs (or adjustments) in PAPL.

>> One should be careful to assure that the adjustments are placed in the proper columns of the sub-table.

2.0 Adjustment for depreciation costs

> For assets with economic life extending beyond chosen project life, depreciation will continue to be generated in the PAPL. The following steps should be taken :

> 2.1 For any such assets above, determine the "Salvage Value" [2] of the asset as cost minus accumulated depreciation during project life. Determine percentage (Salvage Value/Cost) x 100.

> 2.2 Insert above percentages in column 3 Salvage Value of Investment Cost sub table. This will discontinue depreciation after Salvage Value has been reached.

3.0 Residual Value

> As the normal project life in COMFAR is 15 years, any residuals (Book Value of Assets, Working Capital) are cleared in the 16th year and discounted to present value for NPV, IRR calculations.

> It is necessary to make two corrections :

> 3.1 The residuals must be entered in the first year of PAPL.

>> 3.1.1 For Working Capital, if the production/sales level is set to zero for all years in the PAPL, the first year in PAPL will show a negative working capital indicating a reduction to zero and representing a Positive cash flow as required. (The working capital is determined from standard costs, production level, and days coverage). The Working Capital adjustment is then automatically effected.

1 PAPL = Period After Project Life
2 COMFAR treats Salvage Value as Residual Value

3.1.2 For other asset residuals, _negative_ book values
salvage values as determined in 2 a above can
be entered in the first year of PAPL. These
values will be calculated as Positive cash flow
in this year as appropriate and will thus enter
correctly in the NPV, IRR calculation.

3.2 A further adjustment must be made for the _automatic_
insertion of asset salvage value in the 16th year. As the
user has access only to the 15th year the values inserted
in the Investment Cost Table should be salvage value $\div$ $(1 + r)$
where r is the chosen rate of discount for NPV calculation.
These values can be inserted for each asset or in the aggregate.

4.0 Taxes should be reduced to zero automatically when production level
and sales revenue are set to zero. If necessary make necessary
negative tax adjustments in PAPL.
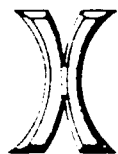
ZDB TRAINING PROGRAMME FOR PROJECT OFFICERS

02 JANUARY — 27 JUNE, 1986

INTRODUCTION TO SOCIAL COST BENEFIT ANALYSIS

THESE COURSE NOTES WERE COMPILED FOR ZIMBABWE DEVELOPMENT BANK
BY W.M. HUBNER

INTRODUCTION TO SOCIAL COST-BENEFIT ANALYSIS

1. Profit is the best measure of micro-economic performance; it is also a measure of an entrepreneur's gain derived from a project. In a perfectly functioning economy this profit equals the gain that the society as a whole derives from a particular project. Profit category is strictly associated with the market, where products and services are bought and sold. Unfortunately markets do not function in a perfect way and actual entrepreneur's receipts and expenditures do not reflect social benefits and costs. It is so because a number of factors intervene and destabilize in short or longer run the country' market relations. In such circumstances, it is always much easier to think of reasons why a system falls short of an ideal, than it is to devise one which is better.[x/] Social cost benefit analysis (SCBA) of projects' impact is a way of dealing with economy's imperfection.

2. Unlimited competition is not possible anymore. We observe nowadays growing influence of monopolies of all kinds. They do function in spite of governments' intervention in most countries. In consequence market distortions might become very serious. It makes traditional micro-economic cost-benefit analysis a doubtful tool of the future project's impact. Process of competition deterioration is irreversible, economies of scale being one of its most important reasons. To be competitive, one has to reduce unit cost of production. At the stage of project preparation and implementation economies of scale seem to be one of the important factors of cost reduction.

   In many cases, governments support monopolies as they are in a stronger position to face foreign competition. As such they contribute much more to the inflow of foreign currencies than smaller ventures.

   Social policy of the government is another distorting factor. Governments are responsible both for economic performance and for population welfare (guarantees of minimum wage level, pensions, free health service, free or subsidized education, basic goods price control etc.). Such policies make micro-economic profitability more ambiguous, especially in price confrontation with foreign competitors.

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x/ J.M.D. Little, J.Mr. Mirrlees: Manual of Industrial Project Analysis in Developing Countries, Vol. II - Social Cost Benefit Analysis, Paris 1968.

The last group of distorting factors might be associated with limited dimensions of national market. In case when a country follows policy of autarchy, economic calculation might be heavily distorted (economy has to tolerate industries that would otherwise be eliminated by foreign competition).

Industrial project has a lifetime exceeding often 10-15 years. Present distorted economic situation cannot serve as a unique basis for a decision with future long-lasting consequences. All such cases demand deeper investigation and analysis from macro-economic point of view.

3. We know how to measure costs and benefits at the enterprise level. For a central decision maker (government) a notion of costs and benefits is different.

   Under "perfect competition" costs accounted for by a firm measured also costs to society (there is full employment of resources on market terms - resource prices reflect marginal productivity of resources - wage = marginal productivity of labour, interest = discount rate of consumption). There is no involuntary unemploymen (the workers evaluate wage and leisure, if wage is too small, they prefer leisure). These conditions in practice are not fulfilled. Employment becomes a cost to a society. Similarly all the investment outlays become costs to the central decision maker.

   Benefits for a society might be measured in consumption or investment terms. They might be also expressed in terms of distribution policy. The government might value much more consumption (i.e., incomes coming from a project) of people formerly unemployed than owner's profits.

   Let's take a standard formula of benefit-cost ratio. It expresses economic efficiency. At the micro-level, the ratio of benefits to costs might be improved by maximizing benefits subject to constant costs or by minimizing costs subject to constant benefits. For the central decision maker choice is narrowed down to only one alternative maximization of social benefits while costs represent all the national resources (labour + capital + natural resources). Minimization would mean increase of unemployment and inefficient allocation of productive resources. The central decision maker has

to value external effects of project implementation. For a firm they do not mean a lot, if they are not included into costs or into benefits category. For the government external effects are not indifferent. They might enter into costs category (negative effects such as pollution or other type of destruction of natural environment) or into benefits category (training of labour to be employed in newly created productive facilities, housing facilities for workers or consequences of project's implementation for the development of other industries in the country).

One may say the same about social and commercial value of products. For entrepreneur product is a means to achieve profits. Central decision maker attaches different values to different products and it has nothing to do with product's prices. It is well known that some products are given higher social value than the others, some get negative value for a society as a whole (just to give a classical example of books and alcohol or cigarettes). Social valuation of products, different than cost or market based prices adds to the need for SCBA.

4. SCBA has to stress the role of the government as representative of "social opinion". A number of tasks can be ascribed to the government. All these tasks might have distorting effects on prices both of products and resources. It has to be dealt with at the phase of economic analysis of projects.

Basic government price distorting policies are:

- regulation of economic processes in order to ensure
  macro-economic efficiency (optimal allocation of
  resources from macro-economic point of view);

- control of unemployment (even liberal governments take
  measures in favour of unemployed people for electoral
  reasons);

- price and wage controls (means of preserving level of
  living of the population - guaranteed minimum wage,
  indexation of wages, basic goods price control);

- more equal distribution of income than laissez-faire
  policy might assure;

- protection of people against other productive activities
  (legislation on effluents, air pollution, noise pollution,
  offensive architecture etc.);

- protection of infant industries or protection of ailing
  national industries against foreign competition, protection
  against trade procedures used by competitors (considered
  to be "illegal" in foreign trade practice).

5. Economic condition of the developing countries that make SCBA
   analysis desirable:

   - the desire to develop rapidly results in constant tendency
     for demand to outrun supply; in consequence generally higher
     rate of inflation is observed;

   - traditional productive sectors (agriculture) are resistant
     to changes - their supplies are lagging and growing demand
     cannot be met (factor of price distortions);

   - currency overvaluation and foreign exchange controls (most
     governments prefer foreign exchange controls when there is
     a constant need for devaluation due to higher inflation rate
     than elsewhere);

   - non-perfect labour market (marginal productivity of labour
     especially in traditional agriculture is often lower than
     wage or consumption) unemployment and underemployment;

   - imperfect capital markets (for equal risks different interest
     rates because of government intervention, monopolistic supply
     of capital and marginal capital "free market");

   - importance of relatively large projects (increasing
     considerably national productive capacities);

   - protection of national industries (different industries
     receive different degree of protection for no rational
     economic reasons);

   - often monopolistic position on export markets (with only
     one or two products accounting for more than 90% of all
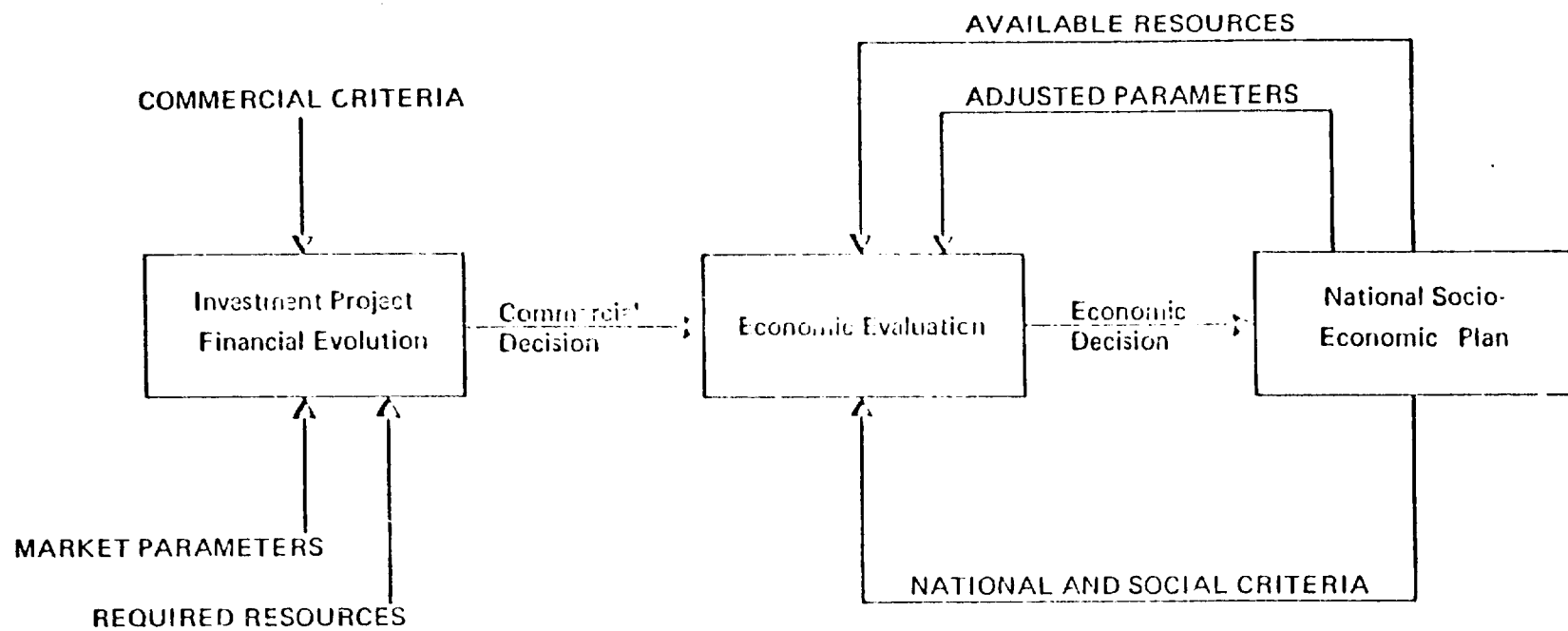   export earnings);

- deficiency of national savings;

- unequal distribution of wealth (political problem that
  involves also future economic growth). More equitable
  distribution of national product reduces country's potential
  savings as poor population spends higher percentage of
  income on consumption than better off classes;

- exaggerated role of project's externalities.

