

**Economic Appraisal of Projects
in Indian Conditions.**

**A thesis submitted
to the University of Poona
for the degree of
Doctor of Philosophy
in Economics**

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and Economics, Pune.**

April, 1982.

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Acknowledgements

First and foremost, I must acknowledge the debt of gratitude that I owe to Prof. A. S. Nadkarni, Joint Director of the Gokhale Institute of Politics & Economics, Pune, who is my guide and supervisor for this research study. I have often taken undue liberties with his time and patience, and I must say that he was always extremely helpful to me in my work. But for his encouragement, help and guidance I could hardly have expected to complete this research study in a short period of just about two and a half years.

Shri D. V. Nagappanavar helped me in several mathematical calculations; S/Shri R. V. Urankar and S. S. Kolvekar provided me some statistical explanations; Miss Sumati Kasar and Miss Tina Rodrigues helped me in compilation of data and preparation of tables. Shri M. E. Bapat cheerfully did the typing. I must acknowledge my debt to all of them for their timely help in this study.

My sincere thanks are also due to Dr. G. V. Kamat Helekar, Director of the Centre for Post Graduate Instruction & Research (University of Bombay), Panaji, for his valuable help by way of allowing me to use the Centre's library services. Similarly, I also feel obliged to Shri S. P. Gothoskar, Director of Statistics, Reserve Bank of India, Bombay, who caused some important information to be collected and supplied to me for use in this study.

Lastly, I am grateful to the Government of Goa, Daman and Diu for permitting me to undertake this research project over and above my official duties.

S. K. Gandhe

Panaji, Goa,
April, 1982.

List of Abbreviation

AOCF	..	Agricultural Output Conversion Factor
AP	..	Accounting Price
ARI	..	Accounting Rate of Interest
AR	..	Accounting Ratio
ASI	..	Annual Survey of Industries
BOUIES	..	Bulletin of Oxford University Institute of Economics & Statistics
BP	..	Border Price
CBR	..	Cost Benefit Ratio
CCF	..	Consumption Conversion Factors
CCL	..	Critical Consumption Level
CI _F	..	Cost, Insurance & Freight (Border price for imported goods)
COPE	..	Central Office of Project Evaluation
CPM	..	Critical Path Method (also called Critical Path Analysis)
CRI	..	Consumption Rate of Interest
CSO	..	Central Statistical Organisation
CWP	..	Consumers' Willingness to Pay
DCF	..	Discounted Cash Flow
DM	..	Domestic Materials (i.e. in terms of domestic market price values)
DR	..	Discount Rate
ECAFE	..	Economic Council for Asia and Far East
ERP	..	Effective Rates of Production

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FE	..	Foreign Exchange
FOB	..	Free on Board (Border price of exported goods)
FS	..	Farm Surpluses
FYP	..	Five Year Plan
GDD	..	Goa, Daman & Diu
GNP	..	Gross National Product
GOI	..	Government of India
IBRD	..	International Bank of Reconstruction and Development (World Bank)
ICICI	..	Industrial Credit and Investment Corporation of India
IFC	..	Industrial Finance Corporation (of India)
IRI	..	Investment Rate of Interest
IIR	..	Internal Rate of Return
LDCs	..	Less Developed Countries
LM	..	Little & Mirrlees Method of Project Appraisal
LSC	..	Local Supply of Cane
MP	..	Market Price
MPC	..	Marginal Propensity to Consume
MPS	..	Marginal Propensity to Save

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NCDC	..	National Co-operative Development Corporation
NNP	..	Net National Project
NPV	..	Net Present Value
NSS	..	National Sample Survey
NT	..	Non Traded
OECD	..	Organisation of European Corporation and Development
OER	..	Official Exchange Rate
PAD	..	Project Appraisal Division
PC	..	Planning Commission
PERT	..	Project Evaluation & Review Techniques
RBI	..	Reserve Bank of India
SARI	..	Social Accounting Rate of Interest
SCBA	..	Social Cost Benefit Analysis
SCF	..	Standard Conversion Factors
SER	..	Shadow Exchange Rate
SRD (SDR)		Social Rate of Discount, or Social Discount Rate.
SRI	..	Social Rate of Interest
SRR	..	Social Rate of Return
ST	..	Lyn Squire and H.G. van der Tak or Squire and Tak, Method of Project Appraisal
SWR	..	Social Wage Rate. Also Shadow Wage Rate
UNIDO	..	United Nation Industrial Development Organisation, Method of Project Appraisal.

