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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

organized by the United Nations Industrial Development Organization (UNIDO) in co-operation with the Commonwealth Heads of Government Regional Meeting Working Group on Industry and Economic Development Board of Fiji

US/RAS/86/012

from 7 July to 25 July 1986

in Suva, Fiji

F I N A L R E P O R T

prepared by:

Richard Kitchen, Team Leader

1. OBJECTIVES OF THE SEMINAR

a) Development Objective

To enhance the industrialization programme of the island countries in the Pacific region through strengthening the professional capability in industrial projects preparation, evaluation and financing.

b) Immediate Objective

To train national staff from the appropriate institutions in the island countries in the Pacific region concerned with pre-investment activities to increase their skills and abilities in industrial project preparation, financial analysis, financial planning and project evaluation.

2. BACKGROUND TO THE SEMINAR

One of the major constraints for industrial development is the shortage of well-studied industrial projects. It is, therefore, necessary that a nucleus of Government officials be trained in the techniques of project preparation, evaluation and financing.

The Chairman of the Working Group on Industry of the Commonwealth Heads of Government Regional Meeting (CHOGRM) during his visit to UNIDO Headquarters from 25 - 28 February 1985, requested UNIDO's assistance to organize jointly with the CHOGRM Working Group on Industry a three-week training programme to familiarize the member countries' staff with the methods and techniques of project preparation and evaluation and with the use of computerized financial analysis and sensitivity analysis.

3. PREPARATION FOR THE SEMINAR

I visited Vienna for briefing on 23 and 24 June. This enabled me to familiarize myself with the backgroumd to the seminar, to prepare and agree a draft course programme with the backstopping officer, and to collect some teaching materials from UNIDO's files. I was able to supplement UNIDO's teaching materials with a considerable amount of materials from my own files, which proved very useful for the course.

UNIDO issued invitation to the governments of the region to nominate participants, and recruited a project team assisting of the following:

Richard Kitchen	(Financial Analyst and Team Leader)
Olavi Heinonen	(Market Analyst)
Donald McLeod	(Industrial Engineer)
Dariusz Rosati	(Industrial Economist)

The Commonwealth Fund for Technical Cooperation (CFTC) was responsible for providing local facilities in Fiji, and arranged for the Economic Development Board (EDB) to act as the local counterpart agency. The CFTC nominated the two participants for the Maldive Islands, which is outside the Pacific region, and UNIDO paid for their travel. The CFTC also nominated a resource person for the course, Mr. V.K. Dar.

Arrangements were made to hold the course at the Fiji Campus of the University of the South Pacific (USP), in the Department of the Social and Administrative Studies.

4. CONTENT OF THE SEMINAR

The intended modules, and time allowed for them, were as follows:

	Modules	Time Allowed
I.	Outline of Project Development Cycle	5%
II.	Market Analysis and Plant Capacity	15%
III.	Technical Analysis	20%
IV.	Financial Analysis	35%
V.	Economic Analysis	15%
VI.	Elements of Investment Promotion and Project Implementation	10%

This outline was adhered to as accurately as the exigencies of course programming allows. See Annex 1 for the detailed course programme.

5. THE COURSE PARTICIPANTS

Although places were available for 20 participants, in the event only 16 attended. This was the only slightly disappointing aspect of the course. It can readily be explained by the limited professional staff resources of some countries in the area, coupled with the relatively large number of training seminars offered, although this appears to be the first in industrial project planning. There is clearly a limit to extent that governments can release staff for training and it seems that the supply of training opportunities exceeds effective demand.

The quality, enthusiasm and motivation of the participants was very good throughout, and as a group they were a pleasure to teach. I believe that the group was as good as one can realistically hope for from this region. A list of the participants is attached as Annex 2.

6. THE CONDUCT OF THE COURSE

The course went very smoothly, which can be attributed to commitment of the lecturers and of the supporting staff. We had excellent support from EDB in the person of Rupeni Tuiloma, and the USP through its Administrative Manager, David Burness, met all our varied requests for help promptly and cheerfully. We were provided with good teaching and office facilities, good secretarial help, good catering, and help with all the minor requirements which inevitably arise in a training course. We received excellent support from the UNIDO SIDFA, Ivan Contreras, throughout the course, and from UNIDO's backstopping officer, Marek Kulczycki.

We were able to adhere to the original programme with only minor changes. The quality of the teaching of the UNIDO lecturers was very good, and we designed two new teaching packages, one on the development of timber resources for housing (technical and marketing aspects) and a second on a plastic button project (financial analysis). Marek Kulczycki also visited the seminar and was able to contribute a two-hour lecture on COMFAR, UNIDO's Computer Model for Feasibility Analysis and Reporting.

A feature of the seminar was the high degree of commitment and co-operation shown by all the UNIDO lecturers, and I should like to express my personal gratitude to my colleagues for making my job as team leader very easy.

7. ASSESSMENT OF THE SEMINAR

This seminar, the first of its type in the region, was a great success. The quality of the participants and the lecturers was good, and the course went smoothly. We managed to teach six hours a day without undue strain on lecturers or participants. It would perhaps have been preferable to hold a four-week seminar, as UNIDO usually does, and we had to deal with some subjects a little superficially, and to omit others. However, given the difficulty that governments have in releasing staff, it was probably wise to hold the course for three weeks only.

8. FUTURE PROSPECTS

There is clearly a keen interest in industrial development in the Pacific region. Of necessity, industries in most countries will be small or agro-based. On the basis of the success of this course, I can recommend that UNIDO should attempt to make the course an annual event. A four-week seminar would be ideal, but it may be necessary to hold future courses for three weeks only. In view of the interest of the Economic Development Institute (EDI) of the World Bank in holding courses in Project Planning and Management in conjunction with the Institute to Social and Administrative Studies at the USP, there is clearly a need for the UNIDO and EDI to co-operate to ensure that their courses are complementary rather than competitive

ANNEX 1.

TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Organised by the United Nations Industrial Development Organization (UNIDO) in co-operation with the Commonwealth Heads of Government Regional Meeting Working Group on Industry and Economic Development Board of Fiji

US/RAS/86/012

from 7 July to 25 July 1986

in Suva, Fiji

COURSE PROGRAMME

Lecturers

COURSE DIRECTOR	Richard Kitchen
	V.K. Dar
	Olavi Heinonen
	Marek Kulczycki
	Donald McLeod
	Dariusz Rosati

Times

Session	
1	8.30 - 10.15
	Coffee
2	10.30 - 11.30
3	11.30 - 12.30
	Lunch
4	1.00 — 2.15
	Tea
5	2.30 — 3.30

TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

WEEK I

Day	Session	Code	Subject	Lecturer
Monday 7 July	1		Opening Ceremony	
	2	Intro	Course Outline: The Project Cycle and the UNIDO Manual	R. Kitchen
	3	Intro	National, Sectoral and Project Planning: Objectives	R. Kitchen
	4	Intro	Introduction to an Industrial Development Project	R. Kitchen
	5		Project Identification	O. Heinonen
Tuesday 8 July	1) 2) 3)	M	Market Analysis: Data Requirements and sources	O. Heinonen
	4) 5)	T	Technical Analysis	D. McLeod
Wednesday 9 July	1) 2) 3)	T	Technical Analysis	D. McLeod
	4) 5)	M	Market Analysis: Demand Forecasting	O. Heinonen
Thursday 10 July	1) 2) 3)	M	Market Analysis: Demand Forecasting	O. Heinonen
	4) 5)	T	Technical Analysis	D. McLeod
Friday 11 July	1) 2)	T	Small Scale Industries: Indian Experience	B.K. Dar
	3		Technical Analysis	
	4) 5)	M	Market Analysis: Demand Forecasting	O. Heinonen
Saturday a.m.			Study Visits	

Week II

Day	Session	Code	Subject	Lecturer
Monday 14 July	1		Compounding and Discounting	R. Kitchen
	2) 3)	F	Discounted Cash Flow: NPV and IRR	R. Kitchen
	4) 5)	F	DcF Exercises	R. Kitchen
Tuesday 15 July	1) 2) 3)	F	Project Accounting: B/S, P/L and Cash Flow	R. Kitchen
	4) 5)	F	Policy and Complaints	V.K. Dar
Wednesday 16 July	1) 2) 3)	F	Cash Flow Exercises	R. Kitchen
	4) 5)	F	Introduction to COMFAR	M. Kulczycki
Thursday 17 July	1) 2) 3)	F	Cash Flow Exercises	R. Kitchen
	4) 5)	E	Social Cost-Benefit Analysis	D. Rosati
Friday 18 July	1) 2) 3)	E	Cost of Capital, Capital Structure Inflation and Project Planning	R. Kitchen
	4) 5)	E	Study Visits	R. Kitchen

WEEK III

Day	Session	Code	Subject	Lecturer
	1	I	Introduction to Implementation/ Discussion of visits	D McLeod
	2	I	The Marketing Plan	O Heinonen
	3		UNIDO's Work in the Pacific	I Contreras
Monday 21 July	4) 5)		Social Cost Benefit Analysis : UNIDO/IDCAS	D Rosati
	1) 2) 3)	E	Social Cost Benefit Analysis : UNIDO Guidelines	D Rosati
Tuesday 22 July	4)	I	Implementation	D McLeod
	5)	E	Social Cost Benefit Analysis	D Rosati
	1) 2) 3)	E	Social Cost Benefit Analysis : National Parameters and Shadow Prices	D Rosati
Wednesday 23 July	4) 5)	E	Implementation Planning - Constraints	V K Dar/D McLeod
	1) 2) 3)	I	Implementation Planning - Network Analysis	D McLeod
Thursday 24 July	4)	E	Social Cost Benefit Analysis : Summary	D Rosati
	5)	I	Panel Discussion	V K Dar/D McLeod D Rosati
	1) 2) 3)	I	Course Evaluation and Review Closing Ceremony	D McLeod
Friday 25 July	4) 5)		F R E E	

ANNEX 2

REGIONAL SEMINAR ON INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

LIST OF PARTICIPANTS

	NAME (in full)	COUNTRY	FULL ADDRESS	TELEPHONE	TELEX
1.	KARAI VUIBAU	FIJI	Economic Development Board of Fiji 1st Floor, Velop House P O Box 2303 Suva, Fiji	315988	FJ 2353
2.	ALBERT BAMIN	Papua New Guinea	Department of Trade and Industry P O Wardstrip, Waigani Papua New Guinea	271052	INDEVNE 233100
3.	MICHAEL BAITIA	Papua New Guinea	Department of Trade and Industry P O Wardstrip, Waigani Papua New Guinea	272220	NE INDEVNE 233100
4.	EILEEN NGANGA	Vanuatu	Department of Industry Box 31 Port Vila, Vanuatu	2770	VanGov 1040, NH
5.	NARIKI KAUTU	Kiribati	National Loans Board P O Box 33, Bairiki Republic of Kiribati	21291	-
6.	TEKOREAUA KAIRORO	Kiribati	Ministry of Trade, Industry & Labour P O Box 69, Bairiki Tarawa, Kiribati	21097	KI 77024 TELECBAI
7.	TOOMATA TUIPEA	Western Samoa	Development Bank of Western Samoa P O Box 1232 Apia, Western Samoa	22961	-
8.	UNAKEA KAUVAI	Cook Is.	Cook Islands Development Bank P O Box 113 Rarotonga, Cook Islands	29341	RG 62080
9.	EMELINE TUITA	Tonga	Tonga Development Bank P O BOX 126 Nuku'alofa Tonga.	21-333 (HOME 21-595)	DEVBANK 2206T

	NAME (in full)	COUNTRY	FULL ADDRESS	TELEPHONE	TELEX
10.	MITI SIAMOMUA	Tonga	Ministry of Labour, Commerce & Industries, Nuku'alofa Box 110, Tonga	21-888	-
11.	MOSES M KOUNI	Solomon Islands	Ministry of Trade, Commerce & Industry Box G26 Honiara Solomon Islands	21140 Ext. 6	PRIMUS HQ 66311
12.	ANDREW NEMAIA	Solomon Islands	Foreign Investment Division P O Box G1 Honiara Solomon Islands	23015	PRIMUS HQ 66311
13.	VIJAY K CHARAN	Fiji	Ministry of Economic, Development Planning & Tourism Government Buildings Suva, Fiji	Office: 211608 - Home: 381372	
14.	HUSSAIN MANIKFAN	Maldives	Ministry of Trade and Industries Male, Republic of Maldives	3756	77076 TRADIND MF
15.	ISMAIL SHAFEEU	Maldives	Ministry of Planning and Development Male, Republic of Maldives.	2818	77076 TRADIND MF
16.	RUPENI TUILOMA	Fiji	Economic Development Board P O Box 2303 Government Buildings Suva, Fiji	315988	FJ 2355

ANNEX 3

SELECTED TEACHING MATERIALS DISTRIBUTED DURING THE COURSE

THE REGIONAL SEMINAR ON INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Introduction: Market study

"Look for things you cannot see"

1. Elements of marketing

Markets
Products
Methods
People
Time
Money

2.Marketing, growth and profitability

Growth factors
Productivity
Cost factors

3.Market research - a management tool

Production no problem
The unpredictable customer
Cover your risk
Be selective, prioritize
Art no science

4. what to study

Look outside
Customers and middlemen
Competitors
Innovation and testing
Your basics can be wrong
Quantity vs quality
Segmentation

5. Intelligence and creativity

Watch and listen
Do the vacuum cleaner act
Your research can be worthless spending

Talk to people who know
Check and double check
Data is like fruit,
only buy it fresh

In 2

SYNDICATE EXERCISES

MARKETING

1. Structural changes and product opportunities in the Finnish grocery markets
(Marker reports 4S/83, 1-2,4/85)

2 How to forecast and promote Nordic assistance to the Region?
(Yearbook of NS,pages 273, 280-286)

3. Opportunities for trade development between Finland and the Region
(Foreign Trade, December 1985)

4. Finnish Forest Indutries: Implications of Structural Changes
from 1960 to 1990
Summary 1985

5. Analyse factors influencing level and development of
paper consumption in different countries
(Summaries, Pöyry)

6. Analysis without data
(Paper clips etc.)

Jan 14

UNIDO SEMINAR 1986-07-08

O. Heinonen/Data Collection

Information/Newsprint Markets

1. External Secondary sources

- FAO surveys and forecasts
- OECD dito
- National/Regional/International statistics
- Producers' assn reports on pulp/paper
- Reports issued by financial institutions
- Expert bulletins and reports
- Customs reports
- Books, magazines (PPI)
- University studies, seminars and seminar reports
- Public and private seminars, conferences

2. External Primary Sources

- Consultants' reports
- Syndicated research projects
- Company observations/surveys
- Expert's interviews
- Inquires into newspaper publishers' internal and External sources
- Company transactions with customers, suppliers, etc.

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UNIDO SEMINAR 1986-07-08

O. HEINONEN

MARKET SHARE

1. Can be measured reliably only if you define the market as a group of end-users/consumers with common characteristics, e.g., Mexican newspaper (morning-evening) publishers.

2. Correlates positively with return of investment.

3. Influences the learning curve and reduces the cost, e.g.

   - production
   - marketing
   - distribution
   - administration overhead

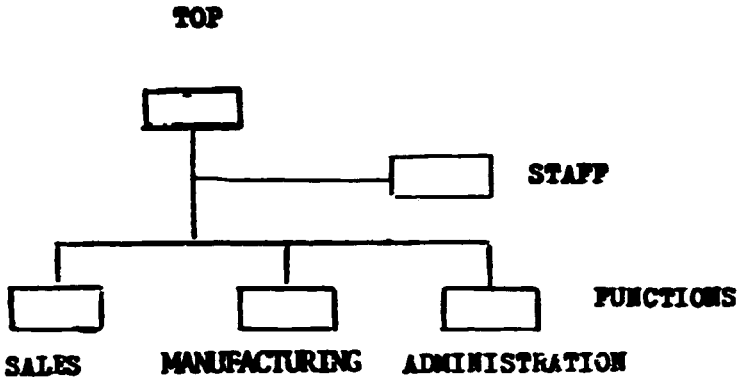
4. Increases the rate of profit and { receivables / inventory turnover.