6. Historical background

Theoretically the idea of what we call today social-cost benefit
analysis was first developed by a Frenchman Jules Dupuit in an
article published in 1944 "On the Measurment of the Utility of
Public Works" (English translation in International Economic Papers
No 2/1952).

Practically SCBA was applied first in developed economies. In the
USA back in 1930's SCBA was used to study effects of public investmer
activity, especially in the field of water resources development.
The idea behind this was that "these benefits, to whomsoever they
may accrue, be in excess of the estimated costs".

SCBA was also used for defense planning during World War II, road
improvements etc.

COMMERCIAL CRITERIA

AVAILABLE RESOURCES

ADJUSTED PARAMETERS

| Investment Project Financial Evolution | Commercial Decision | Economic Evaluation | Economic Decision | National Socio-Economic Plan |

MARKET PARAMETERS

REQUIRED RESOURCES

NATIONAL AND SOCIAL CRITERIA

1. ECONOMIC EVALUATION OF A PROJECT

INTRODUCTION TO SHADOW PRICES

A good project is one that collects productive resources into their most useful arrangements. Attention to profitability, guided by financial analysis alone, will point out the best configuration, if prices are right. Market distortions, external impacts, lopsided income distributions and those dimensions of welfare that elude markets can create the gap between the signals and incentives of markets and urgent demands of development. This gap must be bridged by estimating shadow prices that better reveal priorities and tradeoffs.

That is why shadow prices are commongly applied in all the methods of project evaluation. Sometimes, the synonymous names of "accounting prices" "social prices" or "opportunity cost" (equivalent to shadow price at natio level) are used.

The UNIDO handbook "Guide to Practical Project Appraisal, Social Benerz Cost Analysis in Developing Countries" gives the following definitions for shadow prices. Shadow price is defined as "a term implying a price that ha been derived from a complex mathematical model, i.e. from linear programmi (see accounting price)". Accounting price is defined as follows: "a term often used synonymously with shadow price. The term "accounting" indicate that the price is not a market price. Accounting prices reflect, for exam; the economic value of inputs and outputs as opposed to their financial or market value. The accounting price will depend heavily on the unit of acc

In linear programming analysis the shadow *price* is defined as the increment the value of the objective function that results from that constraint bein relaxed by one unit. Only those constraints that are binding will have positive shadow prices, since those constraints with slack remaining will add nothing to the value of the objective function if increased further. One could find shadow price of each constraint by expanding it by one unit. An alternative algebraic method of obtaining the shadow prices is to solve "dual" of the linear programming problem.

Assuming that an economic problem can be expressed in mathematical mode one can obtain the shadow prices of the resources, defined as the increase in welfare resulting from any mariginal change in the availability of commodities or factors of production. Thus, the process of shadow pricing presupposes:

1) a well-defined social welfare function (objective function), expressed as mathematical statement of country's objectives, so that the mariginal

changes can be evaluated;

2) a precise understanding of constraints and policies that determine countries development, both now and in the future, and hence existing or projected circumstances in which the marginal changes will occur.

The method is presented in simplified model of a national economy, where shadow prices reflect the scarcity of resources (see numerical example). The problem for a real economy or sector of economy is not so simple. It is impossible to built a comprehensive model that would include all the relevant economic interrelations. Even if problems of data availability and processing will not appear, the model will always be a simplification of reality. It is impossible to conceive of complete and appropriate preference and production functions, constraints etc. Usually the concept of welfare is not clearly defined and constraint can take various forms. As far as constraints are concerned a serious problem which unables logical use of shadow prices appears in case of relative excess of resources. The shadow price is than zero and can only play an indicative role. Other evaluation procedures have to be used.

The simplest alternative for shadow pricing based on programming techni. is to take over price relationships observed in the market for similar ite. or in markets for the same items in other countries. Such an approach, for well-known reasons, can produce misleading result, similarity to shadow prices from pretend-economy of simplified mathemathical model.

As a solution for the above mentioned shadow pricing problems UNIDO "Guide for Practical ..." suggests the method which through different stage of approximation, leads to a better allocation of resources than would have resulted from the use of clearly distorted market prices.

There are two other "shadow pricing" methodologies which are currently in use:
a) Little-Mirrlees method (revised OECD method)
b) Squire, Van der Tak method (World Bank approach).

REFERENCES:

1. "Guide to Practical Project Appraisal, Social Benefit-Cost Analysis in
   Developing Countries". United Nations 1978.

2. R.N. McKean, "The Use of Shadow Prices", in: "Cost-Benefit Analysis
   and Project Design". Ed. by John D.Donahue, US Agency for International
   Development, 1980.

3. L. Squire, M.G. van der Tak, "Economic Analysis of Projects", A World
   Bank Publication 1931.

4. I.M.D. Little and J.A. Mirrlees, "Project Appraisal and Planning for
   Developing Countries".

CALCULATION OF SHADOW PRICES

NUMERICAL EXAMPLE

National economy has two resources - labour (l)-2000 h. and capital (u) - 3000 h. Using these resources two goods can be produced - one measured in kg (ex. wheat) and the other in m² (ex. textile fabric). Both resources are necessary for production of wheat and textile fabric but they are used in the production process in different proportions. To produce 1 t of wheat our economy needs 2 work-hours of labour and 4 machine-hours of capital* and respectively for the production of textile fabric it needs 2 work-hours of labour and 5 machine-hours of capital (these coefficients express the technology and they differ from one country to another). The statement of the problem is then as follows:

Assuming that labour and capital can be used for the production of wheat only, for the production of textile fabrics only or for both products at the same time find:

1) feasible quantities of wheat and textile fabric that maximize the value of the national economy's output

2) determine the unit value of labour and capital (shadow prices) if p_1 = $5/ton (price of wheat) and p_2 = $6/m²$ (price of textile fabric)

3) interpret the results.

SOLUTION OF THE PROBLEM

1) The problem might be presented in a form of two simple mathematical equations

$$2x_1 + 2x_2 \leq 2000 \qquad \text{(labour)}$$

$$4x_1 + 5x_2 \leq 3000 \qquad \text{(capital)}$$

knowing that the market prices of wheat and of textile are

$$p_1 = \$ 5/kg \text{ of wheat}$$

$$p_2 = \$ 6/m^2 \text{ of textile fabric}$$

we maximize the value of the output choosing from all the feasible combinations of wheat and textile the one that gives the biggest value of w

$$x_1 p_1 + x_2 p_2 = w \text{ (max.)}$$

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* In this case resources are translated into flows of services that a resource can generate during a given period. Flows are function of resource volume and of time (year, month, day).
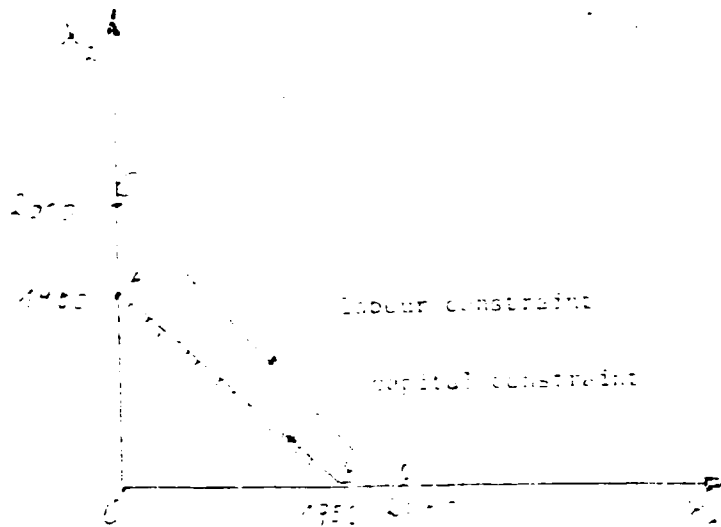
It can be seen that labour is a non-effective constraint (its increase does not increase the volume of production while the capital effectively determines the production capabilities. There is practically unlimited number of feasible solutions all the combinations of x_1 and x_2 inside 0th triangle). We check the border values of w function (equals to linear programming objective function).

$$w(A) = \quad 5 \cdot 0 - 6 \cdot 1400 = \quad \underline{11.200 \text{ \$}}$$

$$w(B) = \quad 5 \cdot 1750 - 6 \cdot 0 \quad = \quad 8.750 \text{ \$}$$

2. The value of labour and capital estimated as function of market prices of products or in other words the influence of the marginal changes on resources of the economic output. Let's assume that the prices of products are function only of labour and capital used in the production process.
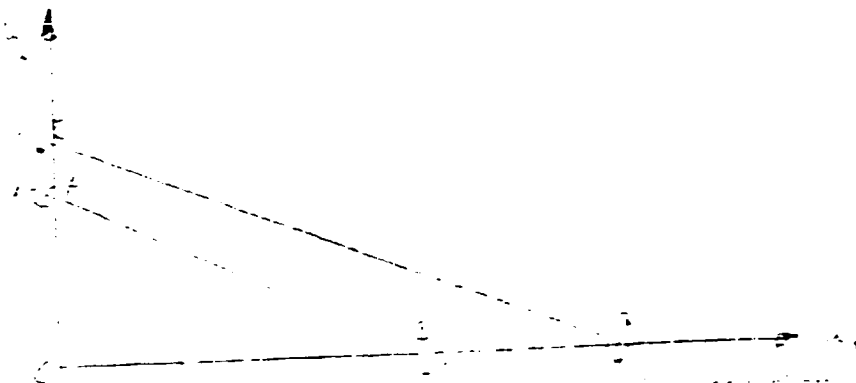Thus, we got:

$$2u_1 + 4u_2 \geq 5$$

$$2u_1 + 6u_2 \geq 6$$

where u_1 — price of labour (shadow price calculated out of a mathematical model)

u_2 — price of capital (shadow)

use of labour and capital must be considered as a cost (K) for our economy.

$$K = u_1 L + u_2 C$$

$$F = u_1 \cdot 4000 + u_2 \cdot 700 = \text{minimum}$$

We solve this problem as below.

