CHAPTER TWO

REVIEW OF LITERATURE
The idea of measuring the net advantage of a capital investment project in terms of society's net utility gains originated with Dupuit's famous paper "On the Measurement of the Utility of Public works' published in 1844. However, it was first put into practice in the United States in 1936 with the enunciation of the United States Flood Control Act. The Act incorporated the persuasive principle that flood-control projects should be deemed desirable if 'the benefits to whomsoever they may accrue, are in excess of estimated costs'.


During the 1960's, cost-benefit analysis became increasingly accepted as a tool for project decision making. Following a study by Tinbergen in 1958 on the use of accounting prices in public investment analysis, the World Bank began to apply the new methodology throughout the
developing world. A two volume manual dealing with the problems of developing countries was brought out in 1968 by the Organization for Economic Co-operation and Development (OECD). It was written by two eminent British economists Little and Mirrlees. The procedure proposed by Little and Mirrlees in the OECD Manual (1968) was widely criticised. See, for example, Joshi (1972), Dasgupta (1972), Steewart and Streeten (1972), Stern (1972), Gutowaki and Hammel (1972), and Healey (1972). Little and Mirrlees revised their approach and published it in the book "Project Appraisal and Planning for Developing Countries" in 1974.

Simultaneously, UNIDO had been developing its own methodology for project appraisal. UNIDO efforts culminated into the famous UNIDO Guidelines (1972) formulated by Dasgupta, Sen and Marglin.

The methodologies contained in UNIDO Guidelines (1972) and Little and Mirrlees' book (1974) are considered to be the most comprehensive. These two are summarised below.

2.1 UNIDO GUIDELINES (1972)

It is argued in the UNIDO Guidelines that commercial profitability analysis does not truly reflect the benefits and costs to society. It is so because of market distortions, unequal income distribution, externalities, etc. UNIDO Guidelines advocates that a project in public sector must be evaluated in terms of the objectives of national planning viz., increasing aggregate consumption and
income redistribution. The UNIDO method emphasises consumption as the ultimate goal of all investments. Therefore, benefits and costs accruing from a project are measured in terms of consumption.

Guidelines develops elaborate project-level methodology of social cost-benefit analysis. It considers all the direct and indirect costs and benefits of the project to estimate the net aggregate consumption benefits of the project. The UNIDO method classifies the inputs and outputs of project into two main categories: foreign exchange and domestic. It has recommended the use of shadow prices. If a commodity is imported or import substituting, c.i.f. prices are used in valuing it. Whereas f.o.b. prices are used in the case of an exportable commodity. If the project output affects indigenous production/consumption, then consumer willingness to pay for it is its social valuation. If it results in an increase in indigenous production of the particular input, the marginal social cost of that production in the economy is its social value on the cost side of the project.

The national parameters viz., shadow exchange rate, shadow wage rate, social rate of discount, redistribution weights, and shadow price of investment, are crucial to UNIDO methodology. The shadow wage rate is determined by taking into account three factors: the direct opportunity cost of labour, the effect of public sector
employment on savings and investment, and the redistribution weight attached to income received by labour employed. The shadow price of foreign exchange is the opportunity cost of foreign exchange which is estimated according to the criterion of willingness to pay. Since the level of aggregate national savings are below the social optimum in developing economies, the social value of funds devoted to investment exceeds the social value of funds devoted to consumption. The shadow price of investment, which is simply the present value of future consumption made possible by an investment, is calculated by taking into account the marginal propensity to save, marginal rate of return on investment, and the social discount rate.

The social rate of discount is kept as unknown. The guidelines recommends instead the computation of switching value of social rate of discount. It is the rate at which the present value of net aggregate consumption benefit is zero.

It is suggested that redistribution benefits should be computed in terms of accrual of benefits to and incurring of costs by backward area along with their multiplier effect.