5. Increases the cost of R & D.

6. Is positively influenced by balance between quality, price and non-price competitive measures.

THREE STAGES OF MARKETING ORGANIZATION DEVELOPMENT:

1. CENTRILIZED, FUNCTIONAL



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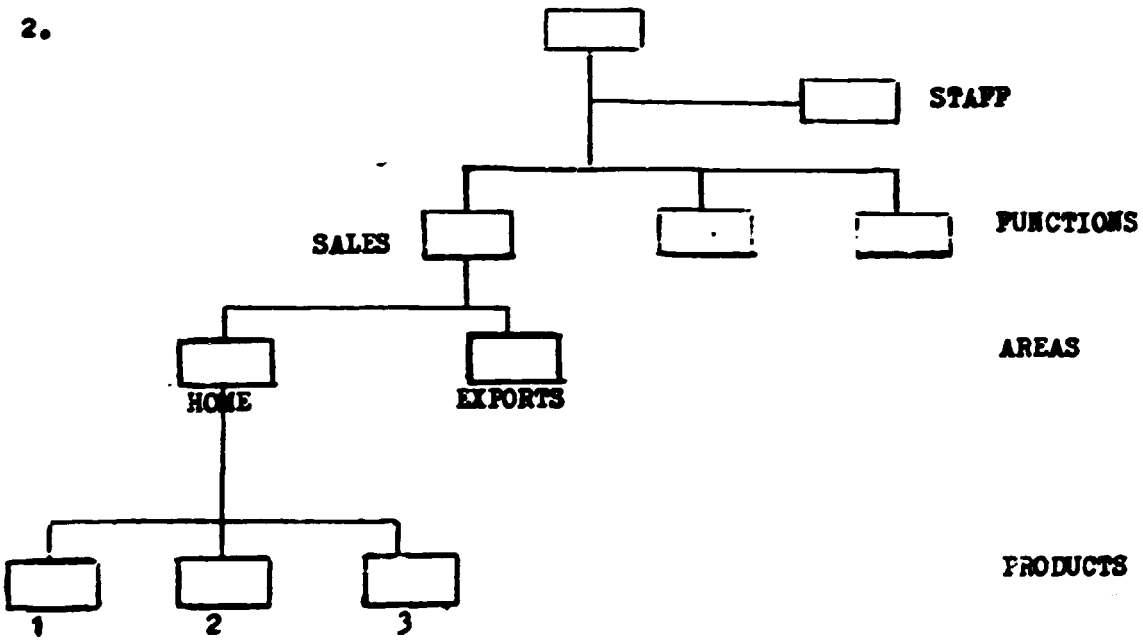

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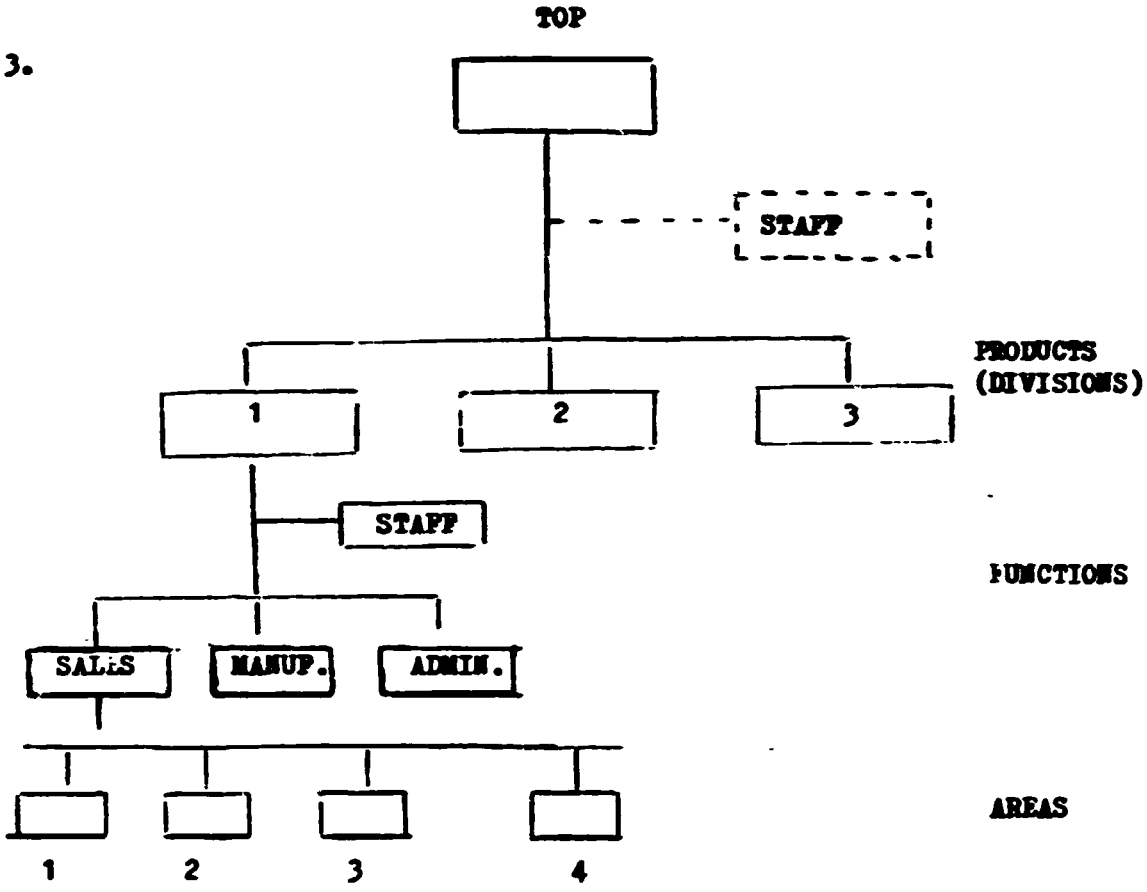
TOP
STAFF
PRODUCTS (DIVISIONS)
1
2
3
STAFF
FUNCTIONS
SALES
MANUF.
ADMIN.
AREAS
1
2
3
4

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Methods of Market Analysis

The object is to identify the types of product needed in the markets under consideration, conditions favourable for sales, and future estimates. This lecture will be concerned both with markets for commodities, and manufactured goods, which are likely to be quite different.

We will talk about: (1) home markets (2) export markets.

1. Local Markets

Needs (a) to estimate current market size, price, quality required, location of market, distribution.

(b) to estimate future market size, future prices, future sales.

An internal market for any good is likely to have a number of characteristics which distinguish it from export markets. There is likely to be protection from imports (i.e. outside competition). Sales may be guaranteed to the local marketing board, at agreed prices. Distribution may be provided by the marketing board. There may be other monopoly buyers who will enter into long-term contracts, e.g. textile mills, food processing and canning.

Future trends in the local market size will, in general, depend on:

- population growth,
- income per head growth,
- income elasticities of demand
- price changes price elasticities and cross elasticities of demand.
- the development of consumer industries.
- the development of tastes and the demand for competing goods.

2. Overseas Markets

In general, these will be competitive, with many buyers and sellers. One would want to look first of all at the world market, i.e. market size, growth trends, prices and price trends, and also at the supply side. Subsequently individual markets of promise can be identified and examined in greater detail.

Two types of market can be identified, well organised commodity markets (e.g. coffee, cocoa, tin, sugar, etc.) and those whose sales are made direct to consumers, (e.g. iron ore, bananas, pineapples). The latter, with long term contracts, may offer some stability in future sales although the existence of futures markets in some non-perishable commodities can enable producers to stabilise their prices, for a year at least.

Future sales in overseas markets depend heavily on world commodity trends, and marketing and promotional arrangements. The degree of risk in a project based on overseas sales is much higher than in a project based on home market sales.

3. Industrial Products

For industrial goods export markets will generally be competitive, but special arrangements may be more prevalent than with commodities. Such special arrangements may include sub-contracting of components (eg in the electronics industry), sales made under a licensing arrangement or long term contract sales of semi-processed minerals. Again, home markets will frequently be much less competitive, often characterised by few (perhaps only one) manufacturers and protection from imports. For intermediate goods, there may be few or a single buyer. Such characteristics are of vital importance in assessing future sales possibilities, and the nature of the market in question must be thoroughly understood before any demand and sales forecasts can be made.

4. Market Research

Essentially market research consists of the collection and analysis of data. This may be divided into two types.

(a) Quantitative Data. Statistical items such as production, exports, imports, price data need to be obtained, and forecasts made. In many cases published data will not be available, and attempts will have to be made to collect it by visiting producers and traders. Usually, the procedures are fairly straightforward, at least for industrial market research. For consumer market research, sampling techniques may be needed, with relatively large numbers of consumer interviews. Organizing the work, structuring the questionnaire and interpreting the results may be quite involved, and it is generally advisable to use a specialist agency for such work. For reliable surveys in the UK about 1500 interviews are needed. Then one can state that there is a 95% probability that the results obtained are accurate to within $\pm$ 5%.

(b) Qualitative Data. This is generally the most difficult to get right. It is concerned with obtaining information about the quality of the products degrees of competition, import and export regulations, design requirements (e.g. ladies' handbags should have clasps rather than buckles in some countries), consumer attitudes and preferences. Government regulations affecting the good (e.g. licensing, health regulations, etc.). Perhaps the most important considerations are the methods of distribution and marketing, especially if the market is competitive.

When analysing the above data, there is one golden rule to remember:

FRAGMENT THE MARKET.

5. Distribution and Marketing

Distribution systems depend upon the product and upon the country, but alternative methods are:

- direct sales to final users
- sales on medium and long-term contracts to final users
- sales through wholly-owned distribution subsidiaries
- sales to middle men (e.g. wholesalers)
- distribution through agents who receive commissions.

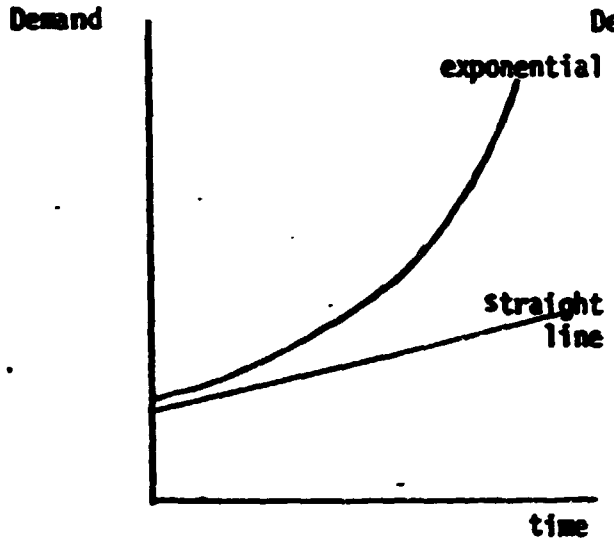
It is important also to know the terms of sales. Retailers' and wholesalers' mark-ups, agents' commissions and handling costs all help to determine ex-factory prices. (Wholesalers and agents can also provide much valuable market information, on a continuing basis.) Decisions must also be made on who to appoint as agents or wholesalers, and the terms on which they should be appointed (e.g. exclusive or non-exclusive). It is often necessary to enquire into the financial position of agents, to assess their reliability.

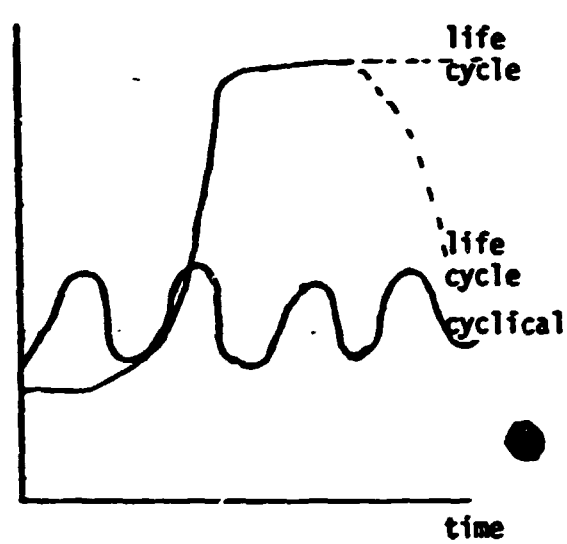
Advertising is a function which should frequently be undertaken in collaboration with distributors. They can advise on the use of media such as papers, magazines, hoardings, radio, cinema and television, and it will often be appropriate to link the distributor's name with the producer's name (or brand name).

Other important aspects of marketing strategy are the level of the market to aim at, the pricing policies (e.g. heavy discounts), the selection of a suitable brand name, servicing and part-exchange arrangements and collaboration with producers of complementary goods.

5. Trends in Demand

It is important to get an impression of demand trends over time for a product before starting to make demand forecasts. Some are illustrated below





7. Consumer Market Research

Market surveys are sometimes required on the present market characteristics and future prospects for consumer goods. This applies mainly to non-durables. Much information can be obtained from household budget surveys, although they are often out of date. Manufacturers of such goods (e.g. chocolates) may conduct sample surveys to test consumer reaction to a product. This can be done by giving out free samples and asking consumers questions such as:

Do you like it?
Will you buy it?
What price would you pay for it?
Do you like the packaging?
Is it too big/too small?
What chocolates do you buy now?
What type of retail outlet do you use (e.g. corner shop/ supermarket/multiple retailer/other)?

and so on.

Such questionnaires need to be carefully structured and an appropriate sample selected. Sampling is a sophisticated statistical technique. Essentially we can select sample sizes so that we can calculate:

(a) 68% confidence limits (one standard error)

(b) 95% confidence limits (two standard errors)

(c) 99.7% confidence limits (three standard errors)

The second is usually chosen. We then say that "the 95% confidence limits for the population p are $X \pm 0.10$ (say). An interesting method of test marketing used in the UK is to market a new product in a region covered by one commercial television station. The products are advertised on TV in that area and distributed in that area only. On the basis of regional sales a decision is then taken on whether or not to "go national".

Suggested Readings

OECD	Manual of Industrial Project Analysis, Vol. 1, Ch. 1
FAO	Introduction to Agricultural Planning, Chapter 3
Makridakis & Wheelwright	Integrating forecasting and Planning (Journal of Long Range Planning, Sept 1973)
Thorelli	International Marketing Strategy (Penguin, 1973)
Mayer & Hollander	Markets and Marketing in Developing Countries (American Marketing Association, 1968)
Shankleman	Marketing and Diverse Industries (Latymer Press, 1970)
Kraemar	Marketing Research in the Developing Countries (Praeger 1971)
FAO	Income Elasticities of Demand for Agricultural Products (1972)

R. Kitchen

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Basic Concepts in Demand, Supply and Price Determination

1. INTRODUCTION

The Exchange Situation

The basis of any economic situation is the presence on one side of people who wish to use things for their own purposes - CONSUMERS - and on the other side of people who produce and make available things that do not occur naturally - SUPPLIERS. In an exchange situation, consumers get what they want by buying them from suppliers, both parties exchanging money for goods. In this relationship, important questions are:

"What do consumers wish to buy?"

"How much of each thing will they want to buy?"

"What factors affect the choice of what to buy and how much?"

These are basic questions on the consumer side. Basic questions on the supplier side are:

"What do suppliers wish to produce and offer to consumers?"

"How much of each thing will suppliers make available?"

"What factors affect the choice of what to supply, and how much?"

Since suppliers and consumers come together to meet each other's purposes by exchanging goods and money, the price of goods is a basic part of the mechanism for their exchange. But it is also a very important factor (but by no means the only one) affecting what is consumed, and how much, and what is supplied, and how much. To understand these things we must look at (1) on one side the behaviour of the buyers of goods for consumption - what we call DEMAND (2) the behaviour of the suppliers of these goods - SUPPLY - and (3) the very important connecting factor of PRICE.

2. DEMAND

In everyday language, the expressions 'demand', 'want' or 'need' for a good or service are used almost interchangeably to indicate a desire for that commodity. In technical language, shades of meaning distinguish each of these expressions. Economists attach a particular meaning to the term Demand: the willingness of consumers to give up money (which represents potential claims on other goods and services) for the good or service in question.

In practice the word Demand is used as a shorthand reference to two distinct but related concepts: first, the amount of a good or service that consumers would like to buy during a given period at a specified price and, secondly, the schedule of amounts that we think that consumers would like to buy at a range of possible prices (all other factors than price being assumed constant).

Demand will change over time: the amount demanded will almost always change in response to a change in price and may do so quite quickly. The demand schedule will also change in response to change in underlying factors, which are collectively known as the conditions of demand.

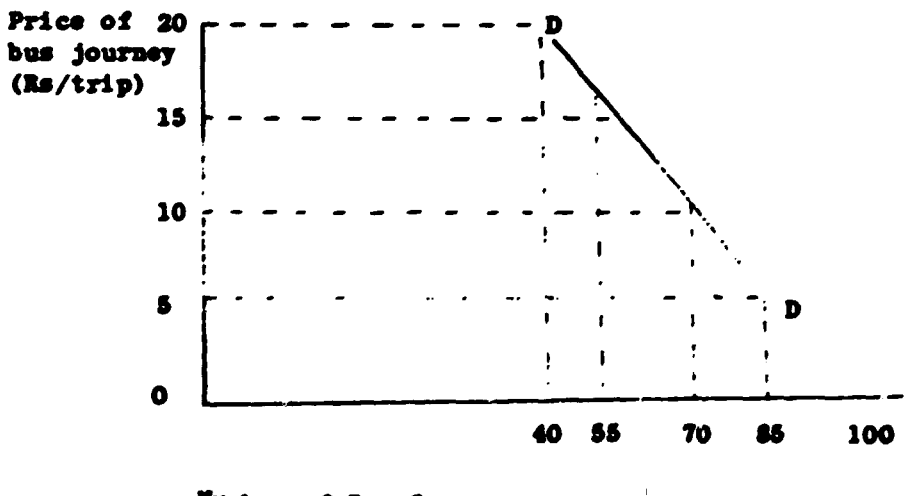
Considering first the relation between the amount demanded and the price casual observation confirms that the two are inversely related; the amount demanded falls as price rises, and rises as price falls. This is intuitively obvious since, as the price of one commodity rises, other commodities become relatively cheaper and hence more attractive, while some people may no longer be able to afford to buy the commodity, or certainly not so much of it.

The relationship between the demand for a commodity and its price can be expressed in a demand schedule which shows the amount that people are willing to buy at different prices. The demand schedule can be illustrated graphically by a demand curve. Table 1 and Figure 1 show how the demand for bus journeys from a village might depend on the fares charged.

Table 1: A Demand Schedule for Bus Journeys

Fare to the City (Rupees)	Number of Journeys Made
20	40
15	55
10	70
5	85

Figure 1: A Demand Curve for Bus Journeys



A demand schedule and a demand curve like this would apply only to one set of basic conditions. Changes in the amounts consumers are willing to buy at any particular price are attributable to changes in the underlying conditions of demand. When at each price consumers are willing to buy more than previously, this is referred to as an increase in demand. It is represented graphically by a shift of the whole demand curve to the right.

The most important factors leading to a change in demand are changes in incomes, tastes and the prices of other goods. Changes in population are sometimes separately identified, though this factor is usually significant only in the long run.

(i) Incomes: For most goods and services, demand increases with rising incomes as people are able to consume more of the things they enjoy. In the bus fares example, as incomes rise, more people would find it possible to travel to town and some would go more often.

(ii) Tastes: The level of demand will vary with changes in consumer preferences and attitudes. These may be a matter of ephemeral fashion, such as styles of clothing and popular music, or of deep-seated social trends, such as stem from the ageing of the population or increasing freedom of women.

(iii) New Products: As new consumption possibilities become available consumers may shift expenditure to these things. When electricity comes to the village, people may spend less on bus journeys so as to have lighting and radios.

(iv) The Prices of Other Goods: The level of demand for a single commodity is influenced by fluctuations in the price of other goods, especially those that are close substitutes for, or complements to, the good in question. Demand increases with a rise in the price of substitutes or people switch to their product and falls with a rise in the price of complements. If bus fares are raised some travellers will switch to the trains, but if the price of food rises, fewer journeys may be made by bus or by train.

3. SUPPLY

Economists use the term 'supply' in a manner analogous to their use of the word 'demand'. It may be used as a shorthand expression for the amount that producers would like to produce and sell over a defined period at a specified price, or it may be used to refer to the schedule of amounts that producers would like to sell over a range of prices (all factors other than price being assumed constant). Again, supply in both senses can change over time. The amount supplied is usually responsive to changes in price and producers' willingness to sell at all prices may vary with changes in the conditions of supply.