The set of feasible solutions is situated on one along the line. The solution of this problem is situated at the point B at the u_2 line.

$$u_1 = 0 \qquad u_2 = \frac{11.000 \cdot \$}{}$$

$$F = 700 = 16.000 \cdot \$$$

Shadow price of capital u_2 is positive while shadow price of labour $u_1 = 0$ in the optimal solution.

Comparing the best solution of the facilitive one $16.000 \cdot \$$ with the primal best solution $F = 16.000 \cdot \$$ one sees that both results are identical.

It is optimal $u_1 = 0$ optimal $F = u_1^* = u_2^*$

$$u = u_1^* = u_2^*$$

$$u_1 = \frac{dF}{dL}$$

$$u_2 = \frac{dF}{dC}$$

That means that the shadow price of labour equals to the marginal productivity of labour what will be the increase of national economy's output if labour increases by 1 unit, and shadow price of capital is marginal productivity of capital. The conclusion is that shadow prices of non-effective constraints are zero because these constraints do not contribute to the increase of the output and shadow prices are measures of marginal contribution of constraints. This is a practical remark showing what an analyst has to look for while computing shadow prices of resources.

1. In most developing countries foreign exchange is more valuable than indicated by the official rate of exchange (domestic currency is over-~~under~~valued). Therefore project's net present economic value should be adjusted by an appropriate premium. Each unit of foreign exchange should be measured in terms of domestic customers' willingness to pay.

   Example :
   - import price of a bottle of wine p cif = 15 FF/bottle
   - official rate of exchange = 2 Rs/FF

   Hence cif cost (border price) in domestic currency of a bottle is 30 R.
   - domestic market clearing price p = 45 Rs/bottle.

   We get additional 15 Rs on each bottle. In other words - each unit of foreign exchange, valued at the official rate, provides 1.5 unit measured in terms of domestic willingness to pay -- the shadow price of foreign exchange is 1.5 times higher than the official one.

2. Methods of calculating shadow exchange rate (SER) :
   a) ratio between official exchange rate (OER) and standard conversion factor (SCF) :

   $$SER = \frac{OER}{SCF}$$

   b)
   $$SER = OER \; \frac{(M + T_i) + (X + S_x)}{M + X}$$

   where : M - cif value imports

   X - fob value of exports

   T_i - import tax revenues

   S_x - export subsidies

   c)
   $$ARFE = OER \left(1 + \frac{M - E}{E}\right) = OER \frac{M}{E}$$

   where : ARFE - adjusted rate of foreign exchange

   M - value of visible and invisible payments expressed in domestic currency

   E - value of visible and invisible receipts expressed in domestic currency

d) Bela Balassa method of calculation of adjustment factor for foreign exchange – AF

$$AF = \frac{\sum e_i X_i (1 + S) + \sum n_m M_i (1 + T)}{\sum e_i X_i + \sum n_m M_i} - 1$$

where :

e_i — elasticity of supply of foreign exchange

X_i — exports

S — export subsidies

n_m — elasticity of demand for imports

M_i — imports

T — import taxes

AF is the premium on foreign exchange over the official rate (expressed as a percentage). AF is equal to shadow exchange rate devided by the official exchange rate minus 1.

$$AF = \frac{SER}{OER} - 1$$

e) UNIDO method of calculating the shadow price of foreign exchange

$$P^F = \sum f_i \frac{p_i^D}{p_i^{cif}}$$

where:

p^F — shadow price of foreign exchange

f_i — fraction of foreign exchange allocated to the "i^{th}" import (on which additional foreign exchange made available by the project is spent)
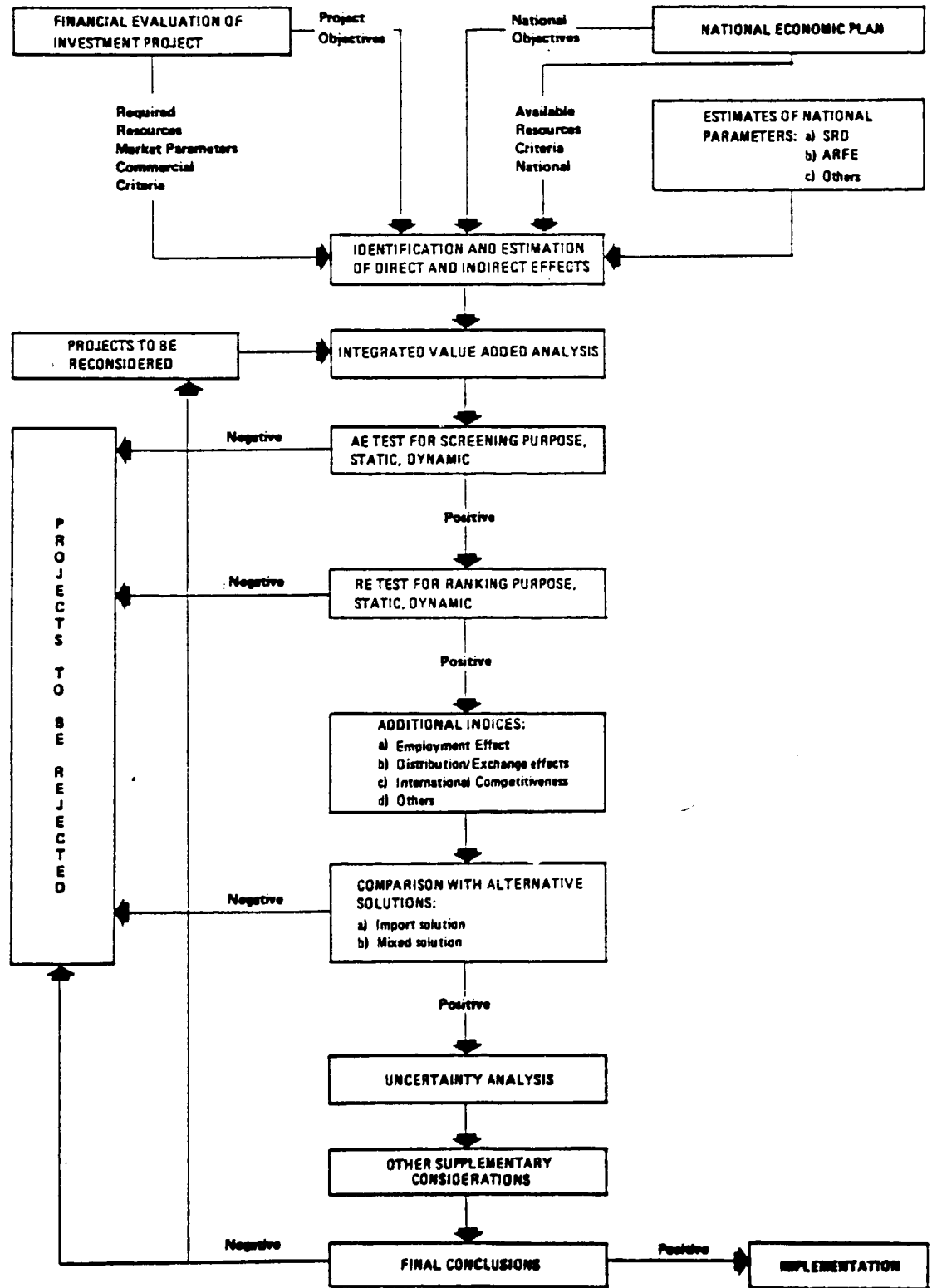
$$f_1 + f_2 + \ldots + f_n = 1$$

Total aggregate consumption value of the imported goods is therefore :

$$C = f_1 \frac{p_1^D}{p_1^{cif}} + f_2 \frac{p_2^D}{p_2^{cif}} + \ldots + f_n \frac{p_n^D}{p_n^{cif}}$$
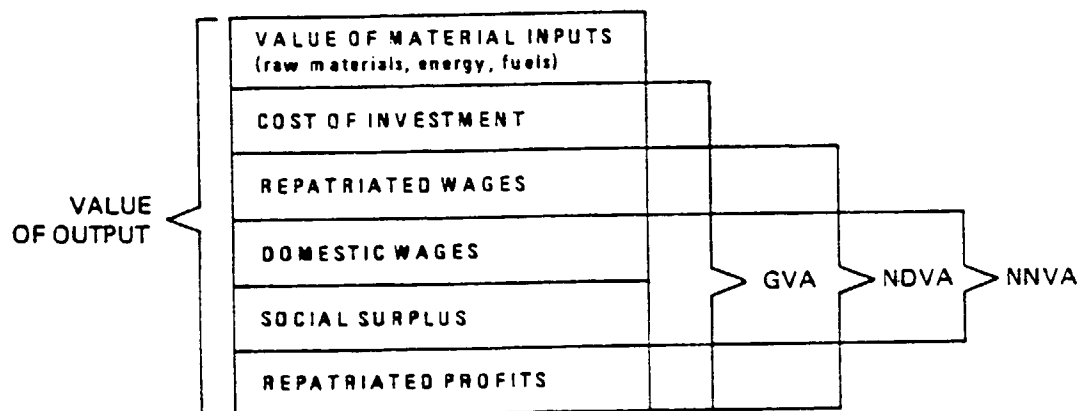
In UNIDO method the shadow price of foreign exchange is calculated as the weighted average of the ratios of domestic market-clearing prices to cif prices calculated at official rate of exchange.

f) Little-Mirrlees method represents the reverse approach - instead of increasing border prices to the domestic market level with the premium (adjustment factor) on the official exchange rate, domestic prices are decreased to the border price level by the conversion factor.