In order to illustrate the practical application of UNIDO methodology to developing economies, a set of four case studies are appended to the Guidelines. The analysis proceeds in four successive stages. The first stage deals
with evaluation of net aggregate consumption benefits due to the project at market prices. The second stage makes an adjustment for shadow price of foreign exchange, skilled labour, and unskilled labour. In the third stage, three groups of gainers and losers have been identified i.e. workers, the government and the private sector. The net benefits flowing to these groups are then divided into proportions that are saved and consumed by each of the three groups. The amount devoted to savings is valued at the shadow price of investment. Finally, the net aggregate consumption benefits and redistribution benefits are combined in a sensitivity analytic framework.

2.2 LITTLE AND MIRRLEES (1974)

The numeraire for social valuations in the Little and Mirrlees approach is current uncommitted social income in convertible foreign exchange in the hands of the government. Little and Mirrlees believe that the shadow or accounting prices to be employed in cost-benefit analysis are world prices. The objective of using shadow prices is to make cost-benefit analysis correspond to the economic realities of the world.

The Little and Mirrlees methodology first provides for the estimation of accounting prices for goods and services. Goods are divided into two categories: tradeables and non-tradeables. It has been argued that all internationally traded goods should be valued at their
c.i.f. (for import) or f.o.b. (for export) prices. The principle recommended for non-traded goods is that accounting price should equal marginal social cost. The procedure is to take each project input and break it down into its own inputs which in turn will comprise items that are traded and items that are non-traded. The only way this chain can be pursued very far is through a detailed input-output table for the economy as a whole. If no such table is available, then the use of standard conversion factors is recommended.

Little and Mirrlees consider the shadow wage rate to be the function of the marginal productivity of labour, cost associated with urbanisation, and the cost of having an additional amount committed to consumption. This is so because the consumption of worker increases as a result of higher income he enjoys in urban employment.

Little and Mirrlees assign greater importance to savings; therefore revalue future consumption in terms of savings. The rate at which savings are discounted is called as accounting rate of interest (ARI). They suggest that the exact choice of ARI can be avoided and in its place trial rates can be chosen - high, low and medium - to select the clearly good or reject the clearly bad projects.

According to Little and Mirrlees, the social cost-benefit analysis will put a social price on all the inputs and outputs. When these are added up for each year,
year-wise net social profit or loss is derived. When this is discounted by the accounting rate of interest, the present social value (PSV) is obtained.

The Little and Mirrlees methodology is practically the same as that of UNIDO (1972). See, for example Dasgupta (1972), Lal (1974), Little and Mirrlees (1974). To quote Little and Mirrlees, "there is no doubt that the two works adopt basically the same approach to project evaluation. Both treatments single out the values of foreign exchange, savings, and unskilled labour, as a crucial source of a distorted price mechanism. Both go on to calculate accounting prices which will correct these distortions, and both carry out these corrections in an essentially similar manner. Both advocate DCF analysis, and use PSVs. The treatment of externalities and risk seem to be very much the same. Finally, both works advocate making explicit allowance for inequality" (1974, p. 362). The differences of detail between the two approaches have been pointed out by Little and Mirrlees themselves (1974, pp.358-366).

Lal (1973, 1974) has pointed out that the theoretical basis of cost-benefit analysis is of welfare economics; hence, most of the methodologies for cost-benefit analysis are alike. All of them attempt to estimate and use a set of shadow prices corresponding to the second best welfare optimum. This is done where markets are not fully competitive and neutral fiscal devices can not eliminate the
divergence between marginal social cost and marginal social values to achieve full Pareto optimum. It is in the estimation of these shadow prices that simplifying assumptions have to be made and that is where these procedures differ.

2.3 OTHER METHODOLOGIES


Balassa (1965) provides the concept of effective rate of protection. It is expressed as the percentage by which value added at world prices exceeds the value added at domestic prices. A project with effective rate of protection (ERP) 1 is acceptable on this criteria. It judges the international competitiveness of the project.

Corden (1966) also recommends the effective rate of protection. It differs with Balassa's (1965) concept in that it adds the value of non-traded inputs both to the numerator and denominator of Balassa's ratio.