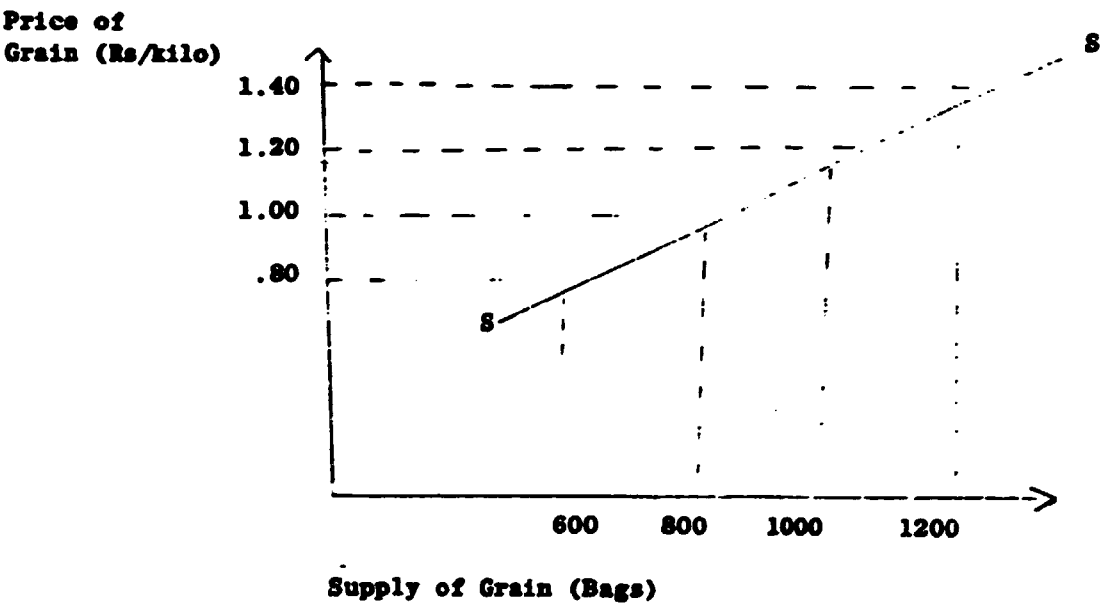
The relationship between price and the amount supplied is almost always positive. The higher the price, the larger the amount that producers would like to sell. This is again intuitively obvious, in that the higher the price, the more profitable production and sale is to the producer.

The amounts that producers would like to sell at different prices can be set out in the form of a schedule and the schedule can be represented graphically by a supply curve. The market for grain can be used for illustration. Table 2 and Figure 2 show how the supply of grain in a small market might depend on the price obtained.

Table 2: Supply Schedule for Grain

Price of Grain (Rupees/kilo)	Supply of Grain by Farmers (Bags)
0.80	600
1.00	800
1.20	1000
1.40	1200

Figure 2: Supply Curve for Grain



Changes in the amounts that producers are willing to sell at all price levels are attributable to changes in the underlying conditions of supply. When at each price producers are willing to sell more than previously, this is known as an increase in supply. It is represented graphically by a shift of the whole supply curve to the right. The most important factors leading to a change in supply are changes in technology, changes in the price of inputs, changes in the price of other commodities and changes in the goals of producers.

(i) Technology: Improvements in technology may make it possible to reduce the cost of production and thereby improve profit margins, encouraging producers to increase the amounts supplied at all prices. The converse is unlikely to happen under competitive conditions.

(ii) Prices of inputs: If the prices of inputs rise, costs of production rise and profit margins are reduced, making producers less willing to supply at all prices. Reduction in the price of inputs leads to an increased willingness to supply.

(iii) Prices of Other Commodities that the Producers could supply: If the prices of other goods rise, producers may switch their resources into the production of those other goods, thereby reducing the supply of the good in question.

(iv) Goals of Producers: Producers are conventionally assumed under market conditions to have the main objective of profit maximisation. Other objectives are feasible and empirical studies show that some production organisations have other objectives, such as maximisation of gross revenue or market share. A change of producer goals from profit maximisation to revenue or market share maximisation could lead to increased willingness to supply at all price levels. A similar effect would usually be expected to follow a transfer from private to public ownership.

4. PRICE AND EQUILIBRIUM

The relationship between demand and price is generally that, as price increases, the amount purchased falls. The demand curve slopes downwards to the right. But supply works the other way. As price increases, so does the amount provided. The supply curve slopes upwards to the right.

Both consumers and suppliers meet in the market to exchange goods and money. How do the two relate, and how does the price become established that will apply for a certain period?

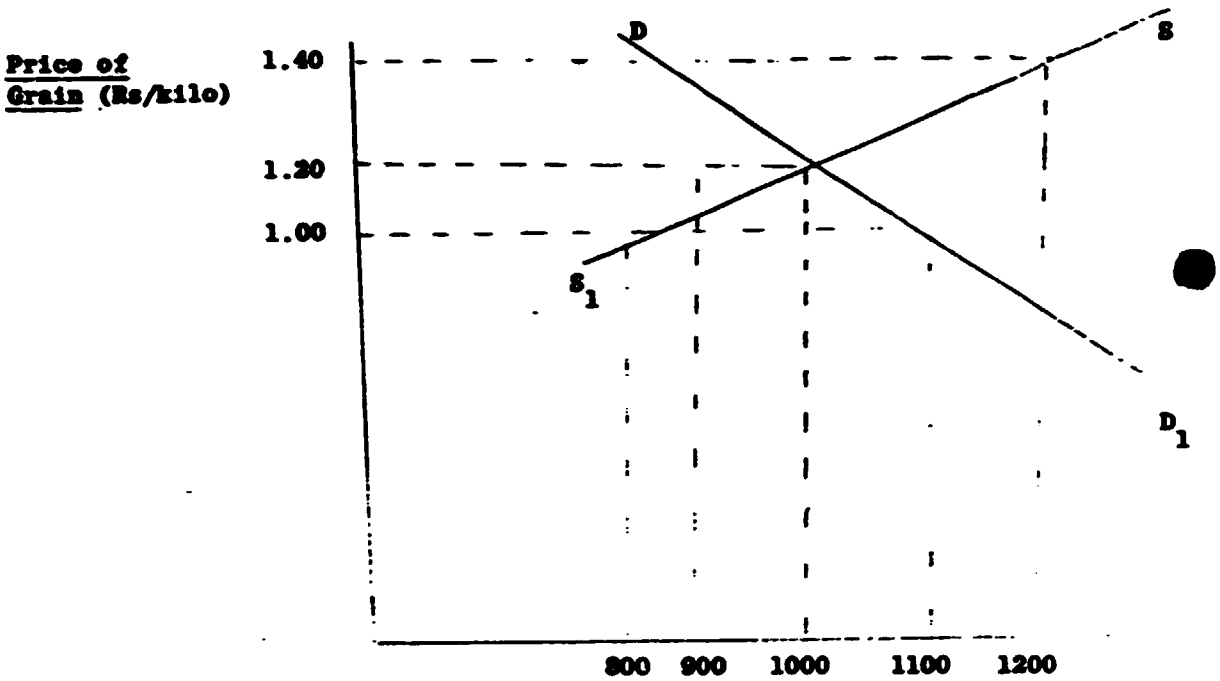
It is possible to put the supply schedule and the demand schedule for a commodity together in a table and to put the two curves in one diagram. For the grain supply example used above, the demand schedule might be:

Table 3: Demand Schedule for Grain

Price of Grain (Rs/kilo)	Demand for Grain (Bags)
0.80	1200
1.00	1100
1.20	1000
1.40	900

The position of supply and demand in the grain market can be seen from Figure 3. At a price of Rs 1.20 the quantities supplied and demanded are the same. This is what is known as an equilibrium situation. Both suppliers and consumers are happy with that quantity at that price, so this becomes the equilibrium price - there is no tendency for the price to move away from this level so long as nothing else changes.

Figure 3: Supply and Demand: The Formation of Price



If producers tried to produce 1200 bags and to sell it at Rs 1.40, only 900 would be sold, so next time producers would grow less. But if suppliers produced 900 bags and offered it for sale, they would find that they could sell it for Rs 1.40 and it would have been profitable to supply more.

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Economic Elasticities

1. INTRODUCTION

The note 'Basic Concepts in Demand, Supply and Price Determination' outlined the basic features of these phenomena, and indicated how an equilibrium price might be arrived at. However, the quantities of a good available at any time may change, so its price may change. Alternatively production factors may alter so much that the supply quantity of a good may change, while other factors that influence the demand for it may also change. How do these prices and quantities change in relation to each other? Associated changes in variables of interest to economists are typically measured in terms of ELASTICITIES. Since project planning involves planning over a long period and since the factors influencing demand, supply and price are sure to vary in the long term, project planners have to be familiar with elasticity concepts.

THE CONCEPT OF ELASTICITY

Elasticity is the ratio of the proportional change in the value of one variable that is associated with a given proportional change in another variable.

Four types of basic economic elasticity are of general importance to project planning.

1. Price elasticity of demand = $\frac{\%\text{ change in quantity demanded of a good}}{\%\text{ change in price of that good}}$

2. Income elasticity of demand = $\frac{\%\text{ change in quantity demanded of a good}}{\%\text{ change in income of people buying it}}$

3. Cross elasticity of demand = $\frac{\%\text{change in quantity demanded of a good}}{\%\text{ change in price of another good}}$

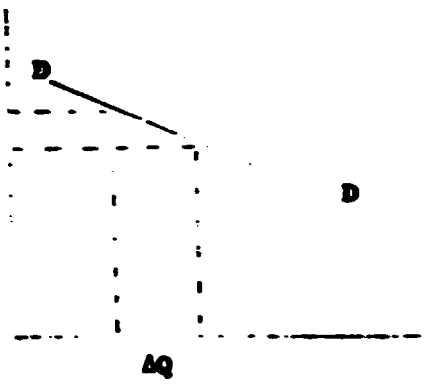
   (This is of interest only when ther other good is a substitute or complementary good)

4. Price elasticity of supply = $\frac{\%\text{ change in supply of a good}}{\%\text{ change in price of that good}}$

PRICE ELASTICITY OF DEMAND (E_p)

Consider the slope of the following two demand curves.

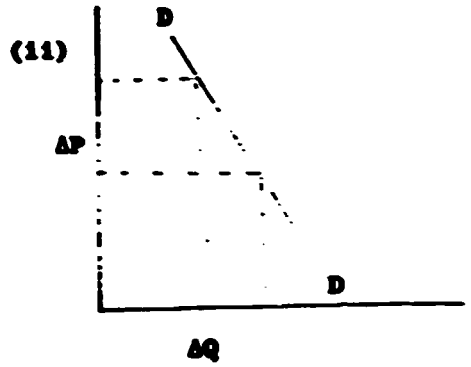
(i)



ΔP <ΔQ

In this case, the quantity demanded changes by a large amount with a relatively small change in price.

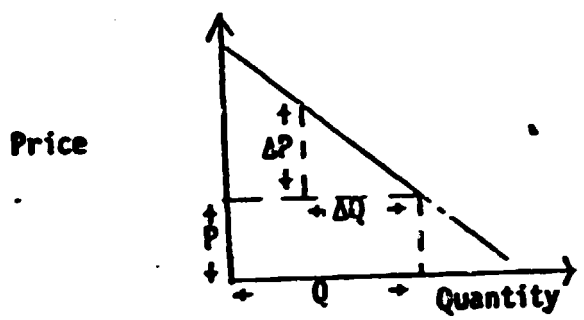
(ii)



Δ <ΔW

In this case, the quantity demanded changes by a small amount with a relatively large change in price.

Clearly, the relative changes in price and quantity demanded depend upon the shape of the demand curve. This can be examined mathematically as follows:



Price elasticity of demand $E_p \equiv \frac{\Delta Q/Q}{\Delta P/P} \equiv \frac{\Delta Q P}{\Delta P Q}$

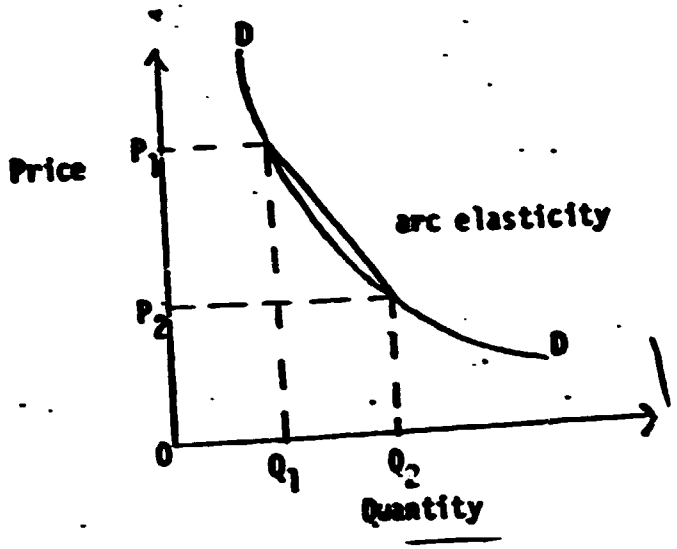
Note that $\frac{\Delta Q}{\Delta P}$ reflects the shape of the demand curve.

$\frac{>P}{Q}$ refers to the point on the demand curve from which the measurement of change is made.

There are two different measures of the price elasticity of demand.

(1) if the price changes are large, the arc elasticity of demand is found
(2) if the price changes are small, the point elasticity of demand is found.

Arc price elasticity of demand The figure below illustrates the situation when the arc price elasticity of demand is calculated.



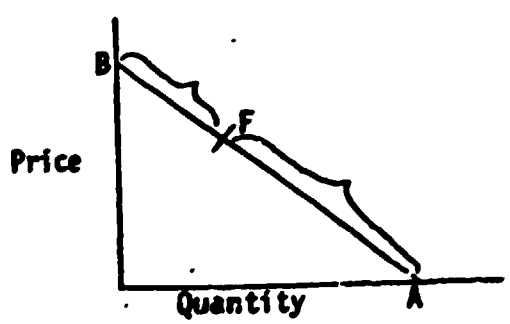
In this case, ΔQ (Q_2-Q_1) is quite large, so is $\Delta(P_1-P_2)$. But what values of P and Q should be used? The estimate of E_p will be quite different if we use P_1 than if we use P_2. Common practice is to use average (i.e. intermediate) values of P and Q thus:

$$E_p = \frac{\Delta Q}{\Delta P} \cdot \frac{\frac{P_1 + P_2}{2}}{\frac{Q + Q_2}{2}} = \frac{\Delta Q}{\Delta P} \cdot \frac{(P_1 + P_2)}{(Q_1 + Q_2)}$$

The arc elasticity calculated in this way is an average elasticity between two points on the demand curve, or more precisely the elasticity at the mid-point of a chord between two points.

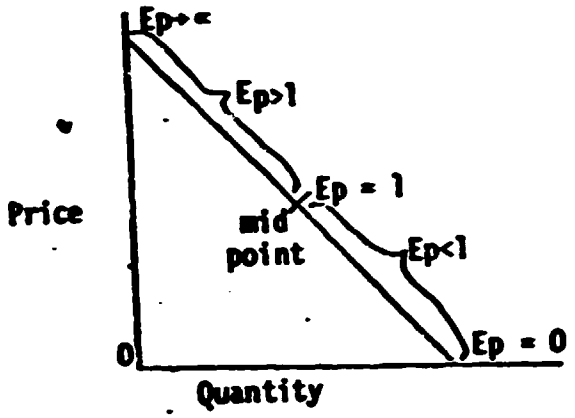
Point price elasticity of demand

Graphically, the point price elasticity of demand at any particular point along a linear demand line is measured by the ratio of (i) the part of the demand line between the y (price) axis and the particular point chosen (F) and (ii) the part of the demand line between the x (quantity) axis and the particular point chosen (F). In the figure below this the point price elasticity of demand is measured by calculating $\frac{FA}{FB}$



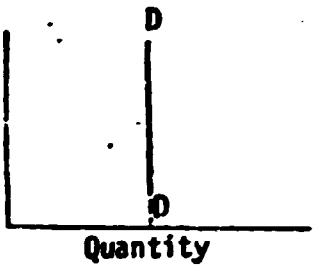
The price elasticity of demand will vary from one point to another along the demand curve. At the mid-point of the linear demand curve the price elasticity of demand is equal to unit: at points above that mid-point the price elasticity of demand is greater than one and tends towards infinity; and at points below the mid-point the price elasticity of demand is less than one and tends towards zero.

Note that the price elasticity of demand is always negative, but by convention the negative sign is often omitted.



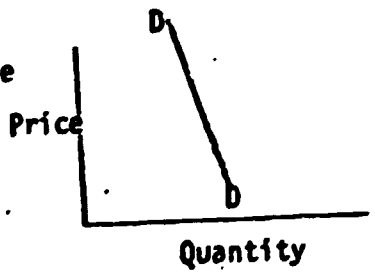
Five distinct forms of price elasticity of demand can be distinguised:-

Ep = 0 Demand is said to be <u>perfectly inelastic</u>



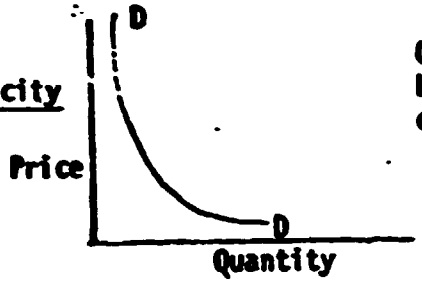
Quantity demanded does not change as price changes.

0<Ep<1 Demand is said to be <u>inelastic</u>



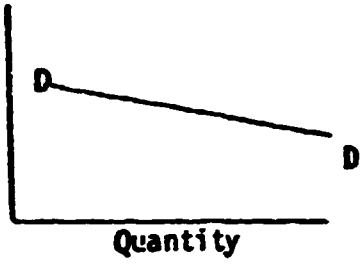
Quantity demanded changes by a smaller proportion than does price.

Ep = 1 Demand is said to have <u>unitary elasticity</u>



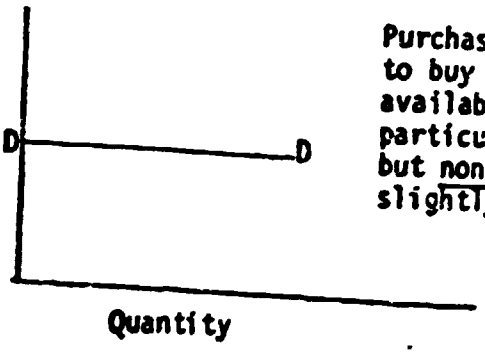
Quantity demanded changes by exactly the same proportion as does price.

1<Ep<∞ Demand is said to be <u>elastic</u>



Quantity demanded changes by a larger proportion than does price.