PROJECT ECONOMIC EVALUATION
(Standard Procedure)

```
┌─────────────────────────────┐   Project            National      ┌─────────────────────────────┐
│ FINANCIAL EVALUATION OF     │   Objectives         Objectives    │ NATIONAL ECONOMIC PLAN      │
│ INVESTMENT PROJECT          │                                    │                             │
└─────────────────────────────┘                                    └─────────────────────────────┘

     Required                              Available              ┌─────────────────────────────┐
     Resources                             Resources              │ ESTIMATES OF NATIONAL       │
     Market Parameters                     Criteria               │ PARAMETERS: a) SRD          │
     Commercial                            National                │             b) ARFE         │
     Criteria                                                      │             c) Others       │
                                                                   └─────────────────────────────┘

                              ┌─────────────────────────────┐
                              │ IDENTIFICATION AND ESTIMATION│
                              │ OF DIRECT AND INDIRECT EFFECTS│
                              └─────────────────────────────┘

┌─────────────────────────────┐         ┌─────────────────────────────┐
│ PROJECTS TO BE              │────────▶│ INTEGRATED VALUE ADDED ANALYSIS│
│ RECONSIDERED                │         └─────────────────────────────┘
└─────────────────────────────┘

                    Negative             ┌─────────────────────────────┐
                                         │ AE TEST FOR SCREENING PURPOSE,│
                                         │ STATIC, DYNAMIC             │
                                         └─────────────────────────────┘

                                                  Positive

                    Negative             ┌─────────────────────────────┐
                                         │ RE TEST FOR RANKING PURPOSE,│
                                         │ STATIC, DYNAMIC             │
                                         └─────────────────────────────┘

                                                  Positive

                                         ┌─────────────────────────────┐
                                         │ ADDITIONAL INDICES:         │
                                         │ a) Employment Effect        │
                                         │ b) Distribution/Exchange effects│
                                         │ c) International Competitiveness│
                                         │ d) Others                   │
                                         └─────────────────────────────┘

                    Negative             ┌─────────────────────────────┐
                                         │ COMPARISON WITH ALTERNATIVE │
                                         │ SOLUTIONS:                  │
                                         │ a) Import solution          │
                                         │ b) Mixed solution           │
                                         └─────────────────────────────┘

                                                  Positive

                                         ┌─────────────────────────────┐
                                         │ UNCERTAINTY ANALYSIS        │
                                         └─────────────────────────────┘

                                         ┌─────────────────────────────┐
                                         │ OTHER SUPPLEMENTARY         │
                                         │ CONSIDERATIONS              │
                                         └─────────────────────────────┘

         Negative                        ┌─────────────────────────────┐   Positive   ┌─────────────────┐
                                         │ FINAL CONCLUSIONS           │────────────▶│ IMPLEMENTATION  │
                                         └─────────────────────────────┘              └─────────────────┘
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PROJECTS TO BE REJECTED

VALUE ADDED-COMPONENTS

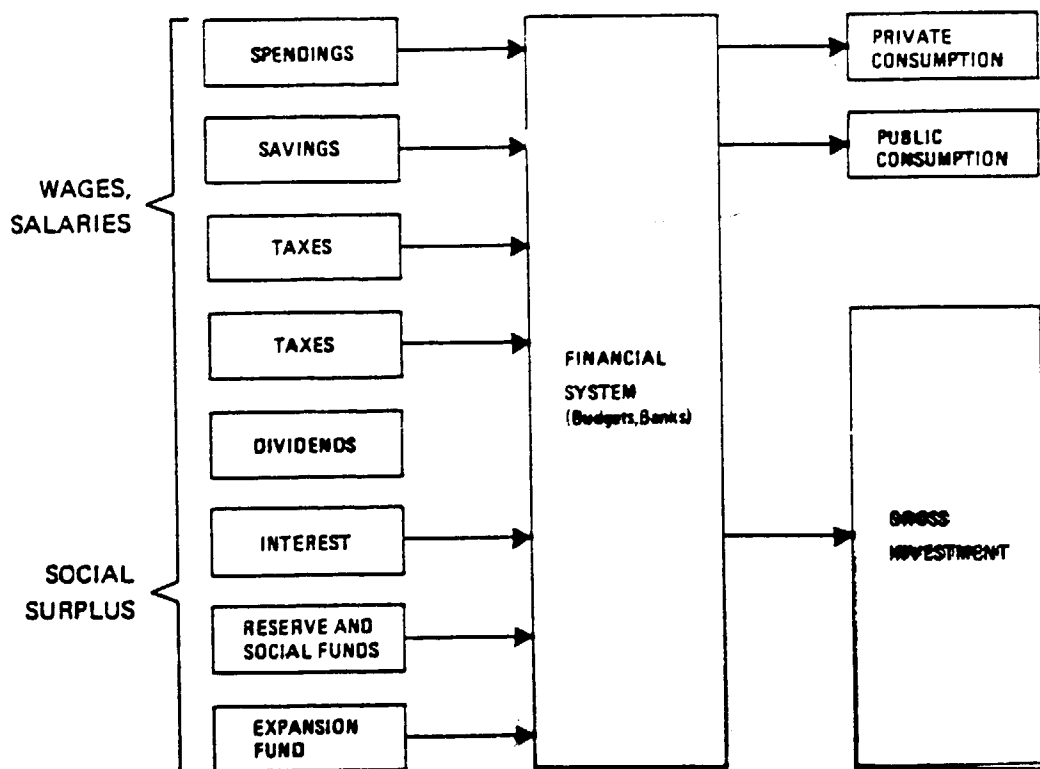| VALUE OF OUTPUT | VALUE OF MATERIAL INPUTS (raw materials, energy, fuels) | | | |
	COST OF INVESTMENT			
	REPATRIATED WAGES		GVA	NDVA	NNVA
	DOMESTIC WAGES		
	SOCIAL SURPLUS		
	REPATRIATED PROFITS		

WHERE:

GVA = gross value added

NDVA = net domestic value added

NNVA = net national value added

VALUE ADDED—REDISTRIBUTION

WAGES, SALARIES

SPENDINGS

SAVINGS

TAXES

TAXES

DIVIDENDS

SOCIAL SURPLUS

INTEREST

RESERVE AND SOCIAL FUNDS

EXPANSION FUND

FINANCIAL SYSTEM (Budgets, Banks)

PRIVATE CONSUMPTION

PUBLIC CONSUMPTION

GROSS INVESTMENT

Project evaluation by the "effects" method in developing countries

Marc CHERVEL[*]

INTRODUCTION

Developing countries have seen a considerable growth in the importance and number of development projects financed by assistance from outside the country, and this has led the financing bodies, particularly in recent years, to ponder and study methods of evaluating projects from the standpoint of society in the recipient countries as a whole.

A number of attempts to codify these evaluation methods have been made or are now being undertaken by various bodies concerned with international or bilateral aid.

Some evaluation methods, based on international shadow prices, seem suitable for international or foreign organizations, which have to evaluate and choose between different projects in different countries.

Economists in developing countries, for their part, feeling that this problem of evaluation and selection is of the greatest concern to them, want to find their bearings among all these methods and especially to see how they relate to the procedures followed in drawing up their own development plans.

Project evaluation by the effects method is based on the procedures followed by the planners, and that is what gives it its specific character. It has been worked out for the purpose of throwing light on the problem of development project selection by a central planning body in a developing country.

This method has been conceived for application at a certain stage in the planning progress when the planners have at their disposal:

(a) An over-all forecast for the economy;

(b) A knowledge of the various constraints (relating, for instance, to investment financing the trade balance etc.);

(c) General guide-lines fixed by the policy-makers (for the growth of the gross domestic product, the creation of additional revenue etc.).

They then seek to make the best possible selection of projects in order to achieve, or attempt to achieve, the goals set.

More precisely, this stage of project selection is reached at the moment when, after the various decentralized planning boards (sectoral and regional) have handed in their reports proposing various development projects and activities, the central planning team makes its first attempt to work these elements into a whole and bring the various activities templated into line with the constraints of the economy and the goals that have been set.

From this brief background, it follows that in project evaluation the analysis is made:

(a) Within a system of constant prices (initial market prices, on the basis of which the over-all forecast is calculated);[1]

(b) For a future domestic demand as given in the forecast especially with regard to household consumption.

In broad terms the selection procedure thus means arriving at a combination of projects which matches the constraints and the domestic demand forecast (in respect of price and volume), in order to attempt to achieve the development goals set by the policy-makers.

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[1] This assumption can be waived; see "Determination of the effects of the project", page 8.

All this procedure is, of course, iterative, as is the planning process itself, and it is only at the end of direct discussions between the three levels:

Policy-makers

Central planners

Planning boards

which may involve reconsideration of certain initial goals, that the selection of the projects is actually made.

Although this effects method may thus appear at first sight to be an integral part of the planning process and very different from the methods based on shadow prices referred to above, it can in fact be applied without difficulty to an isolated project, granted assumptions that can be carefully spelt out.

The following account describes the basic principles of this effects method; it will of course be necessary to specify, on many points, the limits within which the method is valid, the calculations that can be made, and the assumptions underlying the calculations or procedures used.[1]

DESCRIPTION OF THE METHOD

The effects method involves the following procedure:

Analysing the project in detail.

Analysing the country's economy in detail.

Introducing the project into the economy by putting the two analyses together (economy with project)

Studying the alternative situation (economy without project).

Determining, by a comparison of the two situations, the effect of the project on the economy.

Working out a procedure or a criterion for selecting projects by a comparison of their costs and benefits.

This method may easily be applied to the whole range of projects for the production of goods and services (agriculture, industry, mines, transport, tourism), but it is more difficult to apply to projects of the "social" type (education, health, etc.).

Analysis of the project

To simplify this description, we shall consider an industrial-type project and its operating account for one year of normal production.

A similar analysis could also be made for the investment.

The essential information is contained in the estimated operating account, at market prices. This account is broken down into:

Domestic inputs, by product;

Imported inputs, by product (taxes are shown separately);

Value added, mainly wages and social security contributions (by category);

Taxes and duties;

Gross income of the entrepreneur (broken down if necessary).

The total constitutes the estimated turnover.

Analysis of the economy

The analysis is carried out in such a way as to take into account, as fully as possible, the structural features of developing economies — mainly, that is to say:

Dependence on outside resources.

Dualism (a modern sector and a traditional sector).

The data required on the country's economy vary according as the problem is

(a) To formulate a general plan, i.e. to select a whole set of projects;

(b) To study a particular project in a given country.

In the more general case of formulating a plan, the analysis consists of a detailed study of an input-output table in which

The activities of the traditional sector are dealt with separately.

Domestic production and imports cif (cost, insurance, freight) are broken down by user.

The value added of each branch is broken down into:

Wages and social security contributions (by category).

Duties and taxes.

Income of the entrepreneurs.

From this detailed input-output table it is easy to derive the unit technical coefficient matrix for domestic production, which gives for each unit of goods or services considered (output) the intermediate consumption (input) of domestic goods and services required.

The inversion of the complementary technical coefficient matrix for domestic production gives the production per branch necessary in order to provide the economy with an additional unit of each product (assuming average coefficients are constant).

[1] Charles Prou and Marc Chervel, *Etablissement des programmes en économie sous-développee, Vol. 3: L'Etude des grappes de projets* (Paris, Dunod, 1970).

Multiplying this inverse matrix by the row vectors—direct imports and direct values added of the unit matrix—we obtain a breakdown of the value of each good and service produced domestically into:

(a) Imports (cif) included (import content);

(b) Value added included, comprising:

    Wages included;

    Taxes included;

    Entrepreneurs' income included.

(c) In order to study a particular project in a given country, it is not essential to have at one's disposal the whole range of data set forth in these detailed input-output tables. It is enough to have a good knowledge of the main branches of the economy which are going to be involved in the project.