Bruno (1967) has developed a concept of domestic resource cost (DRC). DRC seeks to measure comparative advantage in a trading world; thus, helps identify industries/sectors for which policies of import substitution and export promotion are desirable. The output is expressed
in terms of foreign exchange. DRC is the ratio of domestic resource employed by a project in terms of domestic currency to the foreign exchange earned/saved in terms of say dollars. The lower the DRC the higher is the capability of a project to earn net foreign exchange.

Balassa and Schydowsky (1968) observe that domestic resource cost and effective rate of protection would serve identical purpose. Accordingly, the DRC is equal to unity plus a weighted average of effective rates of protection. The weights are contribution of direct and indirect value added to output produced under free trade conditions.

Bruno (1972) recognised that the measurement of ex-post cost of protection by means of Cordon's EPR approach or by DRC approach should amount to the same thing. He also highlighted the ex-ante normative interpretation of DRC as a comparatively advantageous investment criterion.

The method developed by Prou and Chervel (1974) is called as effects method. It identifies costs and benefits for the various agents in the economy by taking into account the forward and backward linkages of each investment decision. The total value-added is used as a criterion for making investment decision. Chervel (1974) applied the effects method to tyre-manufacture, industrial floor mill and citrus juice projects. He observed that for import substitution project, it is necessary to determine
accurately the c.i.f. price of equivalent product. The technical modernisation projects are desirable only if they lead to a better use of raw material or permit exploitation of by-products. A detailed study of the alternative situation for the export project also appears necessary.

Balassa (1976) critically evaluated the effects method of Prou and Chervel (1974). His main criticism was concerning the valuing of primary factors at their market price rather than at their shadow prices. He observed that when primary factors and tradeable inputs are valued at shadow prices, effects method and domestic resource cost methods will be identical.

Chervel (1977) replied that the essential difference between the effects method and conventional approaches (Balassa 1976) lies not in the shadow pricing of primary factors and tradeables but in the manner in which the problem of project selection is formulated. He observed that Balassa's (1976) methodology is based on neo-classical general equilibrium and optimality theory which is under strong challenge.

Balassa (1977) argued that there is no difference between effects method and conventional cost-benefit analysis. The projects are evaluated in the second-best framework both in the conventional cost-benefit analysis and effects method.

Several attempts have been made to simplify and
modify the UNIDO and Little and Mirrlees approaches with a view to enhance their practical application. One such prominent work is done by Squire and Vander Tak (1975). This has been adopted by the World Bank. They suggest a two-step procedure to arrive at shadow prices. First, on the basis of resource allocation consideration, efficiency prices are derived. Then income distribution considerations are introduced to arrive at shadow prices.

Sau (1971a) proposes a model of cost-benefit analysis where the distortions in market prices are corrected by a 'synthetic' discount rate. In another paper (1971b), he argues that shadow prices as computed from linear programming models of development planning are far from satisfactory as an instrument of planning.


The determination of shadow prices is crucial to social cost-benefit analysis. Several theoretical contributions have been made towards the theory of determination of shadow prices in addition to the references mentioned above. See, for example, Sen (1966), Bacha and


2.4 APPLICATION OF SOCIAL COST-BENEFIT ANALYSIS IN INDIAN SITUATION

The use of cost-benefit analysis in India started in the sixties on a very limited scale. Raj's (1960) appraisal of Bhakra-Nangal project in North India was one of the first few systematic attempts in this field. The Programme Evaluation Organisation of the Planning Commission used in early sixties the cost-benefit analysis in the case studies of major irrigation projects.

"Wells and Welfare" is an exploratory cost-benefit
study of economics of small scale irrigation in Maharashtra by Lal (1972). The study was intended for testing and improving the methodology of social cost-benefit analysis as outlined in the OECD Manual (1968). A re-appraisal of the Purna Irrigation Project in Maharashtra is another study done by Lal along with Paul Duane (1974).