List of Important Symbols under different methodologiesI L. M. methodology

V	..	Value added.
c	..	Project Wage Rate
m	..	Marginal productivity of labour
S	..	Number of units of consumption equivalent to one unit of savings in the hands of government.
i	..	Consumption Rate of Interest (CRI)
g	..	Growth rate of consumption
e	..	Elasticity of marginal utility of consumption
ϵ_a	..	Growth rate of rural consumption
ϵ_c	..	Growth rate of urban consumption
a	..	Per capita rural consumption at base
c	..	Per capita urban consumption at base
b	..	Base-level per capita income, which is considered to be socially as valuable as the numeraire.
r	..	Proportion of re-investment returns on initial investment.
w	..	Proportion of consumption out of return on initial investment.
A_k	..	Accounting Ratio for capital employed
A_v	..	Accounting Ratio for value added
T	..	Time (in future years) at the end of which consumption and savings are expected to be equally valuable socially.
d	..	Income distributional weight.
K^w	..	Capital in world prices.
V^w	..	Value added in world prices.

II UNIDO methodology

q	..	Marginal Productivity of capital (MPCap)
s	..	Marginal Propensity to save (MPS)
i	..	Consumption Rate of Interest (CRI)
m	..	Marginal productivity of labour
w	..	Project Wage Rate
p _{inv}	..	Social Price of Investment
r	..	Percentage of income respent in the region
M	..	Value of imports
X	..	Value of exports
T ⁱ	..	Taxes on imports
S ^x	..	Export subsidies
K ^d	..	Capital in domestic prices
V ^d	..	Value added in domestic prices
Φ	..	Premium on foreign exchange (positive)
λ	..	Premium on labour (negative)
F	..	Resources affecting foreign exchange
L	..	Labour resources
MC	..	NPV at market prices
SC	..	NPV with adjustment for social values of goods & services
C	..	NPV with adjustment for impact of savings and consumption
C*	..	NPV with adjustment for income redistributinal impact
R	..	Regional redistributinal benefits, corrected for multiplier effect of respending of incremental income in the region.

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III ST method

$m\bar{a}$..	Marginal productivity of labour.
w	..	Project Wage Rate
m	..	Pre-project consumption (assumed to be equal to agricultural wage rate)
β	..	Consumption Conversion Factor (CCF)
d	..	Income distributional parameter
\bar{c}	..	Average consumption
c	..	Consumption-level of a particular recipient of incremental income from the project
e	..	Elasticity of marginal utility of consumption.
v	..	Social value of public income (ST numeraire) relative to private sector consumption
ϕ	..	Ratio of the social to private evaluation of the disutility of effort
h	..	Factor adjusting the ST's Accounting Rate of Interest for income distributional impact.

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INTRODUCTION

The era of planned economic development was ushered into the Indian national life in 1950 with the setting up of the Planning Commission. The first medium-term or five-year plan was put into operation from 1st April, 1951. Since then the country has gone through four five-year plans, one four-year plan,^{/1} three one-year plans (1966-67, 1967-68 and 1968-69) and one what may be called a two-year plan.^{/2} The sixth Five Year Plan (1980-85) is now underway. The country has gained considerable expertise over these past three decades in formulation of the macro-level strategies of development and growth. Nevertheless, the pace of economic development has been much below the expectation of the planners and the politicians, and, furthermore, there is a growing feeling among the knowledgeable sections of the Indian community that whatever gains have been derived through planning have not been equitably distributed amongst all sections of the population. In other words realisation of the basic objectives of economic

planning, viz. growth and equity, has fallen short of expectation. There are several reasons for this shortfall but this is not the proper place to discuss all of them. One important reason with which we are directly concerned in this study, is the general weakness of the micro-level planning. This level can be identified with the planning of individual development projects. (In the official parlance projects are often referred to as schemes).

In a vast country like India, micro-level planning inevitably gets diffused into a large number of organisations and administrative sets-up like government departments, divisional and district-level bodies like development councils, "Zilla-Parishads" etc. It is at this level that there is the real and urgent need for highly competent and efficient methods of planning and well defined public investment criteria. Our personal association with the over-all planning for socio-economic development of the State of Goa, Daman & Diu over the last one decade has vividly brought home the fact that most of the development departments are ill-equipped to undertake competent micro-level planning. The situation in other parts of the country is believed to be not much different. What is worse, a very cavalier attitude towards micro-planning is discerned in the development plans. Sometimes projects are copied from other areas irrespective of considerable differences

in the socio-economic and geogra-climatic conditions. No investment criteria are generally followed.

But projects are the building-blocks of investment for development planning. Without efficient project planning, the objectives of macro development planning cannot be realised to a large extent. The intellectual community has realised the need for a highly competent and efficient micro-planning and several efforts have been made in the recent past to evolve techniques of competent micro-planning especially with reference to the developing economies. Economic appraisal of projects, or Social Cost-Benefit analysis of project investment, is a most significant development of the last one decade in this direction. The three major works which have gained international recognition in this field are the methodologies of economic appraisal or SCBA of projects developed by (1) Prof. I.M.D. Little and J.A. Mirrless of England, (2) the UNIDO, and (3) Lyn Squire and H.G. van der Tak of the World Bank.³ Most of the international aid-giving agencies (including UN bodies) have been lately insisting on economic appraisal reports when project-specific financial assistance is required. However, in many of the developing countries, systematic and full-scale use of project appraisal techniques is not being made. In India, a separate Project Appraisal Division (PAD) has been set up in the Planning Commission (PC) a few years back, which is mostly

concerned with large-scale projects for which assistance from the international bodies is sought. However, full-scale use of shadow pricing - an essential feature of the SCBA - is reportedly not being done. Similarly, project appraisal has not so far become a regular feature of the micro-planning process in most of the States and other lower-level planning bodies. No national or regional parameters to be used in project appraisal at the micro-levels of planning have been derived.