Apart from being useful in connexion with the appraisal of projects which is to be described below a knowledge of the various rates for components of value included proves to be extremely helpful in the examination of various problems relating to the economies of developing countries.

In the first place, the rates for value added included show the national contribution to the value of the product under consideration. The rates for imports included, which are complementary to the value added rates, show the extent to which the various branches are dependent on the outside world (dependence rates).

Similar calculations based on the consumption patterns of the various categories of households give the rate of imports included for those categories, that is to say the total imports necessary (directly or indirectly) for each unit of consumption.

A whole series of problems can then be tackled, of the following type:

Effect on domestic prices of a devaluation, or an increase in the price of a specific good, or of an increase in wages?

Effect on the standard of living of the various household categories of a devaluation or a change in one tax or another.

It is thus possible to study, for instance, with regard to the country's income distribution objectives, such matters as

A price policy, or

A tax reform.

Introduction of the project into the economy

(Economy with project)

It is advisable to carry out this process in two stages:

- Study of the set of projects linked to the project under consideration;
- Study of the set of activities.

If the project under consideration is linked to another project or projects, that is to say, if one cannot be carried out without the others, this set of projects must be studied as a whole. A consolidated account is then established for the set of projects (e.g. mine, mine railway, mine port).

This question of whether one project involves another is essential: depending on whether such a connexion is assumed to exist or not, the evaluator will deal with the set of projects as a whole or with the individual project in isolation.

Thus, in particular, the downstream implications of the project will have to be analysed in order to determine whether they need to be taken into account (a good example is the iron and steel industry).

The set of activities brought about by putting the project or set of projects into operation results from the stimulus given to the various branches of the economy by the additional intermediate demand created.

In the general case where a plan is being drawn up, this set of activities may be estimated by applying to the domestic inputs the average rates included that have been calculated previously.

Of course, if more information is available, an attempt will be made to obtain the marginal output coefficients, at least for the main inputs. Lastly, in cases where some domestic production units are working at full capacity, provision must be made for further investment, to be added to the project investment.

In the particular case where an individual project is being studied, if no input-output analysis is available, the same calculation can be effected by retracing, one by one, the chains of domestic production which the project calls upon for its intermediate inputs (the convergence is very rapid).

Whatever calculating procedure may be used (simultaneous or iterative), the real impact on the economy* of carrying out the project will thus have been described, the project being characterized by:

Imports included.

Value added included (itself broken down into its components).

Total turnover.

The corresponding investment to be taken into account comprises:

Investment in the project proper;

Plus investment in projects linked with the project (the two together giving the total investment in the set of projects).

Plus further investment that may be necessary in other branches of production in order to satisfy the intermediate requirements of the project.

Study of the alternative situation

(Economy without project)

The alternative to the project, within the framework of the initial assumption regarding future domestic

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*Primary effects only, excluding secondary effects or income expenditure effects.
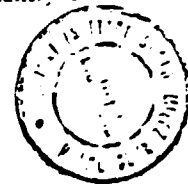
demand, may be of three types, to which correspond three types of projects:

(1) The alternative is to import: the project is then an import substitution one;

(2) The alternative is an old-fashioned or small-scale technique: the project is then a modernization one;

(3) The alternative is to do nothing: the project is then an export one (or a project for adding value to goods formerly exported unprocessed).

For each of these types of alternative solution an analysis can be made similar to that carried out for the project. In general, the alternative is characterized (for the same production value) by:

Imports included;

Value added included (itself broken down by agent)

It should be noted that it is necessary to take account, in the alternative situation, of production that may be eliminated through the implementation of the project, because the project will pre-empt certain factors. For example, the traditional production of wheat may be discontinued:

(a) Because the project uses agricultural labour (a theoretical case, it would seem, in many developing countries where there is abundant manpower); or

(b) Because the project uses land (irrigation and drainage projects).

Discontinued production of this kind has the effect of either reducing exports or increasing imports as compared with the "economy with project" situation.

Determination of the effects of the project

Total effect of the project on the economy

A comparison of the two alternatives (economy with and without project) enables the total (primary) effect of the project upon the economy to be estimated.

The total effect is equal, in all cases, to the extra value added brought into the economy by the implementation of the project; this extra value added (primary effect) is equal to the gain in foreign exchange.

This reasoning applies in a system of constant prices. Thus, for instance, the value added of the alternative solution in case No. 1 is made up of the customs duties that the State levies, or could have levied, by placing the same product on the domestic market at the same price.

When all is said and done, the level of market prices (for a given demand) matters little: an inflation of the value added of the project, as a result, for instance, of the employment of excessive manpower is, it is true, reflected in an increase in the rate of value added included; but the extra value added created (equal to the gain in foreign exchange) remains constant; in other words the State agrees to lose, if the project is carried out, the difference between the market price and the cif price.

Case No. 1
Import substitution project

Case No. 2
Technological modernization project

Case No. 3
Export project

VA: Value added included
I: Imports included
e: Extra value added

These arguments are valid for the three types of projects.

Case No. 2 covers projects such as:

Modernization of the transport infrastructure (former technique – earth road; project technique paved road);

Industries which take the place of traditional production (food industries, textiles, various)

Finally, it is only in case No. 3, where the price is the fob price, that the value added included of the project equals the extra value added created.

Effects by category of agents

A comparison of the two situations, with and without project, can give much more detailed information since there is available the breakdown of value added by category of agents. Thus the extra value added can be broken down by category of agents who benefit, and the project can be characterized by the plus or minus supplements of income it enables to be distributed to employees[4] (who may be foreigners, nationals in the modern sector, or nationals in the traditional sector), to the State and to entrepreneurs (who may be nationals or foreigners).

[4] It is also possible to calculate, on the basis of the rates of average and marginal employment, by branch, the direct and indirect employment created by the project.

The composition of the value added thus created differs considerably according to the case, e.g.:

- Projects of the first type (import substitution projects) may involve a considerable loss of revenue for the State (as in the case of highly protected assembly industries).

- Similarly, projects of the second type (technological modernization) may involve considerable losses of income for traditional small producers (as in the case of an industrial oil-mill whose output replaces traditional types of production).

- Export projects, on the other hand, may lead to a greater or lesser amount of additional income for the various categories of domestic agents.

Finally, it may seem wise to adopt a "national" rather than a "domestic" approach and to try to measure the extra value added going to nationals: this can be done simply by subtracting from the domestic extra value added the income going to foreigners in the form of wages or profits (which amounts to considering these jobs as imports).

Formulating a procedure or criterion for project selection

The problem of project evaluation and preparation for selection takes on a different aspect according as the aim is to formulate a plan or only to estimate the benefit of one particular project.

Project selection in the planning process

The problem of the choice of projects is inseparable from the problem of formulation of the plan.

The central planning body has at its disposal the following information:

The growth objectives of the economy:

The constraints with regard to financing, foreign trade etc.;

Data on the behaviour of agents (e.g. consumption patterns and rates of saving in the various categories of household)):

Income distribution objectives etc.

* The role of the project economist is to set forth in the clearest possible way the implications of the possible choices, in the light of the objectives and constraints.

The process of project selection therefore depends more on a procedure of discussion with the policy-makers than upon the over-all results of simultaneous calculations which, of necessity, implicitly include political choices.

This discussion procedure could be prepared for by:

- Classifying projects in major, more or less homogeneous groups and submitting corresponding schedules of investment costs, value added, and income by agent (particularly the State, but also social categories, regions etc.);

- Preparing several alternative solutions corresponding to different development policies;

Checking them against the initial objectives.

Discussion could then be started with the policy-makers, who, having all the necessary information, could gradually be brought to fix on the various objectives (growth, income distribution etc.), and the economists would make these choices explicit by progressively drawing up the corresponding list of projects.

Economic evaluation of a project

There is nothing to prevent the adoption of more than one over-all selection criterion and the approaches taken in working out different criteria are by no means mutually exclusive.

The mass of analytical data collected allows great freedom in this respect.

To stick to the procedures normally used, one might take, for instance:

A *As the benefit variable:* The extra value added created, weighted if necessary by category of agent. These weightings could take into account, in particular:

- Income distribution goals (by nationality, social category, region etc.);

- Propensity to save of the various agents;

- Multiplier effect of the expenditure of the various categories of wage-earners (secondary effects);

- The State's need to balance its budget.

As the cost variable: Investment cost, or cost without taxes, or the foreign exchange component of the investment cost.

As the calculating procedure: Discounting, either by using a discount rate[5] for calculating present value, or by using an internal rate of return.

More precisely, one might propose:

(1) The simplest over-all selection criterion:

$$\frac{a}{I}$$

where

a is the extra value added created by the project (equal to the gain in foreign exchange in the primary phase);

I is the investment cost, taxes included.