Chopra (1972) made an evaluation of investment in irrigation undertaken in Bhakra Nangal Project. Both the regional effect and the aggregate effect of the investment have been studied on the basis of three different estimates of expenditure on the irrigation side of the project. The shadow price of labour has been taken as 0.87, 0.78 and 0.76 of market wages. The shadow price of foreign exchange has been taken as 1.57 and 2.00 of an official exchange rate. The social rate of discount has been taken as 0.05, 0.09, 0.10, 0.11, 0.13, 0.15. The rate of return to investment in general has been taken as 0.15. The rate of reinvestment assumed the value of 0.20. In all the cases, the regional effect has substantial positive values while the aggregate effect has negative values. She concluded that within the analytical framework, investment in irrigation aspect of the Bhakra-Nangal itself would have led to an increase in the divergence between income levels of the region and of the economy.

Beyer (1972) formulated an economic framework for project appraisal in India. He estimated the values of
national parameters associated with the UNIDO approach. The opportunity cost of capital was estimated to be between 12 to 15 per cent. The social rate of discount was estimated to be between 7.6 to 10.3 per cent. The value of accounting price of investment was between 1.4 to 2.1 (when opportunity cost of capital = 0.15, social rate of discount = 0.10 and varying rate of re-investment between 0.2 to 0.3). Regarding estimation of the accounting price of foreign exchange, he observed that the ratio of accounting price to nominal price was in the range of 1.3 to 1.6 in India. He estimated the ratio of accounting wage rate to market wage rate for female labour as 0.65 and for male labour as 0.43 in case of Ratnagiri Fisheries Project in Maharashtra.

ICICI and the World Bank (1975) carried out a study of economic cost-benefit calculations of 42 projects from ICICI's portfolio, during June 1972 and August 1973. They followed the 'partial' Little and Mirrlees methodology. Before that Little and Mirrlees methodology was not a part of ICICI's project appraisal strategy. They have done best estimate calculations of economic and market rates and sensitivity analysis, all with respect to the assumptions regarding the shadow wage rate, the international price of output, project life and valuation of non-tradeables. They also computed domestic resource costs and effective rates of protection of sample projects.

The standard conversion factor (SCF) for valuation
of non-tradeable has been taken as being equal to $1 + q (1.5)$, where $q$ is the average nominal tariff on traded goods. The sensitivity of economic rate of return to SCF revealed that the returns were not very sensitive to the two other values of SCF, namely, 1.2 and 1.8 for most of the sample projects. They derived shadow wage rate from the following formula:

$$\text{SWR} = \frac{(c - m - a)}{1.5}$$

where $c$ is the industrial wage rate, $m$ is the marginal product of an average worker in rural areas and $a$ is the average saving rate out of wages. SWR was found to be 0.57 of the actual wage rate. They performed sensitivity for two alternative values of SWR, i.e. 1 and 0. It was observed that in as many as 39 out of 42 projects, the economic rate of return changed by more than 10% as a result of changing the value of SWR. This indicated that labour component in many of the sample projects is significant. A proportionate change in international price was found to be more than the proportionate change in the rate of return for all except two projects. They regarded economic quality of ICICI's portfolio as highly satisfactory.

They observed that ERP criterion is more restrictive than the Little and Mirrlees' as far as their sample is concerned. They found rank correlation between adjusted DRC and economic rate of return to be 0.70.

Mishra and Beyer (1976) applied social cost-benefit analysis criteria in the evaluation of
Ratnagiri Fisheries Project of the Maharashtra Government. They have used accounting price of foreign exchange as 40%, an accounting wage rate for unskilled labour as 0.80 of market wage rate, and social rate of discount as 10%. They observed that at market prices, the internal rate of project returns comes out to be 17%. Together with accounting wage rate and foreign exchange premium it comes out to be 26%.

Accounting price of investment was excluded from the analysis on the ground that no estimates were available with respect to saving propensities of the project beneficiaries. They also incorporated the objective of regional and income distribution into the analysis. For this purpose they attached a weight which is higher by 10% to the additional consumption benefits of Ratnagiri on the plea that Government of India provides a subsidy of 10% on all industrial projects located in a backward district.