Ep = ∞ Demand is said to be <u>perfectly elastic</u>



Purchasers are willing to buy all quantities available at one particular price level but <u>none</u> at an even <u>slightly</u> higher price

The principles illustrated here in relation to the price elasticity of demand apply to the other types of elasticity, with variables measures on the axes altered.

In practice, the price elasticity of demand is usually estimated using regression analysis to calibrate two alternative equations:

(i) $Q = a + bP$ (for linear relationships)
(ii) $\log Q = a + b \log P$ (for curvilinear relationships)

In (i) the price elasticity of demand is the coefficient b multiplied by

$$\frac{\text{mean value of P}}{\text{mean value of Q}}$$

Thus the resulting elasticity is an average over all the observations in the sample, something close to an arc elasticity. It is therefore a crude estimate because generally the elasticity varies over the length of the demand curve. In (ii) the equation has the special property that the elasticity is constant over the entire length of the demand curve. This is given by b.

Factors which determine the price elasticity of demand are:-

1. Availability of substitutes: demand is more elastic if there are close substitutes that buyers can easily switch to.

2. Nature of the need satisfied by the commodity: luxury goods tend to be price elastic because people can do without them, but necessities tend to be price inelastic - consumers must have them.

3. Number of uses to which the commodity can be put: the more uses the greater its price elasticity, since some will be luxuries.

4. Proportion of income spent on the particular commodity: the smaller the proportion, the greater the degree of price elasticity.

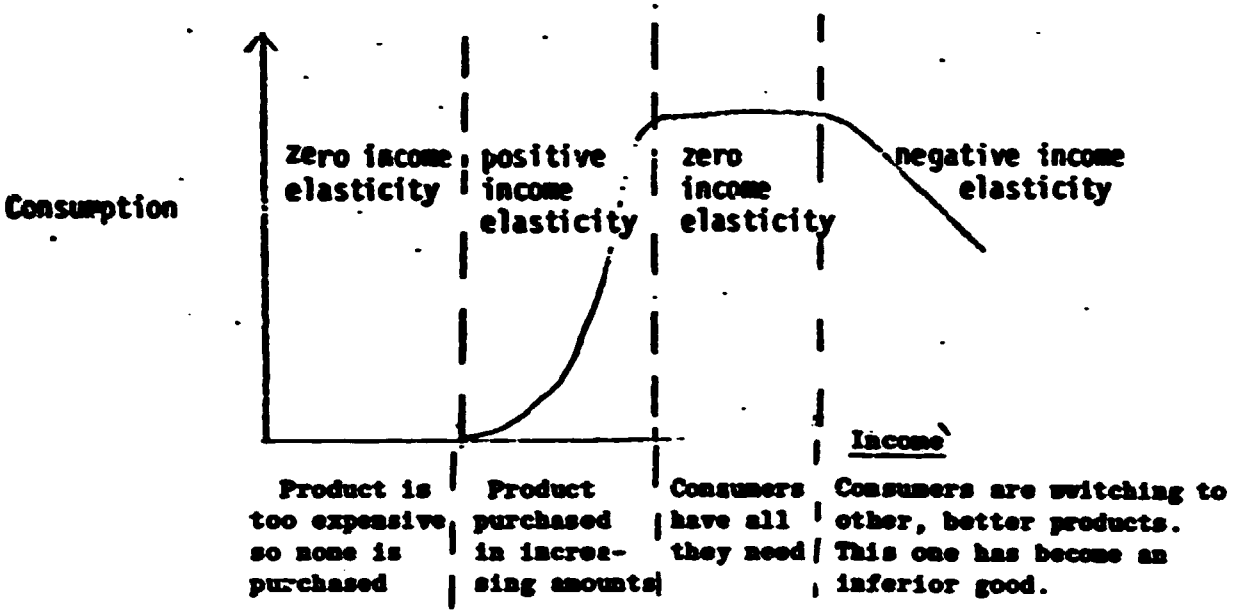
5. Breadth of the definition of goods examined: generally the broader the definition the lower the elasticity.

The price elasticity of demand is used in planning to guide forecasts of future demand and hence total revenue and to indicate the implications of alternative pricing policies (e.g. taxation proposed).

4. INCOME ELASTICITY OF DEMAND (E_i)

The income elasticity of demand is more widely used in forecasting than is the price elasticity of demand. In its nature and mathematical properties, however, the income elasticity of demand is similar to the price elasticity of demand.

Variation in the income elasticity of demand for most products occurs as income rises. This is shown in the following diagram.



Nature of income elasticity	Comments
Negative	Demand for commodity falls as income rises
Perfectly inelastic ($E_i = 0$)	does not change as income rises
Inelastic ($0<E_i<1$)	rises less than proprotionately to a rise in income
Unity ($E_i = 1$)	rises in exactly the same proportion as the rise in income
Elastic ($1<Ei<\infty$)	rises more than proportionately to a rise in income
Perfectly elastic ($Ei = \infty$)	Purchasers are willing to buy all quantities available at one particular income level but none at an even higher income level.

The main determinants of income elasticity are:-

1. The nature of the need satisfied by the commodity: the proportion of total income spent on basic necessities tends to decrease as income increases.

2. The time period: consumption patterns adjust, with a time-lag, to changes in income.

3. The initial level of income in a country: amongst low income countries the income elasticity of demand is elastic on those commodities seen as luxuries (e.g. electric light) but amongst higher income countries the income elasticity of demand is inelastic on those same commodities which are seen as being necessities (e.g. electric light).

8. CROSS-ELASTICITY OF DEMAND (E_{xy})

Mathematically this can be expressed:-

$$E_{xy} = \frac{\Delta Qx}{Qx} \cdot \frac{\Delta Py}{Py} = \frac{\Delta Qx}{\Delta Py} \cdot \frac{Py}{Qx}$$

If x and y are complementary goods, then Exy is usually negative. If the price of tea goes up, consumption of tea may fall so the consumption of sugar may also fall.

If x and y are substitute goods, then Exy is positive. If the price of meat goes up, consumers may switch to fish, so the consumption of fish goes up.

The higher the value of the cross-elasticity the stronger will be the degree of substitutability or complementarity of x and y.

The main determinant of cross-elasticity is the nature of the relative needs satisfied by the commodities. If any two goods have no relation to each other in consumption (e.g. shoes and milk) their cross-elasticity will be zero. A change in the price of one has no effect on consumption of the other.

Cross-elasticities are important in the transport sector to ascertain likely transfers or patronage between different transport modes, in the power sector for consumer choices between using electricity or gas or oil (for example) and in the housing sector for estimating the demand for different types of housing schemes or property.

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INTRODUCTION TO FORECASTING

What do we mean by forecasting? The importance of forecasting in the decision-making process is illustrated, as is the importance of forecasting in project identification and appraisal.

Forecasting as an Art

The "fortune-telling" content of any forecast introduces an element of uncertainty, however scientific or sophisticated the technique used. Judgement is always very important, and no forecast will be exactly correct.

Basic Information

Statistical data, knowledge of the product and of the determining factors are all essential.

Techniques for Forecasting

The major emphsis will be placed on demand forecasting, an often under-rated aspect of project appraisal. The techniques which are relevant are:

- Time series
- Correlation and regression
- Input-output models and technical coefficients
- Econometric models
- International comparisons
- Forecasting without statistical data

The advantages and limitations of each method will be discussed, as will be the interpretation of results.

It is not the intention here to go very deeply into the mathematical formulations behind the various methods. Such an approach would be lengthy and is not necessary for a practical appreciation of the techniques involved. The sensitivity of the project to errors in forecasting will be covered, as will be the treatment of high risk projects. The computer package programmes can often be used quickly and conveniently, although care is needed in interpreting the results.

Suggested Readings

H J Moroney, Facts From Figures, Chapters 16 and 17

K A Yeomans, Statistics for the Social Scientist, Volume 1, Chapters 5 and 6
Volume 2, Chapters 4 and 7

O E C D, Manual of Industrial Project Analysis, Volume 1, Chapter 1

F A O, Introduction to Agricultural Planning, Chapter 3

R L Meek, Figuring Out Society, Chapters 3 and 4

R L Kitchen
May 1982

Factors for consideration in conducting a Technical Appraisal -

1. Supply & Demand situation
2. Identify segment of Market to be supplied
3. Plant location - check suitability of infrastructure
4. Availability of suitable raw materials
5. Choice of appropriate technology & production process
6. Ecology & environmental matters to be resolved
7. Project design & engineering to be finalised
8. Plant layout to be decided -- based on production operations selected for use
9. Estimation of capital cost
10. Project scheduling for factory operations
11. Procurement of plant & construction works
12. Estimation of operating cost
13. Organisation, staffing & management
14. Plan start-up procedures
15. Plan maintenance & repair requirements
16. Develop institutional framework
17. Monitor progress & review results.

NOTE: In Sheet T-4 an outline of a Preliminary Engineering Analysis was given. This consisted of 7 basic steps which are also included in the 17 steps shown above.

Once the above data has been developed and decisions made on these practical matters it becomes possible to undertake a Financial Analysis which is essential to demonstrate if the project will be profitable and a satisfactory return on the investment will follow. This also needs complete data on sales & Markets.

SUMMARY OF EACH COUNTRY'S BASIC RESOURCES - Item 1, [illegible]

List below - for each of the groups shown ......- what is of value or importance to your Country - describe the material or item ...

NAME OF COUNTRY : ....

Minerals -

Agricultural -

Livestock -

Forest based -

Marine or sea based

Other - incl. service activities eg. shipping -

SUMMARY OF EACH COUNTRY'S BASIC RESOURCES - Items 2 & 3 ,T-3.

List below your comments on each group & sub-group...for your Country.

NAME OF COUNTRY : .....

Item 2 - Availability of Semi processed materials - such as ...

Base metals -

Textile fibres,yarns etc

Components & sub-assemblies -

Other items - fuel,chemicals,packaging -

Item 3 - Availability of

- Manpower - numbers/quality
- technology
- management expertise -
- land & physical facilities - harbours,roads,airfields etc

TECHNICAL MODULE T-9

SUMMARY OF EACH COUNTRY'S PLANNING PRIORITIES/NEEDS & PROJECT OPPORTUNITIES _ Refer Items 4,5 & 6 T-3.

Attach separate sheets if listing is long.

NAME OF COUNTRY :.....

Item 4 : National Development Plan : Give comments please -

Item 5 : Most pressing needs : Give your opinion or ideas

Item 6 : Project Opportunities : Give your ideas,no need to 'prove them as being feasible' at this stage.....

TECHNICAL MODULE T-10 : SUMMARY OF DATA FROM T-7 - NATIONAL BASIC RESOURCES

COUNTRY	Maldives	Vanuatu	Cook Is	Papua New Guinea	Western Samoa	Kiribati	Tonga	Solomon Is	Fiji
POPULATION	185,000	130,000	18,000	3,000,000	155,000	65,000	96,000	300,000	690,000
MINERALS	X	Au	X	Limestone, Cu, Au, Ag Oil, Natural Gas	X	X	X	Au, Cu, Ni	Au, Cu, $CaCo_3$
AGRICULTURE	Fruit/ Vegetables	Coffee Cocoa Peanuts Root Crops Fruit/Rice Copra	Fruits Vegetables Copra, Coffee Root Crops	Coffee, Cocoa Palm Oil, Copra Rubber Sugar Cane, Tea Spices	Copra Cocoa Taro Coffee Passion-fruit	Copra Vegetables Fruit - Bananas Root crops	Copra Root Crop Vanilla	Palm Oil Rice Copra Cocoa Root Crops Fruit	Sugar Rice Copra Root Crop Fruits Cocoa Coffee Tobacco Spices
LIVESTOCK	Poultry Goats	Poultry Cattle Pigs	Poultry Goats Pigs	Poultry, Cattle Pigs Sheep Crocodile	Cattle Poultry Pigs, Goats Rabbits	Poultry Pigs Goats	Cattle Poultry Pigs Goats Sheep	Cattle Poultry Pigs Crocodile	Cattles Pigs Poultry Goats Sheep
FORESTRY	Coconut Palm and Local Wood	Timber Rattan	Coconut Palms Local Wood	Timber Rattan	Timber	Coconut Palm Timber	Timber Coconut Palm	Timber Rattan	Timber Logs Plywood Bamboo Rattan
MARINE	Shellfish Fish, Sea-Weed, Shark	Fish B/de Mer Trochus shells Crabs	Fish Trochus Pearl shells	Fish Shells Prawns Shrimps	Fish Shellfish Prawns Seaweed Sea Urchins	Fish Shellfish Lobster/ Shrimps	Fish Lobster Mussels	Shark fish Shrimps Shells Prawns B/de Mer	Fish Lobster T/Shell Seaweed Prawns
OTHER	Tourism Shipping	T/S	T/S	T/S	S	T/S	T/S	T/S	T/S

TECHNICAL MODULE T-11

HOUSING PROJECT - Technical, Marketing & Preliminary Financial Appraisal

This exercise is to be completed by each person individually.....

BASIC DATA: The region you are concerned with has a population of 250,000 spread over 2 main islands, and has a projected annual growth of 2%. On one island are large areas of partly unexploited forest. Some sawmills exist for local sawn timber but most timber is exported as logs. Shipping by barge is easy between the two islands, the main export port being on the island with no forests and a concentration of commercial activity and domestic housing.

A decision has been made by Government that a study should be made to check the possibility of introducing "added value" processing of timber to utilise these local basic resources, and to provide useful employment for local people. The suggestion is that the study should concern itself with the domestic or residential housing market. Present home ownership is limited and quality is poor. Government has also said it would authorise banks to provide finance for home purchase on low deposits, at low interest and over long terms for repayment.

WHAT YOU ARE REQUIRED TO DETERMINE : 1. Factors affecting future demand for housing, allowing for family size (you can make reasonable assumptions here) as this will affect quantities of timber needed. So, first estimate the market over the next 5 years of the house type you have decided on.

2. Estimate the cubic meters of timber required for each home, this figure will be given to you, depending on size of your house type.

3. Assume recovery from sawmilling is 50% of the log then estimate quantity of logs needed for your project over the 5 years.

4. In your project you are required to include production of - doors, windows, benches, simple furniture.....

cont...

in fact as much of the house as possible. So you will need to provide for milling machinery as well as smmilling equipment. Estimates of capital cost will be given to you once you have established the size of your operations based on your projections in 1, 2 & 3 above. In real situations you would get these figures from machinery suppliers. This is the step when you decide on the appropriate technology, and based on this you decide on what production facilities you will need, and then your manpower needs, as you will now know the project size and scale.

So now provide answers for all these aspects - in description and in value, as this is needed to help you arrive at total project capital cost, and as a guide to operating costs. Detail items making up this cost.

5. You must give reasons for plant location, describe how you plan to get your product to the market, indicating any changes you want in infrastructure, or public services.....

6. Estimate operating cost, allowing for such items as -

- material cost, e.g. logs
- labour costs
- fuel costs
- maintenance needs
- overhead costs, office, admin., transport etc.
- consumable stores
- royalties, associated with logging or purchase of logs
- other costs, insurance, interest, depreciation.

for the scale of your operations, in other words you should be able to estimate how much it costs for your product. You will have to decide what unit of production you are costing, e.g. one house lot or so many cu.metres of timber..... you decide.

7. Summarise your cost estimates as follows -

- Capital .. land & civil works
  .. buildings, warehouse & offices
  .. preproduction costs, inc. cost of this study

cont...

.. plant & machinery - inc. vehicles, barges

- Operating cost .. labour
  .. materials
  .. expense items & overheads
  .. sub-contracts.

8. Based on above data estimate possible 'selling price' for your product in whatever unit form you have decided to apply to the project..

9. Outline your plan to increase production to meet projected demand in future years. How would you finance your project - estimate your capital needs over the five year period.

10. Based on above data estimate the return you should expect on your investment - is this a satisfactory one?

NOTE: PLEASE LIST ALL THE ASSUMPTIONS YOU HAVE MADE

ARRANGEMENTS FOR INDUSTRY VISITS

Friday 18 July, 1986 Day - 10

Three visits have been planned.

1. Moh. Ali Woodcraft Co.
   Sawmill
   2.00 p.m.

2. J Hill & Co Ltd
   Joinery and Factory Built Housing
   2.00 p.m.

3. Food Processors Fiji Ltd
   Meat Packers
   4.00 p.m.

To ensure full use is made of all available time during these visits, participants should concentrate on the following matters, in view of the exercise set out below.

Points to cover :-

1. Get general appreciation of the type and scope of operations.

2. Find out the scale of operations - e.g. annual output (by value or units). Is there spare capacity ?

3. Determine the size and nature of the Company's markets - are they static or capable of expanding.

4. Where the main raw materials and input items come from ?

5. What are the staffing levels. Is highly trained staff necessary.

6. How much has been invested in the company. (Capital) Is any increase planned.

7. Why was the company established and what studies were made or decisions taken by the entrepreneurs concerned.

8. How was the company financed.

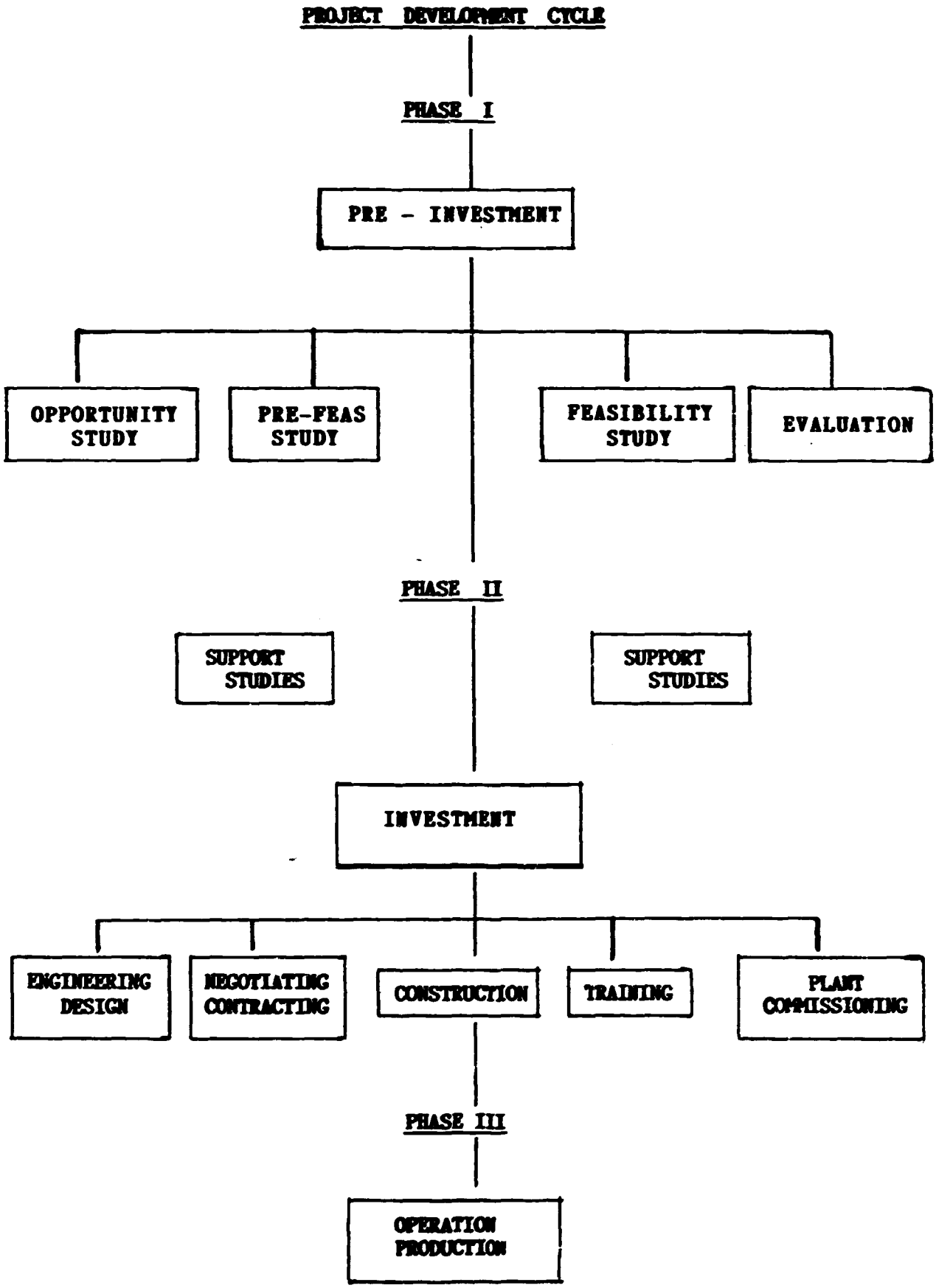
../2.