This selection criterion is obviously suitable for choosing between projects having a more or less constant production schedule and more or less the same duration.

(2) The general criterion which is nearest to those normally used, that is to say, the internal rate of return, r, solution of the equation:

$$-I + \sum_{1}^{n} \frac{a_t}{(1+r)^t} = 0$$

where

a_t is the extra value added (domestic or national) created;

I is the cost of investment (without taxes, or including taxes);

n is the duration of the project.

[5] It is, however, idle to hope that this rate can be given in any meaningful way by the policy-makers or by simultaneous calculation.

Each of the criteria chosen involves a body of assumptions concerning:

(a) Income distribution (considered optimal, for instance, when a general benefit like *a* is obtained):

(b) The progressive distortion of the economy caused by assuming the discount rate to be constant over a period of time (changes in the rate of development in fact lead to variations in this rate).

Whatever over-all criterion may be chosen, it appears, reasonably enough, that it cannot faithfully reflect the whole range of objectives and constraints in the economy.

It therefore seems essential to give individually, for each project, the main economic variables which it has been possible to calculate, such as extra value added, the impact on income of the various agents, or the employment (direct and indirect) created.

CONCLUSION

It may seem disappointing that this effects method does not lead to a very well-defined selection criterion.

More closely examined, the procedure followed in this method can be seen to include two distinct phases:

(1) An analytical phase in which the project is checked against the economy and an attempt is made to measure its impact and effect on the economy;

(2) A policy phase in which, using the material produced by the preceding analysis, an effort is made to combine the various elements in such a way as to match as closely as possible the constraints on the economy and the goals established by the policy-makers.

The variety of criteria to which the effects method leads is thus seen to be a faithful reflection of the variety of situations in different developing countries and of the variety of development choices that can be taken by the policy-makers in those countries.

SOCIAL BENEFIT/COST ANALYSIS

1.0 Introduction

This paper is derived from a review of UNIDO publications concerning economic and social evaluation of industrial projects including :

- Guidlines for Project Evaluation, Dasgupta P, A. Sen, S. Marglin 1972 (hereafter, the Guidelines)

- Guide to Practical Project Appraisal, Hansen J.R. 1978 (hereinafter, the Guide)

- Manual for Evaluation of Industrial Projects. IDCAS, 1980 (hereinafter, the Manual)

The intent is to clarify for practitioners of economic and social evaluation, the methodologies advocated in the Guide and Guidelines, which to some extent vary in their approach (although the Guide is avowedly derived from the Guidelines) and to incorporate some useful concepts as presented in the Manual.

The author is indebted to Dr J. Bendekovic of the Institute for Economic Research in Zagreb and to Dr Dariusz Rosati of the Central School of Planning in Warsaw, whose ideas are inextricably linked in regard to this subject with the author's own. The author however, assumes full responsibility for any errors or omissions.

2.0 Intro to Social Economic Evaluation

2.1 General Considerations

2.1.1 Financial (Commercial) Economic and Social Points of View

Financial – Returns from investment of financial resources such as cash, checks. loans and other financial investments.

Economic – Returns from investment of national resources such as labour, know how, natural resources, fixed assets at economic efficiency prices.

Social – Returns from investment of national resources concerning social objectives such as income distribution and merit wants (Stages IV and V of methodology described below).

2.1.2 Parochial vs Collective Interests

Individual, enterprise values inputs and outputs in terms of market prices.
Society values inputs, outputs in terms of economic efficiency prices adjusted for social valuations.

2.1.3 Market vs Economic Prices

Market prices may not reflect societal values for a number of reasons :

- Imperfections of market – absence of perfect competition
- Market prices vitally affected by financial. economic social and administrative policies of government which are often distorted by political considerations. Often easier to apply objective analysis of the project rather than the macro-level. For a variety of reasons, where price distortions between market and economic/ social value continue to exist that would otherwise rationally be corrected. governments are able to apply at the micro (project) level criteria which could not be applied at the macro level[1].

2.1.4 Time Preference and Social Rate of Discount

- Deals with the relationship between current and future benefits.

2.1.5 Certainty vs uncertainty

Uncertainties in project parameters inevitably exist.
It is crucial to the evaluation of the project to identify those significant elements about which uncertainties exist and to assess risks through sensitivity and probability analysis.

2.1.6 Applicability

Both the Guide and Guidelines imply that socio-economic evaluation is not intended for "private profit-making units".[2] However, it is often the case at private industrial projects are intricately tied to national growth objectives and must interact with central authorities in respect to licensing. financing and trade permits.

Under these circumstances. it would be virtually implicitly
required that private sector projects undergo this type of
evaluation.

2.2 Structure of Project Evaluation

    2.2.1 Commercial Evaluation

        2.2.1.1 Financial analysis
             Liquidity and Capital Structure

        2.2.1.2 Commercial Profitability
             Pay-back, ROI, ROE, NPV, IRR, IRRE

    2.2.2 National (Social Cost/Benefit) Evaluation

        2.2.2.1 Economic Evaluation
             e.g. Value Added, Aggregate Consumption Benefits

        2.2.2.2 Socio-Economic Evaluation
             Distributional Effects (Time, Income Level, Regional)
             Merit/Demerit goods and wants)

2.3 Commercial vs National Profitability

Element of Analysis	Commercial	National
Development Goal	Net Financial Surplus	Socio-Economic Surplus
Range of Effects	Direct	Direct & Indirect elsewhere in economy
Prices of Inputs/ Outputs	Market	Adjusted Prices or Shadow Prices
Time Preference (Discount Rates)	Opportunity Cost of Capital	Social Time Preference Present Benefits vs Future Benefits

3.0 National Parameters

3.1 Bottom-up procedure
    Evaluators are often at a loss to establish values for national
parameters as normally responsible central planning agencies either
do not exist or for various reasons, are not able to supply evaluators
with current values.
A bottom-up procedure is recommended   in which the evaluators prepare
alternatives varying in the degree to which they satisfy efficiency
criteria or equity criteria which are rarely, if ever, simultaneously
optimized. The pattern of acceptance by decision-makers will, in time.
offer a means of establishing appropriate national parameters in the
degree to which they conform to those projects which make their way
through the approval cycle.

3 Guide P1

It is urged that institutions responsible for project evaluation begin to apply some consistent methodology for socio-economic evaluation even in the face of little information or support from the government. In this way patterns of acceptability will begin to emerge and an extremely useful data base will be accumulated in addition to the development of an increasing level of sophistication in regard to evaluation. The methodology described in this paper is one such possibility . Even in the absence of national parameters, however, economists can play a useful role in the late stages to help refine the project to maximise financial and socio-economic profitability.[4]

3.2 Definition of National Parameters:Variables of a Socio-Economic model (ideally abstracted faithfully from reality) that take on values which reflect their effect on national socio-economic development

- yardsticks set up outside investment project
- should reflect optimal allocation of resources
- ideally provided by national planning authority

In effect, national parameters are shadow prices or values which should be constant for the whole society.

3.2.1 Value Parameters, e.g. :

- Minimum acceptable social rate of return
- Income distribution weights
- Regional distribution weights

3.2.2 Factual Parameters, e.g. :

- Adjusted rate of Foreign Exchange
- Marginal Propensity to Invest
- Marginal Savings Rate (Gov't, Private, Skilled Labour, Unskilled Labour)
- Shadow Price of Investment

3.3 Values of National Parameters as used in Guidelines

Premiums or Adjustment Factors (AF) as used in the Guide, when multiplied by the basic parameter, give the incremental effect.

$$\text{Premium}^5 = \frac{\text{SHADOW PRICE}}{\text{MARKET PRICE}} - 1$$

EX : Foreign Exchange Premium

$$\emptyset = \frac{P^F}{R^F} - 1 = \frac{P^F - R^F}{R^F}$$

$$P^F - R^F = \emptyset \cdot R^F$$

$$P^F = \emptyset \cdot R^F + R^F$$

$$P^F = R^F (1 + \emptyset)$$

Guide P6
Same as Adjustment Factor as used in the Guide

P^F - Shadow Rate of Foreign Exchange

R^F - Official Rate of Foreign Exchange

The incremental effect, in this case, would be $\emptyset \times R^F$

3.4 Definitions and Valuations of National Parameters

3.4.1 Foreign Exchange Premium $\emptyset$

- Shadow Price of Foreign Exchange (Guidelines Pg 216)

$$\frac{P^F}{R^F}\emptyset = \sum_{i=1}^{n} f_i \quad \frac{P_i}{P_i^{CIF}}$$

P^F - Shadow Exchange Rate

R^F - official rate of foreign exchange
f_i - fraction of foreign exchange used in importing i^{th} commodity

P_i^D - domestic market clearing price of i^{th} commodity

P_i^{CIF} - CIF price in domestic currency calculated at official exchange rate.

Note that when domestic currency is over valued the P^D will be higher than P^{CIF}

- Shadow Exchange Rate (SER) (Guide Pg 48 footnote)

$$P^F = R^F \left[\frac{(M \times T_i) + (X + S_x)}{M + X} \right]$$

P^F - Shadow Exchange Rate

R^F - Official Exchange Rate
M - Cif. value of Imports
T_i - Import taxes + Transport + Import Profit

X - FOB value of exports
S_x - Export Subsidies

- Manual (Based on Balance of Payments) Pg 115

$$P^F = R^F \left(1 + \frac{M - B}{B} \right) = R_F \frac{M}{B}$$

6 Note correction
from Guidelines
P216

M - Value of visible and invisible payments expressed in domestic currency

B - value of visible and invisible receipts expressed in domestic currency

For consistency, in each case above,

$$\frac{P_f}{R_f} = 1 + \emptyset \text{ and } = \pounds$$
$$= \left(\frac{-}{R_f}\right) - 1$$

3.4.2 Unskilled Labour Premium λ^7

As in other cases $\lambda = \frac{P^W}{R^W} - 1$

Where P^W - Shadow price of unskilled labour

R^W - actual wage of unskilled labour

The shadow price of labour can be treated similarly as the valuation of other project inputs (see section 4.0).

In summary, the unskilled labour impact can be determined as follows :

Impact Upon	Result	Valuation
Other employers	Decrease in availability to other employers	Value to other employers (willingness to pay)
"Production" of labour	More labour available to labour "consumers"	Cost of "producing" labour
Import of labour	More labour imported	Foreign exchange value

If unskilled labour is abundant dometically, the value is cost of "producing" an unskilled worker :

- the cost of transforming an underemployed person to a fully employed worker is the cost to society of giving up what (little) he/she may have produced in addition to the

+ social value of additional consumption required
+ liesure time foregone
+ cost of additional social infra structure, especially where rural-urban migration induced.

- the cost of turning rural worker to urban worker is social cost of migration

- the cost of training unskilled to skilled is the cost of training less the externality of NPV of additional productivity from the time he/she leaves the project until retirement.

7 Guidelines P24
8 Guide P38-40

It has been quoted widely in the literature that the shadow wage of unskilled labour is equivalent to 3kg of grain per day.