Gandhe (1980) observed that Little and Mirrlees technique provides a suitable basis for micro-level planning and is fully justified in the Indian context. He applied the technique to appraise the Sugar Production and Refining Project in Goa. He stressed the need for developing the basic national parameters by the Central Office of Project Evaluation.

Murty (1980) explores problems related to the evaluation of income distributional effects of public investment projects. Relying on a method developed by M.F.G.
Scott (1976), he has highlighted a method of extracting governmental preferences regarding income distribution from the economic plans and programmes of the Indian government. His results show that social value of a rupee of benefits to Bihar is almost three times that of Punjab where the per capita income of the richest state (Punjab) is nearly 2.5 times that of poorest state (Bihar). In the context of personal income distribution too, he observed that around 46% of the Indian population is below the poverty line and social value of a rupee of benefits of public investment to the rural people living below the poverty line income of Rs.61 per month is Rs. 1.55.

He has admitted the difference between his estimates and those of Deepak Lal (1972) which is because of analytical difference. Murty attempts to estimate income distributional weights from governmental behaviour whereas Deepak Lal's estimates are based on observed data about consumer's behaviour and estimate of distribution of personal income in India.

Jain (1981) made an estimate of social prices for India based on Little and Mirrlees approach for traded and non-traded commodities, wage rates for rural and industrial labour, and consumption conversion factors. He has taken social rate of interest, consumption rate of interest, elasticity of social marginal utility of income, and current premium on savings to be 0.11, 0.087, 3 and 1.7
respectively. He has discussed the appraisal of six public sector projects and a feasibility report of a private sector project with a view to illustrate various aspects of project planning and appraisal.

ICAI (1981) made a study of the social cost-benefit analysis of a steel-complex project in public sector and Calcutta's underground railway project. It took foreign exchange premium as 25% and shadow wage rate of unskilled labour as 60% of actual money wages to be paid. Taxes, subsidies, duties have been excluded on the ground of transfer payments. They charged only 40% of the estimated cost of township to the project for social cost-benefit analysis. The social return on steel complex project was computed at 16.6%.

Sinha and Bhatia (1982) carried out social cost-benefit analysis of Auranga Reservoir Project planned for irrigation and industrial water supply to the drought-prone district of Palamau in Chhotanagpur region of Bihar. This analysis was based on valuation of cost and benefits at (a) market prices, and (b) shadow prices. Benefits were estimated under "Without and With" project concept and streams of benefits and costs were discounted over 52 years. The period was assumed to be the economic life of the project. The national and regional parameters e.g. social rate of discount, foreign exchange premium, shadow price of investment, the weighted average of shadow
wage rate to market wage rate of unskilled and semi-skilled labour, and weight on redistribution benefits to small farmers were taken as 10%, 25%, 1.5, 0.600, 0.683, and 0.20.

The social cost-benefit analysis has been carried out on the basis of following three assumptions: (i) The benefits and costs are calculated at shadow prices, without making adjustment for project's impact on savings and investments; (ii) when adjustment is made for project's impact on savings and investment; and (iii) when premium is given for benefits flowing to small farmers. The study has revealed the benefit-cost ratios under the three assumptions, which came to 3.29, 2.33 and 2.51 respectively. Sensitivity tests were also performed with respect to national and regional parameters.

Dasgupta and Murty (1983) made an economic evaluation of alternative technologies for reducing water pollution in the paper and pulp industry in India. For this purpose social rate of discount has been taken as 0.8, 0.10, and 0.12. The rate of return on investment and the proportion of return available for reinvestment in the economy has been estimated at 0.15 and 0.25 respectively. The social opportunity cost of labour, power and fuel, and foreign exchange have been taken as 0.8, 1.373 and 1.60 of their respective market price. The opportunity cost of land has been estimated using farm accounts data for Punjab. The social return on land was estimated at Rs. 823.23 for a
tractor operated farm and Rs. 851.44 for a bullock operated farm.

The study has revealed that the choice between big and small paper mills has implications for environment pollution. Estimates of cost of reducing water pollution have shown that the comparative capital and operation cost per tonne of paper for small paper mill was more than the double for a big mill.