9. What is your impression of company efficiency and quality of management.

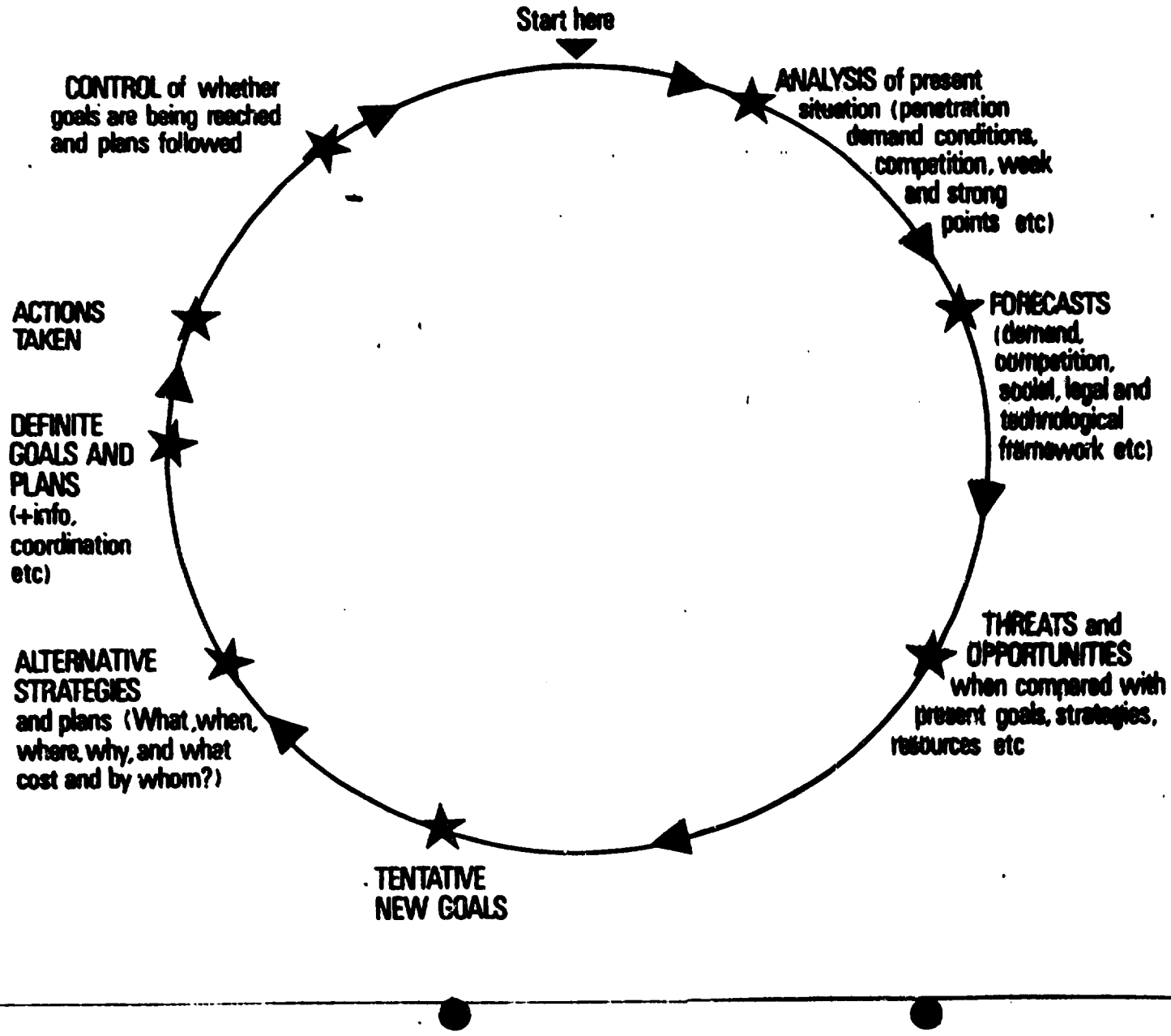
EXERCISE - for individual completion.

Assume each of the companies is planning an expansion and they have called on you as a banker to provide funds for the expansion. Based on the data you have collected and the impressions you have formed what would your decision be, and why.

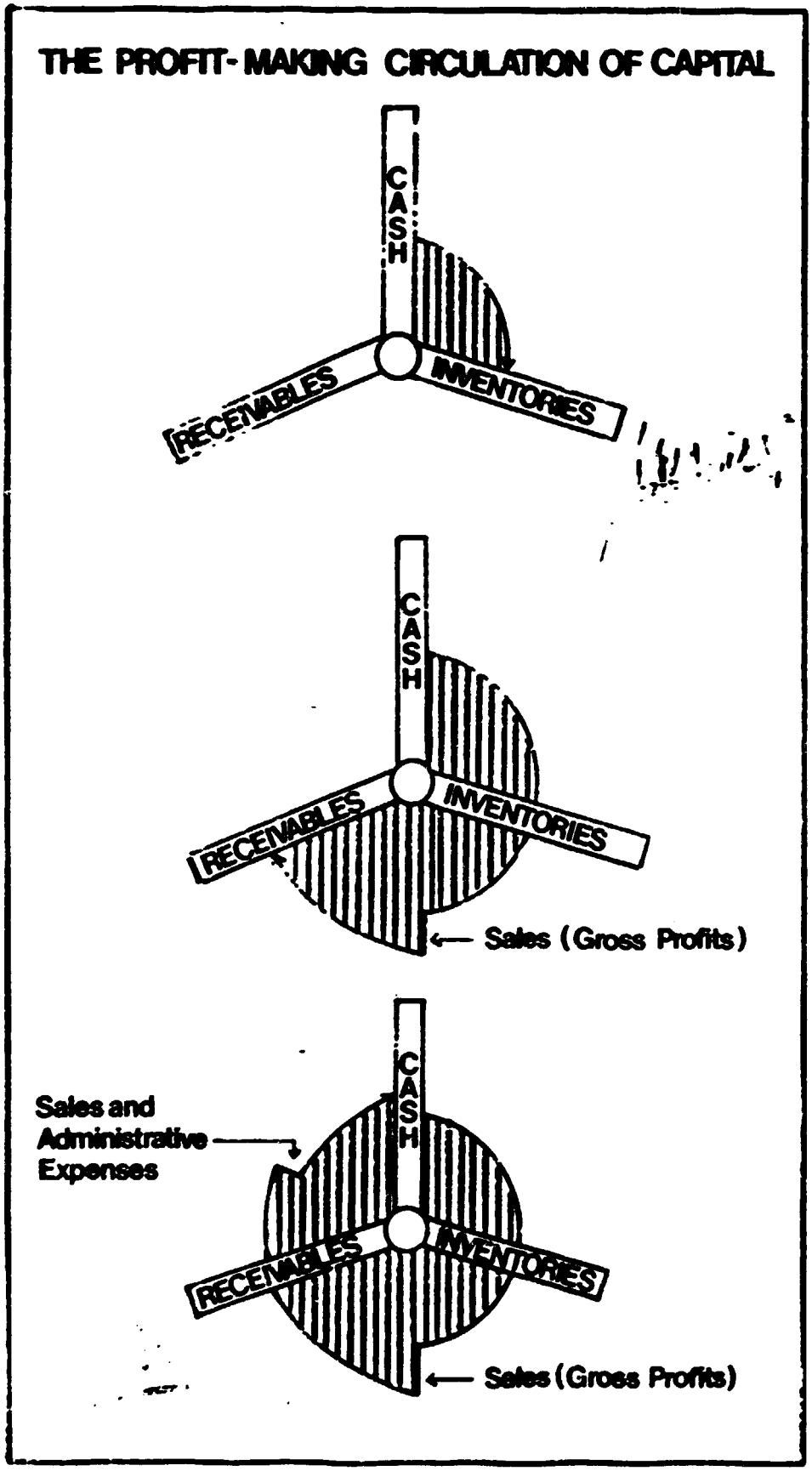
Note: Each person will be allocated one company only.


PROJECT DEVELOPMENT CYCLE
PHASE I
PRE - INVESTMENT
OPPORTUNITY STUDY
PRE-FEAS STUDY
FEASIBILITY STUDY
EVALUATION
PHASE II
SUPPORT STUDIES
SUPPORT STUDIES
INVESTMENT
ENGINEERING DESIGN
NEGOTIATING CONTRACTING
CONSTRUCTION
TRAINING
PLANT COMMISSIONING
PHASE III
OPERATION PRODUCTION

"THE LOOP"


Start here
ANALYSIS of present situation (penetration demand conditions, competition, week and strong points etc)
FORECASTS (demand, competition, social, legal and technological framework etc)
THREATS and OPPORTUNITIES when compared with present goals, strategies, resources etc
TENTATIVE NEW GOALS
ALTERNATIVE STRATEGIES and plans (What, when, where, why, and what cost and by whom?)
DEFINITE GOALS AND PLANS (+info, coordination etc)
ACTIONS TAKEN
CONTROL of whether goals are being reached and plans followed

m7


THE PROFIT-MAKING CIRCULATION OF CAPITAL
CASH
RECEIVABLES
INVENTORIES
CASH
RECEIVABLES
INVENTORIES
Sales (Gross Profits)
Sales and
Administrative
Expenses
CASH
RECEIVABLES
INVENTORIES
Sales (Gross Profits)

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Techniques of Compounding & Discounting

1. The underlying principle for discounting cash flows is that of compound interest, and the formula for discounting is the reciprocal of that for compounding.

2. The elements involved are time in discrete units of years, months, weeks; the rate of interest; and the principal sum involved.

3. A cash flow involves streams of costs and benefits which are not comparable over varying periods of time unless they are linked by applying a rate of interest to the difference in time over which the costs and benefits occur.

4. Compounding begins with a present sum and grows with the accrual of interest to build a greater future sum. Discounting looks at the sum anticipated in the future and reduces the future sum to an equivalent present value.

   ie., If £100 is compounded at 10% for 3 years the value will increase to £133.1. If one expects to receive £133.1 in three years time and the current rate of interest is 10% then the equivalent present value is £100. The formula which was used to raise £100 to £133.1 is also used to divide into £133.1 to bring it down to the present value.

5. The compounding factor used to calculate the future value of an initial sum at a given rate of interest is $(1 + r)^n$ where r is the rate of interest and n is the number of years. This formula will give the value of a single unit of value which can be multiplied by the principal to obtain the future value of the principal sum.

   £1 now = £1.10 in one year's time at 10%
   £1 = £$(1 + .1)^1$

   £1 now = £1.21 in two year's time at 10%
   $(1 + .1) \times (1 + .1)$ or $(1 + .1)^2$

   Where the principal sum is greater than 1, (say £100) the amount is multiplied by the result of the formula eg £1.1 x £100 = £110
   £1.21 x £100 = £121

6. If this formula is shown as

   $$F = P \times (1 + r)^n$$

   F: future value; P: principal sum now

   it can be converted to

2.

$$\text{principal sum now } P = \frac{F}{(1+r)^n} \quad \text{future value}$$

and if as in the tables the future value is 1, the right hand side of the formula becomes the

$$\text{discount factor, } \frac{1}{(1+r)^n}$$

£1 in one year's time at 10% becomes

$\frac{£1}{(1+.1)^1}$ = £0.909, so that in order to have a present value of £1 as above it is necessary to anticipate a value of £1.10 in one year. Then

$\frac{£1.10}{(1+.1)}$ = £1, and $\frac{£1.21}{(1+.1)^2}$ = £1

7. The disccunt tables give the discount factors. These are based on the value 1, with a range of years and rates of interest, so that the discount factors can be directly applied to the expected future values derived from the cash flow.

1. Year	2. Investment	3. Return	4. Discount factor at 10%	5. Present Value
0	100,000	-	1.0	-100,000
1		35,000	0.909	31,800
2		70,000	0.826	57,800
3		110,000	0.751	82,600
			The net present value = (NPV)	72,200

The discount factors are taken directly from the tables (for 10%) and by applying them to the expected future value in each year the present values are obtained. As these are now reduced to the same basis of present value, they are added, and with the deduction of the investment (a cost) the result is the net present value of the negative and plus money flow for the period.

8. When we use discounting methods for deriving present values for a stream of expenditures or revenues over time it may not be necessary to calculate each year separately if the same amounts are paid and/or received each year. By using annuity tables we can find a factor which can be applied to the (identical) amount paid over a specified period. Thus at a 7% discount rate the annuity factor to be applied to an amount paid in each of six consecutive years over the period year 1 to 6 is 4.766540 (4.767). Some projects have regular cash flows for part of the life and irregular for the rest. With these projects it is still possible to reduce the number of DCF calculations as described above through "Present Worth of an Annuity" factors to that portion of the time stream which is regular. Thus if $2000 is received annually for six years from year 4 to year 9 inclusive we can adopt the following procedure (assuming a 9% rate).

(i)	Look up present worth of an annuity factor for 9 years at 9%	= 5.995
(ii)	Subtract present worth of an annuity factor for 3 years at 9%	= 2.531
	Present worth of an annuity factor for 4th through to 9th year at 9%	= 3.464

The total of the discount factors for years 4 to 9 inclusive produces the same result when applied to the expected sum for each year as would be obtained if the discount factor for each year were applied to each expected sum separately.

9. The discount factor for the current year is 1.0, and in the above example this is year 0. This is convenient because in the tables year 1 refers to the discount factor for one year. As the discount factors become smaller each year it is essential that all value streams are calculated from the same base year.

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

COMPOUNDING & DISCOUNTING TABLES FOR PROJECT APPRAISAL

Source

The attached tables are taken from the book with the title shown above, edited by J. Price Gittinger and published in 1973 by the Economic Development Institute of the World Bank, to whom grateful acknowledgement is made.

Form of the Tables

The tables show the value in each year up to 50 of six different Compounding and Discounting Factors. Formulae for these factors are given on the back of this page. Each of the factors is given up to 6 places of decimal, This degree of precision is excessive for most purposes and in the course we shlal never use more than three or four figures after the decimal.

The tables are arranged so that all the factors on one page refer to a single percentage compounding or discounting rate. Although the source book covers all rates from 1 to 50 per cent, the attached tables only cover rates from 1 to 25 per cent inclusive and 30%, 35%, 40% and 45%. This range will certainly be sufficient for most needs in the course.

Using the Tables

The use of the tables and the meaning of the different factors given will be discussed fully in early lectures. The tables show, for a range of time periods and interest/discount rates, the value resulting from applying the appropriate formula to 1 unit of value - 1 Rupee, 1 Dollar, etc. Having the values in this form allows them to be used as simple multiplication factors when sums of more than 1 Rupee are involved. The sum concerned is simply multiplied by the number shown on the appropriate line of the relevant column of the correct page.

For example, say we wished to know the compounded value after 15 years of Rs. 123 deposited at 4%. The factor concerned is in the first column of the 4% table, on the line for Year 15. It is 1.800,944. This we simplify to 1.801, and then multiply it by 123: 123 x 1,801 = 221.523. This we would generally round to Rs. 222. In compounding and discounting work for projects there is no need to worry about decimal fractions of Rupees.

The last two Tables

These tables differ from the rest. Each refers to only one factor - Discount Factor and Annuity Factor - and gives values to only three decimal places of each factor for selected percentage rates and not all years up to 50. These tables are sources of quick reference for the two types of factor most commonly used in project work.

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

INTRODUCTORY DCF EXERCISES

Compounding and Discounting and Use of Tables

1. What is the amount of -

   a) $1 compounded for 10 years at 7 per cent
   b) $10 compounded for 5 years at 8 per cent
   c) £50 compounded for 15 years at 9 per cent

2. a) present value of $1 accruing after 10 years at 6 per cent
   b) present value of $10 accruing after 5 years at 7 per cent
   c) present value of $50 accruing after 15 years at 8 per cent
   d) present value of 10 annual instalments of £10 (paid at end of each year) at 5 per cent

3. What is the value of £100 discounted for 26 years at 9 per cent?

   How would you find, without using tables, the amount of £100 compounded for 26 years at 9 per cent from the present value already calculated?

   What is the compounded value?

4. A project's capital cost is estimated at £1,000 spread over 3 years. It is expected that £600 will be spent in year 0 and £200 in each of the following two years. What is the total cost, discounted to the starting year? Use a discount rate of 8 per cent.

5. The benefits of a project are expected to be $100 thousand annually for 10 years. What is the present value of this benefits stream? The discount rate is given as 10 per cent.