Note if $P_w^w < R^w$ then λ is negative

e.g. if $P^w = 0$

$$0 = 1 + \lambda , \lambda = -1$$

3.4.3 Domestic skilled labour premium [9], χ $\dfrac{P^{sl}}{R^{sl}} = 1 + \chi$

If in short supply, effect is on demand; less available to other consumers of skilled labour so price is value to other consumers (opportunity cost). This value may be greater than the domestic wage.

Spse $P^{sl} = 2 \times R^{sl}$

Then $\dfrac{2}{1} = 1 + \chi$

$$\chi = 2-1 = +1.0$$

3.4.4 Marginal rate of return on investment [10], of (marginal project earns of for each 1 unit of investment.

3.4.5 Marginal rate of saving [11], S

S is the marginal rate of savings for the society as a whole and is treated as being equivalent to investment in the determination of the shadow price of investment, P^{inv} (see section 3.4.7)

3.4.6 Social Rate of discount [12], i

The social rate of discount (SRD) or consumption rate of interest [CRI] in the Guide, accounts for the social preference for current, as opposed to future, benefits. Formulae are proposed in the Guide and Guidelines for its determination. However, in both cases the elasticity of marginal utility of income is a factor which is rarely determined.
The aforementioned bottom-up procedure, (section 3.1) is recommended. In the absence of other information, 10% has been recommended as the "cut-off" rate. Alternatively, the market rate for medium-long term financing could be used initially.
If the elasticity of marginal utility of income with respect to per-capita consumption can be estimated, then the SRD or CRI can be estimated as follows :

9 Guidelines P24
10 Guide P24
11 Guide P175
12 Guidelines P165

$$i = \frac{\Delta\, V/v}{\Delta c/c} \times \Delta c/c$$

where $\dfrac{\Delta v}{V}$ = % change in marginal utility of consumption

$\dfrac{\Delta C}{C}$ = % change in consumption

or i = - (elasticity of marginal utility with respect to per capita consumption) rate of growth of per capita consumption

Usually an unknown - calculation of IRR on public investments (and private) proposed to facilitate inter-temporal value judgements. (i.e. as experience gained in project selection, composite switching values indicate in the long run the social consumption preference).

CRI^{13} = ng + p

n = $-\dfrac{\Delta V/v}{\Delta c/c}$ as above (elasticity of marginal utility of income)

g = $\Delta c/c$ as above

p -   pure time preference

3.4.7 Shadow Price of Investment

By definition arising from the manner of derivation[14] the Shadow Price of Investment P^{inv} is the present value of the aggregate consumption stream generated by one unit of marginal investment[15]. It reflects the effect of savings (treated as equivalent to investment) on consumption benefits.

$$P^{inv} = \frac{(1 - S)\, q}{(i - Sq)}$$

S - Marginal propensity to save for the society as a whole

q - Marginal return on investment

i - Social rate of discount

On the basis of the above definition it can be seen that P^{inv} is a function of i, the SRD.
The premium, or adjustment factor is determined by :

$$AF_s^{16} = P^{inv} - 1$$

13 Guide   P42 footnote
14 Guidelines P177
15 Guidelines P155
16 Guide P65

3.4.8 Marginal propensities to save

    (a)   Government   Sg
    (b)   Private Sector   Sp
    (c)   Unskilled & Semi-
           Skilled Labour   Sl

3.4.9 Marginal Propensity to Respend in Region $\check{Y}$

3.4.10 Proportion of Foreign Salaries Respent in Region $\bar{Z}$

3.4.11 Aggregate Consumption Weight Factor, $\sim$

    Regional Redistribution or Distribution
    by Income Group, Weight Factors $\smile$ etc.

4.0 Shadow Prices

4.1 "Second Best" optimization
    Theoretically all shadow prices should be derived from comprehensive
    mathematical model of the economy.
    e.g. Linear model
        - Imported or shadow prices of scarce resources (inputs) (dual
          variables) reflect marginal impact on benefits of one more
          unit of the resource available.
        - shadow prices of outputs $(Zj - Cj)$ reflect marginal contribution
          per additional unit of production within the system of contraints.

In a perfect market the shadow price would equal the market price.
For traded goods the price would not change from CIF (imports) or
FOB (exports). One would import more rather than paying more than
CIF or export more rather than accepting less than FOB. Normally,
however, for tradeable resources, the domestic prices tend to be
higher than border prices.[7] If a good or service is tradeable,
the border price (CIF or FOB) offers in alternative to domestic
production and consumption and this the economic opportunity cost
of the good or service.[18]
Externalities either do not ordinarily have a market price or society
has not devised a mechanism for charging beneficiaries or for paying
producers. They implicitly carry shadow prices, and when significant,
should be included in the cash flow tables at efficiency prices
(Stage II section Externalities may include, for example, worker
teaming, housing for workers, pollution effects, etc.[19])

Economic project appraisal limited to estimates of social value of

    - main outputs
    - importable material inputs
    - major non-imported material inputs
    - unskilled (and semi-skilled) labour
    - important externalities

In general, choices for shadow pricing should be limited to inputs
and outputs whose prices are (a) most greatly distorted and (b) most
prominent at market prices. These criteria should be simultaneously
applied[20]

17 Guide P23
18 Guide P22
19 Guide P35
20 Guide P21

4.2 Shadow Pricing Rules[21]

The shadow pricing roles indicated below can be used in almost any situation involving project inputs or outputs including capital goods, materials and supplies or labour.

A project input may :

Increase production (supply) from other producers
Decrease consumption (demand) by other users
Decrease exports
Increase imports

A project output may :

Decrease production (supply) by other producers
Increase consumption (demand) by local consumers
Increase exports
Decrease imports

Project Input or Output / Impact of Project on	INPUT	OUTPUT	VALUATION
Non-traded Supply (Prod)	(supply of an input) more from local producers	(supply of an output) less by other producers	cost of production
Demand (Cons)	(use of an input) less for other local users	more for local consumers	willingness to pay
Traded Supply Export	(supply of an input now exported) less export	more export	FOB value
Demand (Import)	(use of an input now imported) more import	less import	CIF value

4.3 Taxes[22]

For non-traded goods where the impact is on consumption (demand) the taxes should be included as reflecting consumer willingness to pay.
For non-traded goods with impact on production, taxes do not constitute part of marginal economic cost of production and should be excluded.
Taxes should be excluded for fully traded goods.

21 Guide P24
22 Guide P27

5.0 Methodology of Project Evaluation

Both the Guidelines and the Guide identify 5 stages of evaluation,
each leading to a successively more complete picture of the financial,
economic and social value of the project. The stages are as follows :

Stage	Description
I	Commercial Profitability at Market Prices
II	Net Benefit at Economic Efficiency Prices
III	Net Benefit in Stage II Adjusted for Savings/ Investment Impact
IV	Net Benefit in Stage III Adjusted for Income Distribution Effect
V	Net Benefit in Stage IV Adjusted for Merit/ Demerit Goods and Wants

Although indirect, or second, third round, etc. effects are considered
as important aspects for socio-economic evaluation, they are extremely
difficult to ascertain. The examples in both the Guide and Guidelines
minimally   treat other than first order effects. Only when clearly
important need these effects be included. As an example   given [25]
overpriced fertilizer from a project to farmers may yet have an impact
(second round) of increasing their income. It should also be pointed
out that these indirect effects should be evaluated ideally in the
same manner as the first round, or direct effects.

The accounting in all stages described uses discounted benefit/cost
flow methodologies to establish the net present value (NPV) of the
project as the basis for comparison and decision.

An additional point is that the numeraire, or unit of account, is
different at each stage of evaluation.

The numeraire should include specifications of

- (a) - unit of currency
- (b) - value of currency with respect to inflation (current or constant)
- (c) - point when cost/benefits occur (past, present, future)
- (d) - relative pricing or value system (foreign trade or domestic market)
- (e) - use of income (consumption or investment)
- (f) - income recipient (rich, poor, government, etc)

In Stage V of the methodology described, the numeraire would be "net
present (c) - consumption benefits (e) in hands of people at base
level of consumption, in the private sector (f) in terms of constant
price (b) domestic (d) accounting monetary units (a)".

5.1 Stage I Commercial Benefit/Cost

This stage involves the evaluation of the project at market prices.
An integrated cash flow analysis similar to that presented in the
Manual (Table 8 P32 and ultimately Table 14 P50) should be completed.

This type of analysis assures the liquidity of the project on a
financial basis and provides the basis for NPV and IRR calculation
at market prices as well as forming the basis for adjustments in
Stages II through V.

One important distinction made in the Guide in respect both to
the Guidelines and the Manual is that during the Stage I analysis
Real Flows are distinguished from Financial Flows. This procedure
is indicated in Table 2 of the Guide, P82 and should be followed.
The Commercial IRR and NPV are determined on the basis of Real
Flows only. The financial flows are not relevant to this analysis
and are included for later use in Stage III and beyond for evaluation
of savings and distributional impacts.

Another point of note is that the Guide distinguishes between
financial and real components of working capital. It is recommended
that the Guide procedure be followed for the entire analysis (although
it is not followed in the Manual) considering the receivables, payables
(if any) and cash components of working capital, as well as taxes and
dividends as financial flows.

The Sarania Case in the Guidelines (P263) is offered as an example
of the use of the methodology. In this case, for the purpose of
simplfying price adjustments the resource categories are broken down
as

    Domestic inputs and outputs
    Foreign Exchange inputs and outputs
    Unskilled and Semi-skilled labour
    Skilled labour

The project is import-substituting so that the benefits (rayon
- grade pulp and corrugating   medium) are measured in terms of
Foreign Exchange resources saved as a result of not importing.

Stage I Commercial Evaluation is not presented in this case. The
values in Table 19,19 P278-9 already have been adjusted for shadow
prices in respect to border pricing and externalities and, in effect,
represent partially the outcome of Stage II-1 analysis as described
below.

5.1.1 Discounting of Benefits and Costs

        If it is assumed that all relevant parameters are constants
        then the time flows for all of elements in Stage I can be
        converted back to Present Value at year of using a common
        rate of interest (for example, the three values of Social
        Rate of Discount given earlier), and the present values
        of each item can then be substituted into the equations to
        give the project's total contribution to different objectives.

5.2 Stage II Net Aggregate Consumption Benefits at Economic
Efficiency Prices

5.2.1 Application of Shadow Prices

Stage II is carried out in 2 substages as follows :

Stage II-1 Adjustment Factors based on shadow prices
are applied to the market prices for real
and financial flows as shown in Guidelines
Table 10 Pg 87. This provides NPV at
economic efficiency prices. The NPV is
determined for Real Flows only.

Stage II-2 Foreign Exchange Factors are applied to
economic efficiency prices to obtain Stage
II NPV. This is shown in the Guidelines
Table 11 Pg 88

In Stage II-1 Net Present Economic Value is obtained from the
summation of Financial Net Present Value and Economic Adjustment
Value for real flows only [23]. In the financial section, emphasis
is on distortion with respect to values received by the project
rather than the economy. The purpose is to measure (in Stage III