Singh (1983) attempted to investigate into private, commercial, and social profitability of public investment in the Western Gandak Canal Irrigation system which lies in the eastern region of Uttar Pradesh. He assessed the commercial benefits and costs over the expected economic life of the project (42 years). He assessed the social profitability of the project based upon accounting prices of labour and fertilizer inputs. His comparison with commercial evaluation case shows that the adjustment for accounting prices of unskilled labour makes a tremendous improvement in the social profitability of project. There is, however, a pull back due to accounting price of investment when marginal propensity to save of the farmers and unskilled labourers in the project region is taken to be 0.29 and for the government as unity. With the accounting price of investment as 1.5, the net present value and internal rate of return of the project become sensitive to marginal propensity to save. He observed that even at the
smallest value of income-distribution weight, the social value of a unit of region income is more than twice its nominal value.

Chopra (1987) evaluated social forestry projects with explicit distribution, management and design considerations built into the analysis. This approach eliminates the need for giving weights to the parts of output accruing to different sections of society. Attention is focused on the evolution of institutions which ensure that project output/input shall accrue to different social groups. For the specific project analysed, rates of return to project authority and to society are calculated. She found that a divergence of interest may exist between the two. This can be minimized by correct selection of design and a system of cost sharing based on people's participation.

Several theoretical and opinionistic observations have been made regarding application of social cost-benefit analysis in Indian context. There is general agreement on need for using social cost-benefit analysis in project appraisal in India with certain modifications. Some of these are mentioned below.

Acharya (1972) examined the influence of pricing of project output on the evaluation of a public monopoly project. He showed how re-investment benefits, surplus labour, foreign exchange constraints, and redistribution...
objective could be brought into analysis.

Lai (1972) has worked out the inter-regional and intra-regional distribution weights for India. His estimates were based on social utility function with constant elasticity of marginal utility of income which was estimated from consumption expenditure data.

Jalan (1973) doubted the relevance of Little and Mirrlees (1968) methodology of project appraisal to developing countries, especially India. He observed that the rationality of a policy cannot be judged independently of a country's development objectives. Further, the valuation of governmental savings in the Little and Mirrlees' method is in terms of world prices, which suffers from a practical disadvantage as an instrument for raising the level of domestic savings.

Ranganathan (1976) pointed out that social cost benefit analysis will provide a framework for explicitly incorporating the development objectives in its evaluation procedure. However, at present these can only be identified and brought into the cognition of the policy maker. This is done merely by providing qualitative description of how the project will contribute to the achievement of these objectives.

Lal (1977) derived distributional weights to evaluate inter-personal consumption changes in terms of their savings equivalent social value. He derived current
saving equivalent weights for weighing the inter-temporal consumption effects of projects. He derived national parameters as approximation from a long-run optimal growth model for the Indian economy. The estimated values of national parameters, such as accounting rate of interest, ratio of social to market industrial wage, the base line consumption level at 1970-71 accounting price at which consumption accruals are considered socially as valuable as the numeraire savings expressed in foreign exchange, premium on savings and consumption rate of interest were 10.75%, 0.62, 262.28, 2.78 and 6.7% respectively.

Kohli (1978) developed a system design for providing information required for social cost-benefit analysis. He observed that simplifying assumptions are needed in both the UNIDO and Little and Mirrlees methodologies. He opined that both the methodologies are similar excepting the difference due to distributional considerations and the choice problems among the multitudes of substitute possibilities.

Venu (1980a) discussed Mishan's approach to consumer surplus and its areas of applications. He found it relevant in many areas of cost-benefit analysis.

Venu (1980b) observed that the gross national product should continue to be the main measure of 'welfare' supplemented by micro-cost-benefit analysis studies.

Rajaraman (1982) examined some estimation problems
which arise in a world of less than total tradability. She suggested alterations in the procedures based on Little and Mirrlees methodology. The iterative resolution of mutual interdependence between accounting prices of goods and weights classes must be started with an initial round of estimates that are given independently and at all stages made explicit. She suggested that such a start may be obtained through valuation of weights required for estimating accounting price for non-tradeable goods at domestic market prices. She examined the procedure used by Lal and could not recommend the use of these prices for project appraisal.