   What difference will it make if the benefits start to accrue in year 3 instead of year 1 and continue on the same regular basis of $100,000 per annum through to the end of year 8 after which year 9 has no benefits and year 10 has $28,000 from terminal scrap value of the plant?

Tables to be used

World Bank Compounding & Discounting Tables for Project Evaluation

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PACIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

INTRODUCTORY DCF EXERCISES

Answers to Compounding & Discounting Exercises

1. a) $ 1.97
   b) $14.69
   c) £182.12

2. a) $ 0.558
   b) $ 7.13
   c) $15.76
   d) £77.22

3. Present value of £100 discounted at 9 per cent for 26 years = £10.64

   Present value formula is $\frac{1}{(1+i)^n}$

   Compounded value formula is $(1+i)^n$

   Therefore, compounded value is reciprocal of PV. PV of £100 = £10.6, therefore, PV of £1 = $\frac{10.6}{100}$ = 0.106. Therefore, compounded value of £1 (reciprocal) = $\frac{1}{0.106}$ = 9.399.

   Therefore, compounded value of £100 = 9.399 x 100 = £939.9.

4. Cost in year 0 = £600, discounted value = £600
   Cost in year 1 = £200, discounted value = £185.2
   Cost in year 2 = £200, discounted value = £171.4
   £956.6

5. The present value of benefits stream (starting immediately) is $614,457 If this stream is delayed and starts in year 3 through to year 8 and continues with no benefits in year 9 but with $28,000 in year 10, the present value of the benefits stream falls to $370,734. The calculations are as follows -

page 21 of World Bank Tables

Present worth of year 8 Annuity Factor	5.3349
Present worth of year 2 Annuity Factor	1.7355
	3.5994 Difference

3.5994 is the annuity factor for the period year 3 through to year 8.

Check

Discount Factors page 21 of World Bank Tables

Years		
	3	0.7513
	4	0.6830
	5	0.6209
	6	0.5645
	7	0.5132
	8	0.4665
		3.5994

3.5994 x $100,000 year 3 to 8 = $359.940

Year 9 - Nil

Year 10 - Discount factor x 28,000 =

0.3855 x 28,000 = 10,794

Total Present Value = $370.734

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SPECIFIC REGIONAL TRAINING SEMINAR IN INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

Project Accounting Procedures

The object of this lecture is to give a description of accounting terms and procedures used in project appraisal work. Essentially this is "forward-looking" accounting, based on estimates of the future. This is rather different from "conventional" accounting, which is a historical record of the performance or value of a firm. The lecture concentrates on the essentials of project accounting, rather than things such as double-entry bookkeeping.

Basic Definitions

Trading Account This shows income from sales and deductions from them, together with the cost of buying the inputs and processing them for sale. The final figure is the trading point, and is a building block for the Profit and Loss Account.

Profit and Loss Account This account starts with trading profit and deducts interest and depreciation to get net profits before tax, deducts tax to get net profit after tax. It measures the performance of a business over a period of time, usually one year. It also shows amounts distributed and put to reserves.

Working Capital This is cash + stocks + work in progress + accounts receivable, less accounts payable. In balance sheet terms, it is current assets less current liabilities.

Flow of Funds Statement (or Cash Flow) This shows the cash coming in and the cash going out during the period in question, usually one year.

Balance Sheet This states the assets and liabilities of a firm at a certain point of time (e.g. December 31st). It is usually constructed in such a way that the assets and liabilities are equal. It shows the value of a firm at a point in time, which is assets - liabilities or equity + retained earnings.

Accounting Principles

Accounting may be regarded as a systematic method of recording and reporting the use of real and financial resources in the operation of an enterprise. Historically the emphasis was laid on giving a true ex post account of the "stewardship" of the enterprise for the benefit of owners, lenders and trading partners. In more recent times, the functions of accounting have expanded to constitute a financial information service to guide management in the conduct of all aspects of the business. One of these aspects is the appraisal of investment projects, which may be assisted by the preparation of projected income statements, balance sheets and funds statements. Although the details of accounting practice vary widely, there are certain underlying general ideas that may be regarded as accounting principles. Among these are:-

(i) the enterprise is a separate entity;

(ii) the enterprise is a going concern;

(iii) the accrual concept, by which is meant that the accounts for a period deal with the transactions of that period, regardless of when the cash relating to those transactions is received or paid;

(iv) prudence, or conservatism. The implication of this principle is that losses are included in the accounts as soon as they are recognised, whereas profits are only to be counted after they are realised;

(v) objectivity. Recognising that some valuations are the subject of opinion, as far as possible the accountant refers to tangible evidence, such as the historic cost of acquisition of an asset;

(vi) consistency. Accepting that the treatment of many items is subject to various conventions, this principle requires that the particular conventions adopted are consistently employed, so permitting valid comparisons over time, and reducing the risk of fraudulent presentation.

EXAMPLE OF TRADING ACCOUNT, PROFIT AND LOSS ACCOUNT AND SOURCES AND APPLICATION OF FUNDS.

SALES	100	
COST OF SALES		
Labour	20	
Material	30	
Other	10	
TRADING PROFIT	40	
Depreciation	15	
Interest	10	(10% over 10 years; loan 100)
Net Profit before Tax	15	
Tax @ 40%	6	
Net Profit after Tax	9	
SOURCES		
Sales	100	
APPLICATIONS		
Cost of Sales	60	
Interest	10	
Tax	6	
Loan repayment	10	
TOTAL	86	
NET CASH FLOW	14	

PLASTIC BUTTON PROJECT, FIJI

1. Market Demand

The total production of made-ups in Fiji is around 10,000 pieces per day. Assuming that on an average four buttons are used in one item the average consumption of buttons on a daily basis is placed around 40,000 pieces. A single unit having a capacity of 50,000 buttons per day is being proposed.

2. Product Specification and Capacities

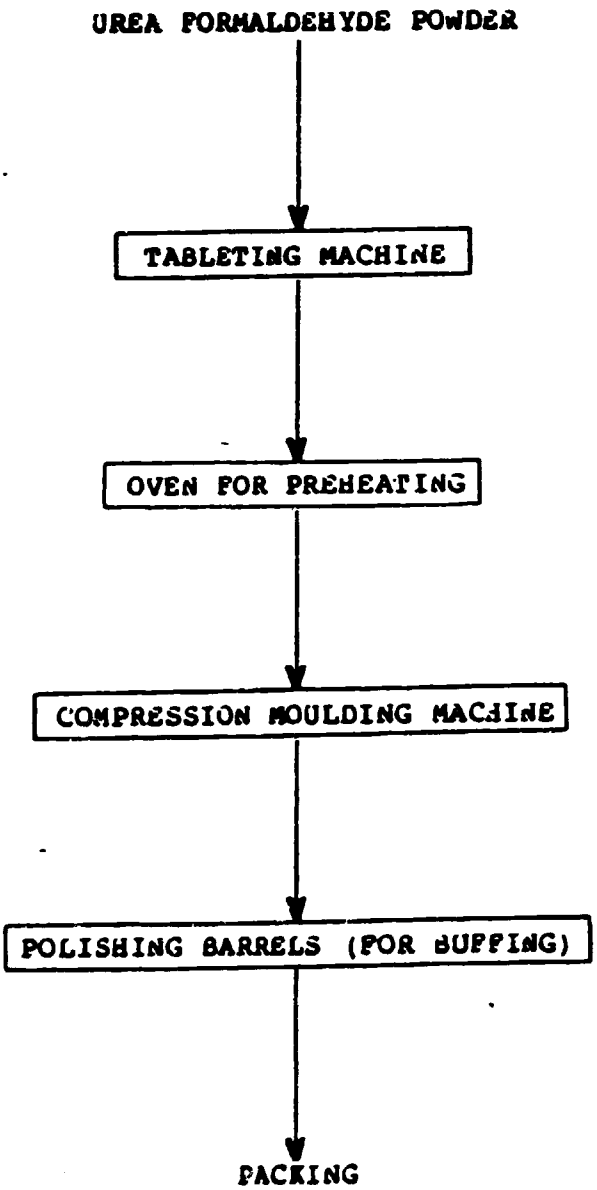
The unit shall manufacture plastic buttons from urea formaldehyde moulding powder by compression moulding technique. The annual production capacity is estimated at 100,000 gross buttons.

3. Production Process

The moulding powder is first converted into tablets of suitable size and weight by means of a tableting machine. These tablets are preheated in an oven and thereafter compression moulded into buttons by a semi-automatic compression moulding machine. The moulded buttons are buffed, if necessary, and then packed.

PROCESS FLOW SHEET

PLASTIC BUTTONS UNIT



4. - Plant site conditions

Location

(a site in Suva is proposed)

Plant construction

a) Floor space and plottage for the plant

The following floor space is required:-

Production and Storage	1200 Sq. Ft.
Administrative	100 Sq. Ft.
Toilets	50 Sq. Ft.
Total	1350 Sq. Ft.

b) Building and structure

Column Grid	30 ft. x 25 ft.
Clean height of structure	12 ft.
Columns	Reinforced Concrete
Wall	Brick
Roof	Corrugated galvanised iron sheets
Trusses	Steel
Floor	Cement

c) Civil Works

i) Land adjustment work

An area of 1350 Sq.Ft. shall be adjusted for the plant.

ii) Roads

All the roads within the battery limit shall be paved with asphalt or concrete.

iii) Effluent discharge

Sanitary waste water shall be led to the septic tank through the underground pipe. The effluent treatment and draingage outside the battery limit is not studied here.

5. Machinery and Equipment

Item No.	Machinery and specification	Qty.
1.	Tabletting machine (power operated)	1
2.	Semi-automatic compression moulding machine with working pressure of 50 M-ton	1
3.	Heating oven (3'x 4' x 4')	1
4.	Polishing Barrels (hexagonal shape)	4
5.	Dies and Moulds set	1
6.	Testing equipment set	1

6. Raw Materials

The following raw materials shall be required annually;

Item No.	Item	Qty.	Price (
1.	Urea formaldehyde moulding powder	12000 kg	3.00
2.	Card Board Boxes	100,000 units	0.01/

7.2 Utilities

a) Electric Power (Annexure 1)

Power shall be available from the City Electric Supply.

Installed Capacity	26 KW
Annual Energy Consumption	46,800 KWH
Annual Energy Cost	F $ 7370

b) Water

The water source shall be the City Water Supply.

For drinking and toilets	100 KL/Year
Rate per KL	F $ 0.40
Annual Cost	F $ 40

8. Operations of plant

The working hours of the plant are expected to be as follows:-

Working hours per week per shift	45
Shift per day	1
Working hours per year (50 weeks)	2250

9. Manpower

Total number of Employees 9

S.No.	Placement	Person	Shift	Total	Monthly Cost in F $	Amount in F $
1.	Manager	1	1	1	450	450
2.	Foreman (Expatriate)	1	1	1	600	600
3.	Foreman (local)	1	1	1	350	350
4.	Tabletting machine	1	1	1	250	250
5.	Compression moulding machine	1	1	1	250	250
6.	Heating Oven	1	1	1	250	250
7.	Polishing Barrels	1	1	1	250	250
8.	Clerk/Accountant	1	1	1	300	300
9.	Security	1	1	1	200	200
						2900
					Social benefits @ 20%	580
					Monthly Salary Bill	3480

10. **Financial Evaluation**

Application and source of funds
Assumptions

- The costs of construction are based upon current rates of civil works prevailing in the area.

- No suppliers credit is available for raw materials and consumables.

- No credit is given to the buyers.

- Prices are based on current prices prevalent in Fiji.

- Loan for purchase of plant and machinery upto 85% of costs including freight is available; payable in 5 years in 6 monthly instalment starting from 1 year after the date of last shipment.

- Loan upto 85% of cost of building is available.

- Land is being allocated free of cost.

Capital Cost

The total cost of Project is as given below:

	F $
Building Furniture and Fixture	27,775
Plant and machinery	61,815
Working Capital	12,900
Total	102,490

The details of cost are given in Annexure 2.

In the costs have been included 10% toward contingency.

Building

The cost of construction for the building has been estimated at F$15/sq.ft.

Furniture and Fixtures

The cost of furniture and fixtures for offices has been estimated at F $ 5000. This is for providing tables, chairs, typewriter and other office equipment for the unit.

Plant and Machinery

The cost of plant and machinery required for the project has been estimated at F $ 56,195.

Costs of Insurance, Ocean Freight, Installation, local transportation in Fiji @ 5% of C & F price have been included in the above plant and machinery costs. For details refer Annexure 2.

Contingency

Contingency of 10% of fixed assets has been provided to meet all the costs not listed and for any increase in costs during the implementation of the project.

WORKING CAPITAL

Item No.	Requirement
Raw Material	4 months
Finished Goods	1 month
Cash	$2,000

No allowance is needed for accounts payable and receivable, so all transactions are assumed to be for cash. Work in progress is negligible.

Source of Funds

Details of financing of the project are given below:

a) A supplier's credit of F$40,000 is provided for purchase of plant and machinery by way of deferred credit. The interest rate is 10% and the loan is to be repaid over 5 years in equal instalments of principal. The first repayment will be at the end of year.

b) A development bank loan of F$25,000 is being taken as long term loan for the construction of building and provision of fixtures and fittings. The loan carries an interest rate of 13%, and is repayable over 10 years in equal instalments of principal, starting at the end of year 1.

(c) An overdraft of F$13,000 will be negotiated as a loan for working capital, at 14% interest.

(d) A sum of F$30,000 is to be provided as equity by the Promoter.

A summary of capital costs and financing is given in Annexure 3.

Estimated Operational Costs and Sales

Guidelines for computing operational costs and profitability are listed below:

Sales

Sales have been estimated at 60% capacity in first year, 70% in second year and 80% thereafter, and has been estimated using an average price of buttons of F$2 per gross.

Raw Materials and Consumables

Raw Material and boxes costs for the unit have been given in Section 6.

Utilities

Power

The electrical load for the entire unit has been estimated as 26KW. The annual energy consumed shall be 46,800 KWH at a cost of F$7,370 per year.

Water

The water requirement for the entire unit has been estimated at 100 KL per year at an annual cost of F$40.

Repairs and Maintenance

The repairs and maintenance cost has been estimated as per details given below:

	1st Year	2nd Year
On Plant and Machinery at C & F price	1%	2%
On building including Furniture & Fixture	2%	4%

The estimates for the first year are lower as the plant is new.

Salaries and Wages

A total of 9 persons inclusive of operations, Administrative and Clerical Staff will be employed in the Unit. The annual wages inclusive of 20% social benefits have been estimated at F$41,760.

Administrative Overheads

The administrative overheads have been estimated at FJ5,800 per year.

Depreciation

The following rates of depreciation have been applied:

	1st Year	2nd Year Onwards
Building	10%	1.25%
Furniture & Fixtures	30%	7%
Plant and Machinery	30%	7%

Contingency allowances should be included.

Management Fee

It is envisaged that the Promoters shall appoint Management Consultants to provide necessary assistance for the effective management of the unit. The Consultants shall be paid 2% of the Sales Turnover subject to a minimum F$10,000 as Management Fee.

Tax

Tax has been provided at the rate of 37.5% of profits.

ANNEXURE 1

PLASTIC BUTTONS UNIT
ELECTRICAL LOAD AND POWER COSTS

(at 100% Capacity)

S.No.	Machine	No. of Units	Unit Load KW	Total KW
1.	Tabletting machine	1	5.0	5.0
2	Compression moulding machine	1	7.5	7.5
3.	Heating Oven	1	10.0	10.0
4.	Polishing Barrels	4	0.75	3.0
	Total			25.5

Installed Load 25.5 KW

Say 26 KW

Assuming diversity factor 0.8 0.8 x 26 = 20.8 KW

Annual energy consumption 46,800 KWH

Energy cost per KWH F $ 0.1575

Annual energy cost F $ 7,370

ANNEXURE 2

PLASTIC BUTTONS UNIT

DETAILS OF COST OF PROJECT

	Local	Foreign	Total F $
Building	20,250	-	20,250
Furniture & Fixtures	5,000	-	5,000
Sub-total	23,250	-	25,250
Plant and Machinery	-	37,000	37,000
Freight	-	4,450	4,450
Insurance	-	670	670
Inland freight port clearing	2,075	-	2,075
Installation	4,500	7,500	12,000
Sub-total	6,575	49,620	56,195
Contingency	8,145	-	8,145
Total	39,970	49,620	89,590
Working Capital			12,900
Total investment			102,490

ANNEXURE 3

PLASTIC BUTTONS UNIT

SOURCE AND APPLICATION OF FUNDS

APPLICATION	AMOUNT in F$
Building	20,250
Furniture & Fixtures	5,000
Plant and Machinery	56,195
Working Capital	12,900
Contingency	8,145
TOTAL	$102,490

SOURCE	
Supplier's credit	40,000
Longer term loan for Building, Furniture & Fixtures	25,000
Overdraft	13,000
Equity	30,000
TOTAL	$108,000

UNIDO/CFTC

PACIFIC REGIONAL TRAINING SEMINAR ON INDUSTRIAL PROJECT PREPARATION, EVALUATION AND FINANCING

SUVA, FIJI

Selected papers on social cost-benefit analysis.

Dariusz K. Rosati.

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 categor 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 consequenc 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 contribu 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 competito

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x/ J.M.D. Little, J.Mr. Mirrlees: Manual of Industrial Project Analysi in Developing Countries, Vol. II - Social Cost Benefit Analysis, Pa 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 unemployment (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 or 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 investment 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. Nowadays developed economies do not need so much SCBA as actual market parameters used for project profitability calculations are not to distant from (social) economic parameters and they reflect relative scarcity of products and resources. Moreover, the elements described under point 5 do not hold in most instances for developed economies.

NATIONAL OBJECTIVES AND PROJECT EVALUATION

1. The development process as a process with multi-objectives :
   - economic objectives,
   - political objectives,
   - social objectives,
   - national security objectives,
   - ecological objectives.

2. Interrelationship of national development objectives :
   - dynamism vs. harmony,
   - conflict and complementarity between different objectives.

3. A strategy - within the national economy - for the liquidation of underdevelopment.
   - transformation of the distorted economic structure,
   - aims, means, processes,
   - strategic and tactical questions,
   - consumption vs. investments,
   - isolation (autarchy) vs. integration with the world economy or a group of countries.

4. Economic development viewed and assessed through different criteria :
   - material progress,
     the effect on the distribution of national and global wealth,
   - the degree of satisfaction of the basic needs by the broadest masses.