and beyond) the project's distribution impacts rather than on
the efficient use of economic resources [24]. For example,

- concessionary interest rates show as "extra" income
  to the firm
- taxes paid are completely lost to the firm
- dividends abroad are valued at 100% loss to firm

In Stage II- 2 The Foreign Exchange Premium or Adjustment Factor
need be applied only to those goods valued at border prices;
goods shadow-priced at "willingness to pay" or cost of production
implicitly include a premium on foreign exchange.

In returning to the Sarania Case, it would be well to introduce
the national parameters and their values used in the case. (see
Table I next page).

5.2.2 Stage II-1

Stage II-1 analysis is completed by applying pricing rules
not only for traded inputs/outputs, but also for other items
that must be shadow priced such as skilled and unskilled
labour. Although not shown in the case, the Stage II-1 result
could be expressed as

$$SC^1 = MC + \lambda L + \chi W$$

where $MC = (1) + (2) + (6) - (3) - (4) - (5)$
and $\lambda L + \chi W$ complete the shadow pricing.

23 Guide P44
24 Guide P44

Housing for domestic personnel is valued at this stage.
in effect, as an externality, a project benefit for domestic
personnel. This would not be included in the commercial
analysis.

Item (5) represents recovery of residual value such as working
capital and book value of capital equipment, etc.

The NPV's for SC^1 represent the net project benefit at efficiency
prices.

TABLE I

National Parameters :

(1)	Foreign exchange premium	$\dot{z} = 0.5$
(2)	Unskilled labour premium	$\lambda = 1.0$
(3)	Domestic skilled labour premium	$\chi = +1.0$
(4)	Marginal rate of return on investment	$q = 0.20$
(5)	Marginal rate of savings	$s = 0.30$
(6)	Social rate of Discount	$i = 0.8, 1.0, 1.2$
(7)	Shadow price of investment	$P^{inv} = 7, 3.5, 2.33$
(8)	Marginal Propensity to save	$s^G = 1.0$
		$s^p = 0.6$
		$s^{\perp} = 0.0$
(9)	Marginal propensity to spend in region	$\gamma = 0.2$
(10)	Proportion of foreign salary spent in region	$\delta = 0.2$
(11)	Weights	
	Aggregate Consumption	$\ominus = 1.0$
	Redistribution to Region	$= ?$

5.2.3 Stage II-2

In this stage the shadow rate of foreign exchange P^F is
introduced to correct for Foreign Exchange Effect.

The discussion below follows that of the Guidelines, where
the net benefit is determined in 2 steps, SC* and finally SC.
However, it should be noted that, in effect, the Foreign
Exchange Adjustment Factor, Ø, is applied in all cases, to
economic efficiency prices and, in SC, an adjustment is
made for portions of foreign salaries spent domestically.

In the Guide, the Foreign Exchange Adjustments for Stage II-2
are summarized in Table II P 88 where the final Stage II NPV's
are also given.

$$SC* = MC + ØF' + \lambda L + \chi W$$

F' is net foreign exchange flow, ie foreign exchange inflows
minus foreign exchange outflows

$$F' = (1) + (6a) - (3a) - (3b) - (4a) - (5a) - (5b)$$

L is total cost at market price of unskilled and semi-skilled
labour

$$L = - (3c) - (5e)$$

W is total cost of skilled labour at market price

$W = - (3e)$ (note skilled foreign personnel in F' above)

Now a portion of foreign exchange, $\hat{a}$, paid to foreign personnel will be converted at official exchange rate and thus extra value of foreign exchange is not lost.
So F' above should be corrected by adding back this amount.
Thus :

$$F = F' + \hat{J}(3b) + \hat{J}(5b)$$

Now $SC = MC + OF + \lambda L + \Upsilon W$

This represents the net aggregate consumption benefits taking into account the shadow prices of inputs and outputs.

[Note SC determined, as in Stage I, for each social
          rate of discount]

5.3   Stage III   Net Aggregate Consumption Benefits Adjusted for
                   Savings/Investment Impact

In Stage III the intent is to show the effect of distribution of benefits to various groups considering the marginal propensity to save and its effect on the benefit stream.

In the approach taken in the Guide[25] the gains and losses concerning distribution to groups are assumed equal to the distortions between market and shadow payments (including both efficiency and foreign exchange adjustments, i.e. the Stage II value) for inputs and outputs. Table 12 Pg 89 of the Guide summarizes distortions.

Disaggregation of society into groups can take many forms depending on local circumstances.

A fundamental assumption is that there is a gainer for every loser. A further assumption is that the project loses if the economic benefit is distributed to others. Under these conditions, even though the project may have an NPV ≤ 0 at Stage II prices, there may yet be economic transfers among groups.

When distributional impacts have been determined as in Table 12 above, the savings impact can be determined as in Table 13 P 90 of the Guide using the distributional information from Table 12 and alternative values of CRI.

25 Guide P52

The Adjustment Factor of Table 13 is

$$AF = P^{inv} - 1$$

and is a function of i (CRI) so that three values of the AF are determined (one for each CRI).

The Guidelines approach differs from the Guide in that the Guidelines uses the parameter, marginal propensity to save <u>for each group</u>. whereas this factor is ignored in the Guide. The Guide, instead, uses probability factors for each adjust factor derived strictly from P^{inv} and consequently from the <u>societal</u> propensity to save.

The Adjustment Factors of Table 13 in the Guide are added to the NPV's in Stage II to arrive at Stage III values including savings/ investment impact. This is roughly equivalent to the stage in the Guidelines of equation 19.5 P 284 as described below.

In the Guidelines the Stage II benefits SC are distributed among income groups.

$$SC = SC^G + SC^P + SC^L = MC + ØF + \lambda L + \chi W$$

Values on right side represent Social Benefits for Government, Private Sector and Labour, respectively.

Note that this equation must be respected, ie, SC from Stage II = sum of right side.

$$\underline{SC^G = MC - (2) + ØF}$$

$$[MC = (1)+(2)+(6)-(3)-(4)-(5)$$
$$\hat{F} = (1)+(6a)-(3a)-(3b)-(4a)-(5a)-(5b)$$
$$+ \hat{i}(3b)+ \hat{i}(5b)]$$

$$ØF = \{Ø(1)-Ø(3a)-Ø [(3b) - \hat{i}(3b)]$$
$$-Ø(4a)- Ø(5a)-Ø [(5b)+ \hat{\sigma}(5b)]$$
$$- Ø(6a) \}$$

$$ØF = Ø(1)-Ø(3a)-Ø(3b)(1-\hat{i})$$
$$- Ø(4a)-Ø(5a)-Ø(5b)(1-\hat{\sigma})-Ø(6a)$$

$$\underline{SC^P = \chi [\overbrace{-(3e)}]}$$

The private sector loses the amount equal to the premium on skilled labour as this is drawn from the private sector.

[Note χ is positive so SC^P is negative]

$$SC^L = \lambda L = \lambda [-(3c)-(5e)] + (2)$$
$$\underline{SC^L = -\lambda [(3c)+5(e)] + (2)}$$

Unskilled labour gains premium on value plus housing - [Note λ is negative so value is positive]

Note SC^G, SC^P, SC^L computed as in Stage 1 for each Social Rate of Discount

Considering the Marginal Propensity to save for each group S_g, S_p, S_l and the Shadow price of Investment

$$[P^{inv} = \frac{(I - S)q}{1 - Sq}]$$

the Net Aggregate Consumption Benefits for the country can be computed as the sum of social values for each group, where

$$C^L = [(1-S_l) + S_l \, P^{inv}] \; SC^L$$

$$C^G = [(1-S_g) + S_g \, P^{inv}] \; SC^G$$

$$C^P = [(1-S_p) + S_p \, P^{inv}] \; SC^P$$

$$C = C^L + C^G + C^P$$

C can be determined for each discount rate and represents the total Stage III benefits of the project.

5.4   Stage IV   Income and/or Regional Distribution Benefits

The approach in the Guide is to determine weightings for each group receiving income according to the formula

$$W_i = \left(\frac{b}{c_i} \right)^n$$

where   b - base level of per-capita consumption
             c_i - level of consumption for i^{th} group (per capita)

             n - elasticity of marginal utility of income.

Then, as in Table 14 Guide P 91 the adjustment factors are determined for three assumed value of n where

$$AF = w_i - 1$$

This AF, as others, is used as a multiplication factor to determine the incremental effect which is then added (after using probability analysis on n to arrive at the expected value) to the Stage III benefits to arrive at Stage IV values.

In the Guidelines, the regional benefits are not , in general, adjusted for shadow prices. What is an opportunity cost for the country is not necessarily so for the region.

In this case, the regional benefits, DR, are determined as the summation of

(2) Housing
(3c) Unskilled Labour Wages (construction)
(3c) Skilled Labour Wages
(5e) Unskilled Labour (operations)
(5d) Semi-skilled Labour (operations)
(3b) Foreign Exchange (personnel - construction)
(5b) Foreign Exchange (personnel - operations)

Finally, if ⁻ represents portion of marginal benefits respent in the region, then $R = DR \left(\dfrac{1}{(1-\bar{S})} \right)$

Summation of Present Value of Net Benefits

	Social Rate of Discount		
Aggregate Consumption	8%	10%	12%
MC			
F			
L			
W			
SC_G			
SC_P			
SC_L			
C			

Redistribution to Region
$\bar{R}_s$

(Please take from Guidelines (see Pg 288 of manual for numbers)

5.5 Stage V Merit/Demerit Goods and Wants

In the Guide[26] the adjustments for merit/demerit goods and services are derived in consideration of the differences between efficiency and social values of resources, per se, as opposed to the difference between economic and social value of income distributed among groups as in Stage IV.

The social values applied in this case are perhaps even more subjective than in previous stages.

Once the social values are established, the adjustment factors are determined in the usual way.

$$AF = \frac{\text{Social Value}}{\text{Economic Value}} - 1$$

Adjustment = Economic Price x AF

26 Guide P75-77

These values are then added to the NPV of Stage IV to arrive at the adjusted value.

Merit/demerit valuations may consider such factors as

- need for foreign exchange to increase ability to withhold exports for strategic reasons
- need to build basic industries to reduce dependency on primary exports
- support of infant industry
- premiums for strategic imports/exports

In the Guidelines, the approach is to assign weights to consumption benefits and to examine the effects of varying weights, ie. the sensitivity, on national objectives.

$$V = \ominus^C C + \ominus^R R \qquad C - \text{Stage IV Benefits: } R - \text{Regional Benefits}$$

where weights for national aggregate consumption and regional benefits are $\ominus^c$ and $\ominus^R$, respectively

if $\ominus^c = 1$, then V is set to zero, establishing a region of acceptability

then $\ni = C^{(i)} + \ominus^R R^{(i)}$ and $\qquad \ominus^R = -\dfrac{C(i)}{R(i)}$

Note C,R are functions of SRD, i
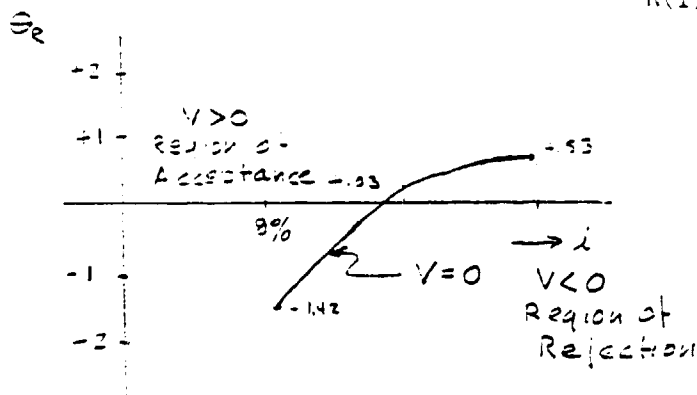
i	C(i)	R(1)	C(i) / R(i)	$\ominus_R$
8%	313.95	220.175	1.42	-1.42
10%	- 6.245	196.025	- 0.03	0.03
12%	-92.040	174.581	- 0.53	0.53

It appears that SRD $\geq$ 10% should only be considered in this case.

5.0   Comparison of World Bank, OECD and UNIDO methods

In the UNIDO approach - tradables are raised to average domestic
                            price levels. [27]
In the Little Mirlees - (OECD) method - non tradables are deflated
to border prices.
  -   If tradables at border prices are understated (UNIDO) to the
      same extent as non-tradables are overstated (OECD), then same
      conclusion about desireability of projects will result.
  -   UNIDO method has a tendency to use domestic prices for
      tradable goods. while OECD has a tendency to use border prices
      for non-tradable goods.

This effect appears to make the UNIDO method somewhat more responsive
to national priorities and aspirations. For example, in the case of
a good which is protected by import duties, the OECD would tend to
treat this as a tradable (at border prices) even though the good will
not be traded, while the UNIDO method would tend to value it as
non-tradable (production cost of alternative output if substitution,
willingness to pay if addition to supply).

The World Bank approach traditionally involved exclusion of import
duties (which in most cases implied, in effect, the use of border
prices) for major inputs and outputs. Also excluded were transfers [28]
such as domestic taxes that did not include a real use of resources.

In a footnote [29] the Guide alludes to the discussion of the use
of border prices having the tendency to lock developing countries
into lines of comparative advantage (which usually precludes advanced
technology and broadening the industrial base).

27 Guide P29
28 Guide P21
29 Guide P34