Our present study is an attempt to make an in-depth analysis of the theoretical underpinning of the three methodologies of SCBA referred to earlier with a view to highlighting their common as well as distinguishing features, and, furthermore, to demonstrate their application to a live Indian project. The live-project that we have selected as a demonstrative case study is the sugarcane production and processing project of Goa. This project combines the farming as well as processing operations, and application of the three SCBA methods to this single project will thus demonstrate their use in both agricultural as well as industrial projects. In the process of practical application of the methods, even if by way of demonstration, we develop some important national and regional parameters for use in this country.⁴ Hopefully, this study will provide the basic frame-work for developing the techniques of economic appraisal

of projects in Indian conditions. Actual experience in their practical application over a few years will enable the economic-analysts to further refine the parameters and sharpen other tools of economic analysis.

Organisation of this study

This study is presented in eight chapters.

The first two chapters deal with the theoretical aspects of economic appraisal of projects. In the first chapter we have presented the general outline of the theory of appraisal, while the second chapter deals with the specific theories of the three leading methodologies of SCBA, viz. the LM, the UNIDO and the ST (World Bank) methods. Various formulae enunciated by the authors of the three methodologies for derivation of important parameters for use in project appraisal are discussed. A comparative analysis of the theoretical bases of the three methods is also presented in detail in this chapter.

The third chapter deals with the mathematical derivation of the national and regional or project-specific parameters on the basis of the available Indian data. This chapter presents the basic framework necessary for economic appraisal of projects in Indian conditions.

The fourth chapter presents various details of the sugarcane production and processing project of Goa. The socio-economic

conditions in which the project is set are discussed. The estimates of production of sugarcane in Goa and import of cane from the neighbouring state of Karnataka are also presented. A general introduction to the sugar factory (the processing unit) is given. This chapter has two appendices. The first appendix deals with the survey of sugarcane farms from which we culled out the data on various factors affecting cultivation of sugarcane in Goa. The second appendix presents in nut-shell the financial position of the sugar factory.

In the fifth chapter we present the commercial appraisal (at market prices) of the project. While this is important from the point of view of the owners of the sugar factory and the sugarcane farmers, it is also an essential preliminary step for economic appraisal or SCBA. An important contribution of this chapter is collation of data needed to set up the annual statement of costs and benefits of sugarcane production and sugar factory's operation. The results of commercial appraisal highlight the failure of the project as a commercial venture.

In the sixth chapter we attempt the application of the three methodologies of SCBA to our case study project. The national and regional parameters (based on Indian data) derived in Chapter III are used in this chapter. Similarly the annual

statements of costs and benefits for the farming and factory operations presented in Chapter V are used as basis for shadow pricing in this chapter. Derivation of social costs and social benefits is discussed. Results of economic appraisal of the project under the three methods are also presented.

The last two chapters are in the nature of concluding chapters of the study. In chapter seven, we have analysed the various reasons for differences first in the commercial versus social results and then among the results of the three SCBA methods. The data problems likely to be faced by any economic analyst in India are highlighted and a few suggestions to improve the data base are made. Against the background of the limitations of the data, the validity of national and regional parameters derived by us and used in this study is critically examined. This chapter also deals with two analogous issues, viz. sensitivity analysis and externalities. Sensitivity of the project's social results is examined in relation to two of its most important variables, i.e. supply of local cane for crushing in the processing unit, and sale price of sugar. Impact of the modern technology expected to be used in cultivation of sugarcane on the traditional crop of Goa (paddy) is evaluated as an externality of the project.

The last chapter (eight) deals with the functioning of the case-study project. First we have analysed the important reasons for its failure from the traditional financial accounting angle and then discussed some of the policy implications to make it a commercially viable project.

1. The Fifth Five Year Plan (1974-79) was out short by one year by the Janata Government which came to power in 1977, and hence the Fifth Plan virtually became a four-year plan.
2. The Janata government introduced a new five-year plan (1978-83), but the same was shelved by the Congress (I) government which regained power early in 1980, and hence this plan had a run of only two years. We have, therefore, called this a two-year plan.
3. Since the original work of Little & Mirrlees (Manual of Industrial Project Analysis in Developing Countries, 1968) was sponsored by the OECD (Organisation for European Cooperation and Development, Paris), their method was earlier referred to as OECD method. However, the authors independently published in 1974 a more developed treatise on the subject (Project Appraisal and Planning for Developing countries), and hence we refer to their work as LM method rather than OECD.
4. Detailed derivations of these parameters, based on Indian data, are given in Chapter III.