5. The links between national objectives and criteria for project evaluatio

6. The set of criteria approach (basic, additional and supplementary) vs. application of a single, universal yardstick.

7. No macro-efficiency without micro-efficiency of the project.

8. Project's impact on the balance of payments and international competetiveness of the national economy.

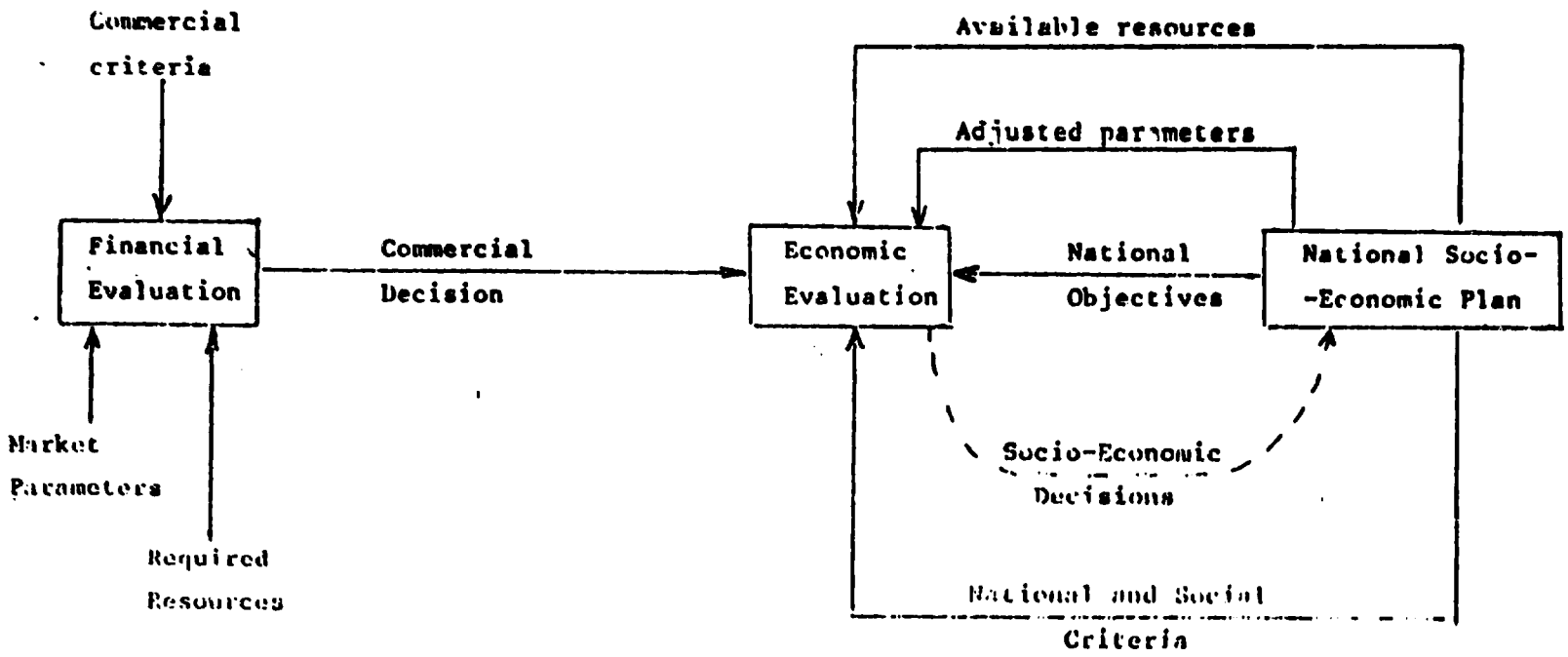
Material (A) and resource (B) balances

(A)

Product "x"	
Supply (Sources) "S"	Demand (Destination) "D"
1. Output	1. Consumption
1.1. Plant "A"	2. Production inputs
1.2. Plant "B"	2.1. Plant A
1.3. Plant "C"	2.2. Plant B
.....	2.3. Plant C
2. Decrease of inventories	.....
	3. Investment
3. Imports (when D > S)	3.1. Project K
	3.2. Project L
	3.3. Project M
	.....
	4. Inventory increase
	5. Exports (when S > D)
	6. Reserves

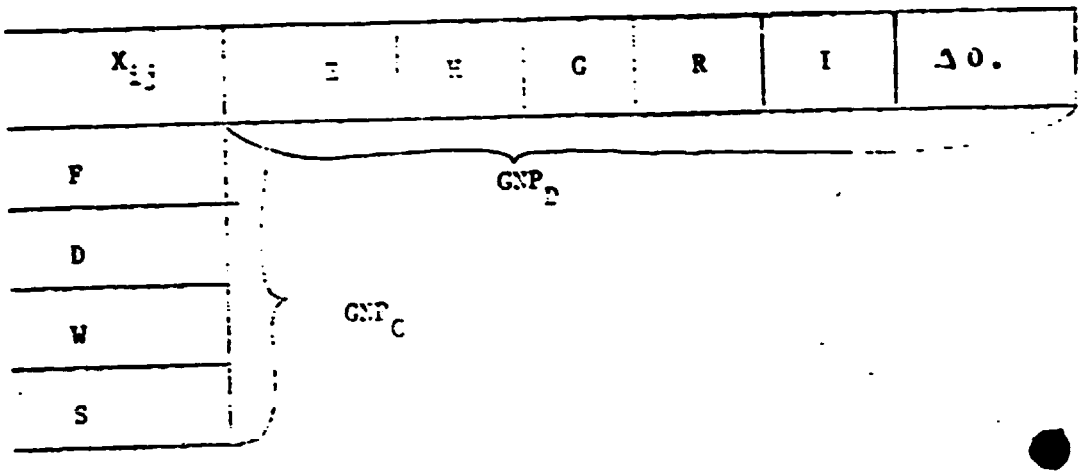
(B)

Resource "y"	
Supply (S)	Demand (D)
1. Domestic resources	1. Production
	1.1. Plant A
	1.2. Plant B
	1.3. Plant C
	.....
2. Foreign resources	2. Investment
(when D > S)	2.1. Project K
	2.2. Project L
	2.3. Project M
	.....
	3. Export (when S > D)



Economic evaluation of a project. National objectives and the project

Social output creation and distribution



X_{ij} - flows-matrix

E - exports

H - individual consumption

G - collective (social) consumption

R - replacement

I - investments (new)

O - stock (changes)

F - imports

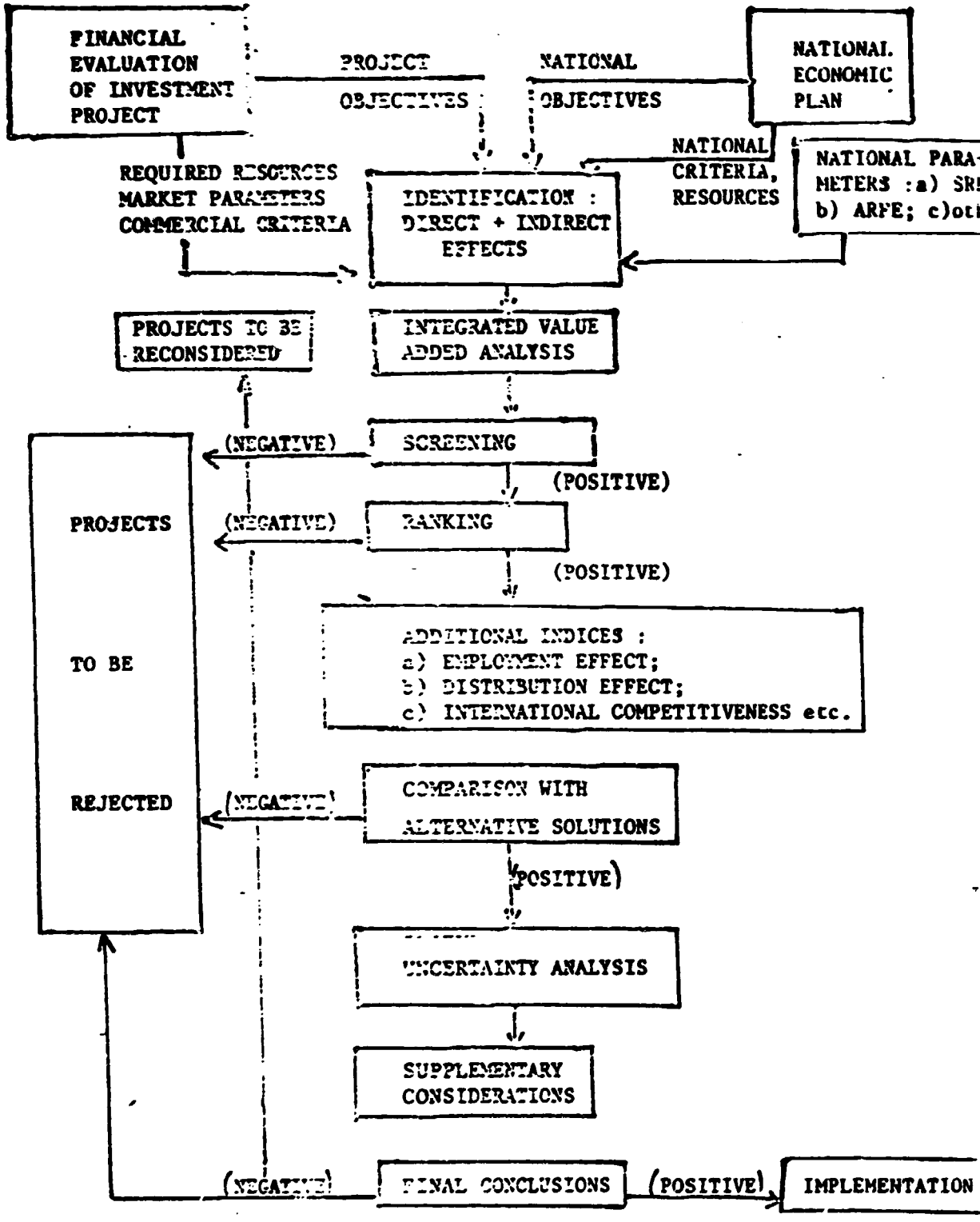
D - depreciation

W - wages

S - social surplus

GNP_C, GNP_D - GNP created, distributed

PROJECT ECONOMIC EVALUATION (STANDARD PROCEDURE)



REGIONAL OBJECTIVE

Exercise

1. Redistributional benefits accruing to particular regions.

   Let's discuss a hypothetical example.

   The following regions can be identified in a country.

   A. Industrialised, surrounding capital city, where about 30% of the population lives, but about 70% of national income is spent.

   B. Mining region, with 20% of the population, 20% of national income is spent and no big industry.

   C. Rural region, with 50% of population and 10% of national income is spent on basic goods, no industry whatsoever.

   Assume that respective of x_i are known, where x represents the marginal proportion of the direct net redistributional benefits R^D, which - if respent within the region - results in additional net benefits to the region

   $x_A = 0.7$ $x_B = 0.2$ $x_C = 0.1$

   Assume that a textile project, implemented in one of the three regions would produce net direct benefits of US$ 100.000 per year. Please calculate net redistributional benefits accruing to particular regions.

2. Discussion to be prepared by the participants and carried on in small groups::

   - identification of main regions in their respective countries and approximate estimates of regional income multipliers as well as weight attributed to incomes accruing to particular regions.

Type of region	Regional objective	In line with national objective	Limitation to national objective
1. Highly industrialized region (industrial complexes)	1.1. Further industrial development of the region on the basis of existing infrastructure. Traditional orientation.	1.1. A, (B), F(?)	1.1. C, D, E, (B), F(?)
	1.2. Protection of environment, restrictions on production growth.	1.2. C, D, E, (B)	1.2. A, (B), (F)
	1.3. Reconstruction of the industry, modification of its structure.	1.3. F, A, (B)	1.3. C,D,E
2. Agricultural region of low output/yields	2.1. Intensification of agricultural production. Introduction of high quality livestock breeding.	2.1. (B), C, (E),(F)	2.1. A, (B), D
	2.2. Intensification of agriculture production and investments in food processing industry.	2.2. C,(B),D,E,F	2.2. A, (B)
	2.3. Industrialization of the region (manufacturing industry).	2.3. D,E,(F), A	2.3. C, (B)

3. Industrial-agricultural region with a natural basis for the development of both industrial and agricultural production	3.1. Development of industry	3.1. A, (B), D, (E), (F)	3.1. C, (B)
	3.2. Development of agriculture	3.2. C, (B)	3.2. A, (B), D, (E), (F)
	3.3. Intensification of agriculture + food processing industry	3.3. C, B, D, E, (F)	3.3. A
4. Raw material-bearing areas	4.1. Development of processing industry	4.1. A, (B), (F),(E)	4.1. C, (B),(D),(E)
	4.2. Protection of environment, restriction on production growth	4.2. C, (D), (E), B	4.2. A, (B), (F)
5. Large cities and industrial--urban centres	5.1. Further development of the region on the basis of existing infrastructure	5.1. A, (F)	5.1. (B), C, D, E.
	5.2. Limitation of excessive expansion, deglomeration, reconstruction of transportation network etc.	5.2. B, C, E	5.2. A
	5.3. Reconstruction of the industry, modification of its structure	5.3. F, A, (B)	5.3. C, D, E

6. Region with tourist attractions	6.1. Development of tourist industry (construction of hotels, different tourist facilities), protection of nature, no air/water polluting industry in the region.	6.1. B, (C), (E),(F)	6.1. A, D
	6.2. Parallel industrialization of the region	6.2. A, D, (E)	6.2. C, (B)
7. Region providing conditions for rest and medical treatment	7.1. Development of suitable facilities (e.g. new water intakes, sanatoria, etc.)	7.1. B, C, (E)	7.1. A, D
	7.2. Parallel industrialization of the region	7.2. A, D	7.2. C, (B)

National objectives :

A - Accelerated industrialization of the country, accelerated economic growth

B - More balanced, moderate economic growth. Deglomeration of industry

C - Fully consumption oriented strategy. Self-sufficiency in food production

D - Industrialization of underdeveloped regions

E - More equal income distribution within the country

F - Improvement of the situation in the balance of payments, strengthening of the international competetiveness of the national economy

( ) - with some reservations

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 pri[illegible]", "social prices" or "opportunity cost" (equivalent to shadow price at nationa level) are used.

The UNIDO handbook "Guide to Practical Project Appraisal, Social Benefit-Cost Analysis in Developing Countries" gives the [illegible]owing definitions for shadow prices. Shadow price is defined as "a [illegible] implying a price that has been derived from a complex mathematical model, i.e. from linear programming (see accounting price)". Accounting price is d[illegible]d as follows: "a term often used synonymously with shadow price. The term "accounting" indicates that the price is not a market price. Accoun[illegible]g prices reflect, for example 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 accoun

In linear programming analysis the shadow price is defined as the increme[illegible]to the value of the objective function that results from that constraint being 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 model 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 [illegible]ment 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 mariginal 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 preferenc 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 techniqu is to take over price relationships observed in the market for similar items or in markets for the same items in other countries. Such an approach, for well-known reasons, can produce misleading result, similarily 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 stages 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-Mirrless method (revised OECD method)

b) Squire, Van der Tak method (World Bank approach).

SHADOW EXCHANGE RATE

1. In most developing countries foreign exchange is more valuable than indicated by the official rate of exchange, i.e. domestic currency is undervalued. 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

   - domestic market clearing price p = 45 Rs/bottle.

   We get additional 15 Rs on each bottle. In other words - each unit of foreign exchange, measured 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's method (calculation of adjustment factor for foreign exchange - AF)

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

where :

e_f - 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

$$P^F = \sum_i f_i \frac{P_i^D}{P_i^{cif}}$$

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 egregate consumption value of the imported goods is therefore :

$$T = f_1 \frac{P_1^D}{P^{cif}} + f_2 \frac{P_2^D}{P_2^{cif}} + \ldots + f_n \frac{P_n^D}{P_n^{cif}}$$

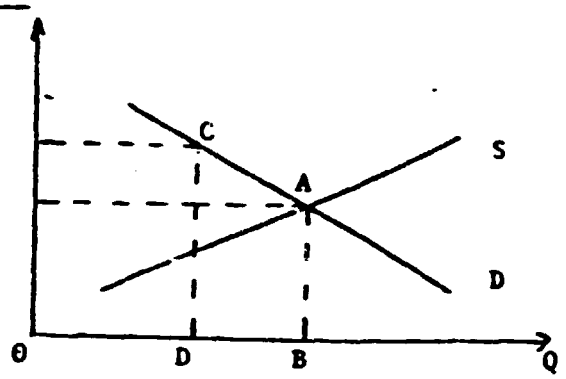
In UNIDO method the shadow price of foreign exchange is calculated as t weighted average of the ratios of domestic market-clearing prices to c prices calculated at the official rate of exchange.

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

SHADOW WAGE CALCULATION

Most of the developing countries face [illegible]ment and /or under-employment situation. At the same time there exist systems of wage controls (minimum wages set by government or its agencies). Accordi to the law of demand and supply on a competitive market prices refl equilibrium situation of demand and supply. Wage is a price that th enterprise has to pay for labour.

Figure 1.



Point A on Fig. 1 is a point of full employment on competitive te (the enterpreneurs are willing to employ more workers, but for lower wages and the workers prefer leisure than working for less money). Minimum wage (CD) guaranteed by the authorities is higher than the hypothetical "equilibrium wage" (otherwise it would not be necessary set wage controls). There are different categories of labour. Some s are scarce, others are aboundant in a given economy. Usually unskill labour is aboundant and skilled labour is difficult to find. Differe demand and supply functions for particular skills needed by the deve-lopment project point out to where the wage controls are necessary (c might be imposed). No wage controls for skilled labour (which is bet payed than unskilled labour) prove that this category of labour is employed on competitive terms. In any case the project would have to pay the same wages under actual and hypothetical competitive market situation.

The wage status of aboundant unskilled labour is somewhat differe Because of minimum wage guarantees this category of labour gets more than it would be payed under free competition. The enterpreneur (dev lopment project) has to spend more on wages than under competition a

consequently suffers hypothetical losses. In order to assess these losses one has to determine the difference betwee.: actual wage of unskilled labour and its shadow version (corresponding with the hypothetical equilibrium).

As we know already from the definition of shadow prices, the shad price of an aboundant factor of production has a zero value (the contribution of marginal increment of labour force to the value of production in the situation of unemployment is zero - increase in labour results only in the increase of unemployment, not in production resul Theoretical assumption of zero price of labour cannot be accepted in real life. Every human effort costs additional energy spending. The energy source is food consumption. It is well known that athleets, miners etc . have to consume more food than average consumers in order to be able to perform. Same is true for someone who is not professionally active and starts working for 8 hours a day. His food requireme increase sometimes considerably.