Lal (1982) in response to criticism of his estimates of social prices for India by Rajaraman (1982) observed that most of her criticisms are based on a misunderstanding of the procedure adopted.

Krishna (1982) observed that the Third World countries have now realised that their long-term development plans cannot succeed unless they ensure systematic project planning. They all have made a beginning in (a) evolving a system suitable to their needs; (b) strengthening their divisions and departments concerned with project planning and providing requisite training in this discipline; (c) improving the data/information base; and (d) integrating project appraisal into the sectoral planning and capital budgeting systems. Regarding the applicability of social
cost-benefit analysis to investment decisions a majority of the countries are found unprepared which is indicated in their vague planning objectives. As regards border prices, the main difficulty relates to the availability of long-term forecasts. Further, there is often absence of clear long term policy and strategy for the development, in particular, of the sector to which the project belongs, and planning in general.

Krishna (1983) critically examined the procedures and methods of national and project planning in India since 1951. She described process of project planning, identification, formulation and appraisal within the framework of a national plan. She observed that the guidelines for preparing feasibility reports for industrial projects (1975) have improved their quality. Due to time, staff and information constraints a meaningful social cost-benefit analysis has not been done.

Chowdhury (1984) suggested performance evaluation indicators along with weightage of public enterprises to them. These along with their respective weightage are, (i) growth rate of value added (30), (ii) growth rate of gross profit (30), (iii) ancilliarisation (10), (iv) import substitution and export promotion (15), (v) employment generation (5), (vi) income redistribution (5), and (vii) regional development (5).

Singh (1986) examined the project planning and
appraisal system and project dynamics of the Punjab State Industrial Development Corporation (PSIDC). He observed that the social cost-benefit analysis recommended in UNIDO Guidelines and OECD Manual may not be applicable in India instead organizations like PSIDC should follow the methodology suggested by UNIDO-IDCAS (1980). He used this approach in evaluating 45 projects of PSIDC. He pointed out that a significant aspect of project dynamics has been changing in cost estimates over time, due to delay in implementation, and change in project profile. There is a direct positive relationship between the quality of planning and appraisal and efficiency of implementation of projects.

Narain (1989) emphasised the need for sectoral planning and complete projectisation exercise so as to appraise the projects of same nature/sector/undertaking simultaneously competing for scarce resources and linked projects. He regarded techno-economic parameters as more crucial to appraisal methodology.

2.5 GENERAL LITERATURE ON PROJECT MANAGEMENT

Several academicians and management experts have studied different aspects of management of industrial projects including planning, appraisal, implementation, monitoring, control and evaluation. In view of the operational interdependencies of the different aspects of project management, it will be of interest to review the general literature on project management in India with a
view to put the present study in proper perspective.

Dave and Bhat (1971) stressed the use of domestic cost of foreign exchange as a criterion for project evaluation in addition to internal rate of return criterion.

Murthy (1978) observed that Industrial Development Corporations (IDCs) in almost all the states are expected to adopt some rational criteria for identifying projects to be taken up in joint sector. But, in practice, all the IDCs were following 'imitative' policy in applying for and getting industrial licences. Financial constraints like the budgetary allocations, limited re-finance facility, high cost of funds, overruns, additional working capital requirements and poor recovery strain the financial resources of IDCs and their promotional role. Further, due to lack of staff, monitoring and follow-up of projects, rehabilitation of units appears to be neglected. He stressed the need for sharing the project reports amongst IDCs in order to overcome the limitation of expertise.

Nayak (1978) cautioned that formulation of a composite application incorporating industrial licence, foreign collaboration and related import of capital goods necessitated considerable amount of project planning. He observed that low rate of implementation in some states was due to poor project planning. He emphasised the need for having a mix of projects at the IDCs level. Pointing out the danger of putting too much money into any project or
industry with long gestation period or into project exclusively in the small, medium or large sectors, he observed that a mix would help IDCs to withstand the vicissitudes of industrial environment.