Another factor that can serve to determine shadow wage is the valu of foregone production due to the transfer of unemployed or underempl person from his present status to the project. It is obvious that a person supported by his family contributes to some extent to the work done by other members of the family (it is true especially in agriculture and handicraft) even if he or she is not formally employed.

The existance of aboundant unskilled labour does not mean necessar that labour is available in desired quantities at project's site. Trans of labour from areas where it is aboundant to projects site costs mon (very often the workers migrate with whole families).

All the above mentioned elements determine the social cost of labo (called also opportunity cost of labour or shadow wage).

Shadow wage is a national parameter. It means that the same (uniqu shadow wage should be used for the economic evaluation of all the projects that undergo this procedure. In practice it is difficult t make sophisticated computations of the shadow wage. As the matter of fact, the whole social-economic evaluation of projects is very approx mative and very fine and time consuming computations give in most ca the results very close to the proposed rough estimates.

"Guide to Practical ..." and other publications propose different shortents to determine a shadow price of unskilled labour:

- the equivalent of 3 kilograms of grain per day;

- forgone production in agriculture (the pay of rural market in slack season - in absence of other data it comes again to 3 kilograms of grain per day);
- 50% of the minimum official wage.

These three different estimates give very close numerical results. If one understands the idea of the shadow wage, it seems sufficiently satisfactory to adopt a certain percentage of the minimum wage as an approximation of the shadow wage.

Topics for discussion (national cases)

The participants are asked to prepare and think over the following questions relative to their respective countries :

- average wage by sectors;
- market wage of unskilled workers;
- labour market (number of unemployed and underemployed);
- transfer payments to unemployed;
- cost of transfer of labour from rural areas to project location;
- cost of training;
- cost of daily subsistance (price of basic stapple crop).

INCOME DISTRIBUTION OBJECTIVES

1. As pointed out at the earlier stages of Social Cost Benefit Analysis income distribution is one of the government objectives. The governments tend to subordinate income distribution to two basic targets:
   - economic growth
   - more equitable distribution

   of incomes among different groups of society. Investment projects appraisal has to take into account government's priorities with respect of income distribution.

2. Income distribution with respect to economic growth means that government prefers projects generating higher savings, as they contribute much more to development objectives rather than consumption. Distribution of benefits generated by a project over time is dealt with at Stage Three of the UNIDO's "Guide to Practical Project Appraisal".

3. Distribution of benefits among contemporaries is subjected of Stage Four of the above mentioned UNIDO method. This objective is to some extent contradictory with the first one. At this point the government has to evaluate higher consumption of the poor than the incomes going to the rich people. Ambiguity of both income distribution objectives reflects nevertheless real choices that have to be made by the government.

4. Stages Three and Four of "UNIDO Method" present the logical development of Stages One and Two. The data reflecting adjustments to cash-flow from Stage One and Two are starting point for income flow analysis. Price distortions taken into account at earlier stages generate income distribution as compared to hypothetical situations of a competitive market. Each adjustment, being hypothetical flow, at the same time increases incomes of one agent and decreases by the same value incomes of another (or several) involved agent. For example it was proved at Stage One that unskilled labour was overpaid. The difference between what the workers effectively got and what they should have been paid is their benefit. It is at the same time a loss for the project (under competitive economy the project would have to pay only a competitive wage, lower than the official minimum protected by law).

5. Prior to Stage Three and Four UNIDO's "Guide ..." introduces Inco Flows Analysis necessary to assess project's impact on savings an equity objective. Income Flows Analysis consists on - identificat of social groups involved in a project (practically all the socia macro groups are to some extent affected)
   - attribution of gains (losses) resulting from the adjustments to cash-flow to different identified social groups
   - preparation of income flows data for the proposed procedure of analysis (calculation of present value of gains /losses/ of each social group in adjustment terms; see Table 12 in the "Guide ...

6. Knowing additional flows of incomes of different social groups one can determine the savings of the respective groups. The sum of resulting savings is NET PROJECT IMPACT ON SAVINGS.
   Procedure for savings determination:
   - marginal propensity to save (MPS) of each social group has to be evaluated - it differs depending on the level of incomes (the mo one earns, the more be can save out of additional income),
   - additional incomes of social groups (sum of adjustments going to a particular agent) considered as marginal incomes together with the respective MPS determine the volume of savings.

7. Savings serving development objective have more value for the government than NET PROJECT IMPACT ON SAVINGS. The valuc of savings under the circumstances of economic situation is determined by the AF_s

$$AF_s = \frac{MPC \cdot MPC^{aP}}{CRI - MPS \cdot MPC^{aP}} - 1$$

Economic meaning of the formula for - --→ annual consumption (MPC - Marginal Propensity to Consume) out of marginal product of capital (MPC^{aP}) discounted by consumer rate of interest (CI minus rate at which marginal product of capital is reinvested and creates additional flow of consumption. MPS, MPC and MPC^{aP} might be determined empirically. CRI is not know (it is different for different social groups). The "Guide ..." suggests, instead of trying to evaluate CRI, a method of weighted calculation of AF_s taking into account different values of CRI. This procedure reflects interactive approach

into which both decision makers at the top and analysts at the bo
are involved. The weights are not associated directly with CRI, b
with projects impact on savings calculated out of the resulting s
Probabilities of acceptance of a given adjustment are weights for
calculation of the expected value of AF_s. Adjustment value for
savings is calculated by multiplication of NET PROJECT IMPACT ON
SAVINGS by the expected value of AF_s.

8. At Stage Four the government has to value the incomes of differen
social groups. The intuition says that incomes of the "poor" are
more valuable than the incomes of the "rich". It has to be quanti-
fied. The "Guide ..." suggests a method that can be presented in a
number of steps:
   - determination of the base level of consumption (the level that neither has to be taxed nor subsidized),
   - calculation of ratios of the base level of consumption to the consumption level of social groups identified at Income Flows Analysis,
   - evaluation of the elasticity of the marginal utility of income "
     (by similar method to the one used for calculation of AF_s).

   The method involves calculation of adjustment factors for differen
   social groups

$$AF = \left(\frac{b}{c}\right)^{n} - 1 \qquad \text{for } n = 0, 1, 2$$

   where

   b - base level of consumption

   c - consumption level of one of the social groups identified at the Income Flow Analysis

   and as a result distribution adjustment values. On this basis pro-
   babilities are associated with "n" values and expected "n" value is
   calculated. Expected "n" value is used for calculation of income
   distribution adjustment values.

9. After Stage Three and Four adjustment values are added to project value at the preceding stage and IRR is calculated.

Comment:

Consideration of the project's impact on the achievment of social goals set by the government involves subjective judgements. This procedure can be questionned, but on the other hand government social policies are always to some extent subjective. Accepting or rejecting project proposals on the grounds of social considerations, the government expresses its subjective preferences. That is why the proposed procedure "objectivizes" subjective approach as far as it is possible. It helps to use the same yardstick to measure impact of different projects on social policies implementation.

UNCERTAINTY IN PROJECT EVALUATION

Uncertainty is linked with every human activity. It has to be take into consideration also in project evaluation.

Sources of uncertainty:

1. Changes in prices of most inputs and outputs that enter into a cas -flow table. For financial analysis important is their absolute value. For social cost-benefit analysis the relative prices matter Price changes might be causes by changes in demand (supply) or by modification of macro-economic relations resulting in new exchange rate levels.
2. Changes in technology that are very probable in project's life time
3. New consumption-patterns.
4. Project's capacity might not be attained.
5. At the starting point cost-estimates might not be exact.
6. During project's life time political changes might occur that resul in different social c/b analysis (different priorities for a new government).

Uncertainty results in different performance of the project than th conclusions of the feasibility study, when actual results are better than forseen, it constitutes additional gains for the project. Mo dangerous is the inverse situation, it might cause a failure of the enterpreneurs.

Dealing with uncertainty

- Stage of financial analysis (discussed earlier):
  Project financial analyst has different tools at his disposal - break-even analysis and sensivity analysis. Practically he assumes the worst potential outcomes and evaluates what happens with the project under these assumptions. The enterpreneur investing his own money prefers usually to stay on safer grounds by assuming rather higher costs and lower sales revenues.
- Stage of economic analysis:
  For economic analyst of project, conservative estimates are not so important as in the financial analysis. Government agency aproving

projects needs very realistic estimates of future project's activ
The estimates should be unbiased. Social cost-benefit analysis dea
with economic analysis and with social (distributional) aspects of
project implementation. The second element of project evaluation -
social impact - depends on government's policies on distribution.
They might change over time, but they do influence project approva
by the authorities. Uncertainty analysis of distribution aspects o
project implementation is not able to give satisfactory and meanin
ful results. Economic part of SCBA needs other methods to deal wit
uncertain future.

Adopted procedure to treat uncertainty might be as follows:

1) Identification of the key variables (with the biggest impact on project's value or with the biggest possible variations) - for eco nomic analysis they might be: number of jobs created by the projec export earnings, spending on imports;
2) Identification of possible range of variation of the selected variables;
3) Association with each variation of a likelihood of its occurence;
4) Calculation of the expected values of variables;
5) Calculation of the analysis.

The above proposed method could be more or less complicated depend on qualifications of the analyst. It can take a relatively simple fo It requires however a good experience of experts evaluating probabili of occurence of the variations. In order to simplify the analysis it is proposed to use a limited number of variations for each variable (ex. optimistic, "realistic" and pessimistic). The probabilities might as well be determined by a panel of experts as a result of their discussion.

Example:

The experts determined three versions of the productive capacity utilization - optimistic 100%
"realistic" 60%
pessimistic 40%

Respective probabilities were estimated at 0.1, 0.6 and 0.3.
Expected value (the most probable) is calculated as follows:

100	x	0.1	=	10
60	x	0.6	=	36
40	x	0.3	=	12
				58

Note: the probabilities have to sum up to 1.

Another way of dealing with uncertainty at the stage of economic analysis is a specific type of sensitivity analysis. In this method first the important variables have to be identified. Then a project analyst might proceed to analyse how sensible the project is to the changes of a selected variable (or variables). In consequence it migh ce critical zones that require special supervision. Sensit ty ysis does not diminish risks but it can point out to some measure that can reduce risk by increasing costs (ex. constitution of necessa reserve of foreign currency to offset fluctuations of export prices). More elaborate probability analysis has to be made for larger, more complex projects. In such cases succes or failure of the project migh weight heavily on national income.

COMPREHENSIVE METHODS OF PROJECT EVALUATION

A project is selected in the first stage of its evaluation based o profitability from the enterpreneur's point of view. Cash flow of the project is built up based on market prices of inputs and outputs. All the items included in it are directly involved in the project itself. The projects selected from private enterpreneur's point of view guara optimal allocation of resources only if market prices used for calcu- lations of profitability are based on true equilibrium prices (reflec equilibrium between demand and supply for particular products and re- sources). This condition is very rarely met in the developing countri where distorted markets make it impossible to assure optimal allocati of resources from nation's view point. The governments have to interv in order to structure national economy accordingly to what is "ration There are two types of considerations having impact on the allocation of resources :

1) correction of investment decisions based on distorted prices;
2) taking into account government's social policies for shaping up of investment structure.

The first type of approach aims at the recreation of the market conditions of a hypothetical free competition. Under these conditions a new profitability calculations are made. Net present value of the project is than expressed in economic categories (which are different than financial or commercial values).

The second type of approach has a subjective character. It reflect government social policy (ex. more resources for education or health, full employment policy, more equal distribution of income etc.). The social considerations are hard to measure. They are different from on country to another, they change over time, but do not follow any spec pattern.

To evaluate an investment decision one has to take into account possibly both points of view. It is not an easy task as it has to comb several criteria in one logically constructed method. There are diffe such methods, each one of them having advantages and inconveniences. reflect also major trends in economic development at the moment they were worked out.

The most popular methods of social-economic evaluation of investmen projects are (in chronological order) :

1) Ian M.D. Little, James A. Mirrlees
Manual of Industrial Project Analysis in Developing Countries, Vol. Social Cost Benefit Analysis, 1968 (OECD) - modified in 1974.

2) Partha Dasgupta, Stephen Marglin, Amartya Sen
Guidelines for Project Evaluation, 1972 (UNIDO)

3) Lyn Squire, Herman G. van der Tak
Economic Analysis of Projects, 1975 (World Bank)

4) John R. Hansen
Guide to Practical Project Appraisal. Social Benefit-Cost Analysis in Developing Countries. 1978 (UNIDO)

All these methods recommend use of the shadow prices for all the basic items of project's cash-flow. In this way they try to find a com denominator in which the project contribution to national economy as a whole might be expressed.

Basix differences between these models result from different assumptions made by the authors.

For (1) the common denominator is public income (called social value);
For (2) it is "aggregate consumption";
For (3) it is "uncommitted public income" (net social benefits = net efficiency benefits - net social cost of increased private sect consumption);
For (4) "consumption benefits in the hands of people at the basic l of consumption".

Another feature differenciating the models is the question of curren in which a denominator (numéraire) is expressed. For (1) and (3) it is convertible currency, for (2) and (4) it is domestic currency. Conseque the question arrises of how to estimate the relative value of domestica produced goods. All the methods use similar notions. In general all the products are put into two categories: traded goods and non-traded goods (in foreign trade). For traded goods (1), (3) and (4) recommend the use of border prices - cif for imports and fob for exports to set proper pr relations. Method (1) proposes for price ratio estimation "willingness of the consumer to pay" and border prices for traded goods.

Methods (1) and (3) consequently to the use of convertible currency and border prices for traded goods deflate the value of non-traded good

to their border equivalent. They use for this purpose Standard Conversi Factor

$$SCF = \frac{OER \text{ (official exchange rate)}}{SER \text{ (shadow exchange rate)}}$$

Methods (2) and (4) use shadow exchange rate to express the values of imports and exports to national economy (for respective entries of project's cash flow). Similar procedure is used for other tradable goo that are not actually traded. Non tradable's prices are evaluated in methods (2) and (4) by "willingness of the consumers to pay" or by a of production in (4) depending on the category of product.

Approach to labour inputs: all the methods use shadow price of un-skilled labour. Some, ex. (1), give different names for it: Accounting, Marginal Productivity of Labour etc.

It is difficult to make all the calculations in one step. The pro-cedure of gradual improvement of calculations leading finally to the statement of economic profitability "can be traced on the example of the UNIDO's "Guide to Practical Project Appraisal".

This method is composed of several phases:

1) Adjustments to cash-flow (in order to eliminate market price dis-tortions);
2) Adjustment to cash-flow (real value of foreign exchange is taken into account);
3) Income flow analysis;
4) Adjustment for the value of savings;
5) Adjustment for the income distribution;
6) Qualitative aspects of project implementation.

The first two phases constitute economic evaluation of the project After the adjustments are made, new internal rates of return are cal-culated and serve for comparisons with interest rates (capital market social etc.).

The following phases take into account what often seems difficult be measured. Phase 3 supplies necessary data for phase 4 and 5. Phase gives opportunity to complete the evaluation by other important aspec of project's contribution to national objectives implementation.

The contents of the phases of project evaluation:

Phase 1

- Identification of the items to be adjusted for price distortions (tradable, traded, non-tradable, non traded goods);
- Evaluation of the above items content to be adjusted (prices of products and resources, especially unskilled labour);
- Estimation of conversion factors ($CF = \frac{\text{shadow price}}{\text{market price}}$) and adjustme factors ($AF = CF - 1$);
- Calculation of adjustments to cash flows;
- Calculation of preliminary adjusted present value;
- Calculation of the IRR.

Phase 2

- Evaluation of the foreign exchange content of different cash flo
- Calculation of shadow exchange rate;
- Calculation of conversion and adjustment factors

$$CF = \frac{\text{Shadow Exchange Rate}}{\text{Official Exchange Rate}}$$

$AF = CF - 1$;

- Calculation of adjustments to cash-flows;
- Calculation of adjusted cash-flows (Preliminary adjusted present val adjusted for foreign exchange);
- Calculation of the IRR.

Phase 3

- Analysis of all the adjustments to cash-flows;
- Identification of social groups benefiting or losing in consequence of project implementation (Project, Rest of Private Sector, Governm Workers, Consumers, Foreign);
- Attribution of gains (losses) resulting from the adjustments to cas -flows to different social groups identified above;
- Calculation of net present value (NPV) of gains (losses) of each so group expressed in adjustment terms.

Phase 4

- We have to evaluate what part of consumption gains is saved. Additi incomes are partly spent and partly saved. Marginal propensity to s (MPS) determines the part of additional income that is saved. It va from one social group to another. Proper MPS' have to be attributed

to social groups identified under Phase 3;

- Savings of each group have to be calculated. The sum of resulting savings is NET PROJECT IMPACT ON SAVINGS;
- Calculation of adjustment factor for savings

$$AF_s = \frac{MPC \; MPC^{ap}}{CRI - MPS \; MPC^{ap}} - 1$$

where

MPC - marginal propensity to consume (MPC = 1 - MPS)

MPC^{ap} - marginal productivity of capital

CRI - consumer's rate of interest.

MPC, MPS, MPC^{ap} are known.

AF_s is to be calculated for different values of CRI that is unknown. Probabilities of adoption of an adjustment factor have to be evaluated and the expected value of AF_s should be determined (also called "best estimate")

$$\overline{AF_s} = \sum AF_{s(i)} \quad p\left[AF_{s(i)}\right];$$

- The adjustment value for savings is calculated as net project impact on savings x $\overline{AF_s}$;
- New IRR is calculated.

Phase 5

- Income distribution determined in Phase 3 is evaluated according to its importance to the central planner;
- Income distribution weights reflecting social preferences should be calculated:
  - base level of consumption (that is neither taxed nor subsidized) is to be determined,
  - ratios of base level to the consumption of a given social group are established,
  - elasticity of the marginal utility of income "n" is calculated by a trial and error method;
- Adjustment factor for income distribution is determined

$$AF_D = \left(\frac{b}{c}\right)^n - 1;$$

- Income distribution adjustments are calculated and project's adjuste value for income distribution;
- Project's IRR after adjustments is calculated.

Phase 6

The adjustments of other nature (then the ones considered in Phases 1 - 5) might be taken into account. These adjustments reflect governme policies with respect to for example:

- Regional development;
- Use of scarce resources (petroleum);
- Creation of new jobs;
- Industrialization policies;
- Sectoral industrial policy;
- Pollution control etc.