Gupta (1978) emphasised the need for post-sanction appraisals to improve the quality of operations of development bank in the country. A series of post-sanction appraisals for a number of projects help in decision-making at the pre-sanction stage or in policy formulation. A major objective of the post-sanction appraisal, therefore, is to analyse the variance of expected and actual achievements of individual projects and to learn about the decision taken by a development bank in the past. If pre-sanction appraisal is a tool to implement the national policies, post-sanction-appraisal provides feedback to constantly review those policies besides pin-pointing the areas where performance needs to be improved.

Bhattacharjee (1980) discussed the role of formulating criteria for evaluation. He observed that the formulation of hypothesis should be specific and clear and criteria of evaluation be derived from these. The end product of any evaluation is correct judgement in regard to the problems in implementation and in suggesting remedial measures.

Dar (1980) gives an overview of the approach to evaluation. Evaluation can be described as a stock-taking
exercise based on application of standards of rationality in the performance of visualised tasks. It has to be selective since time and resources are limited.

Puttaswamaiah (1980) thought evaluation to be an essential aid to policy. He discussed the objectives, scope and methods of conducting such an evaluation. According to him evaluation should be based on implementation of programme, the techniques of enquiry and analysis adopted.

Tewari (1980) gives a broad spectrum of the type of problems a project analyst has to face in project appraisal while trying to quantify and measure benefits in transport and education sector. He observed that data base and time factor determine the level of sophistication which can be introduced in appraisal exercise.

Chitale (1981) made an attempt to evaluate the impact of sharp escalations in investment costs since the mid-sixties on the viability of over 200 industrial projects. These projects had either gone into commercial production or were under implementation in seventies. He observed that industrial projects have lost their viability under the impact of sharp escalations in investment costs. Low capacity utilisation rates persisting over years in a number of major industries are not likely to exert upward leverage on investment.

A study by Tripathy (1982) reveals that only 5 of the 49 public sector projects, each costing over Rs. 20
crore and expected to be commissioned during 1974-79, were completed on time. Only two were completed within the project cost. The average time delay was around three years and the average cost overrun was around 100%.

Kharbanda (1983) provides data on cost and time overruns in the case of 15 fertiliser projects. On an average the actual completion time was about 7 years - 1.9 times the scheduled duration of 3.7 years - and actual costs were 2.4 times the planned costs. The cost overrun per month of delay was Rs. 2.1 crore.

Mohsin (1983) attempted to appraise the existing system of financial planning and control in public and private sector units in India to assess their suitability in changing socio-economic environment. He advocated the use of cost of capital approach in project evaluation.

ICAI (1983) made a study to ascertain the criteria adopted by national and state financial institutions to determine the suitability—financial, technical, marketing and managerial—of projects. It studied the norms for providing finance, and the procedure followed in processing, evaluation, sanction and monitoring of projects. It observed that the gestation period generally prolongs; thus, necessitating project sensitivity studies and risk analysis.

Choudhury (1981) examined the human behaviour aspect of project execution and recommended a real time system to be introduced for better control.
Kuchhal (1984a) studied 46 projects of IFCI, IDBI and ICICI. They were drawn from a group of 12 industries to analyse the factors responsible for the success and sickness of new projects. Of the 46 units studied, 54% units were successful and 46%, unsuccessful. He observed that projects in the three industry groups of hotels, sheet glass and automobile tyres accounted for a large proportion of total cost overruns. He attributed the cost overrun to backward area location, large size of project, long implementation period and inflation. He took contingency provision to be 10% of the non-confirmed cost of assets. The study revealed that the project appraisal system of financial institutions has improved over time, but monitoring system varied from case to case. The use of Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM) and Strengths, Weaknesses, Opportunities and Threat (SWOT) analysis by the promoters while preparing a project report was recommended.

Kuchhal (1984b) has analysed the problems in the promotion and financing of new industrial projects in India. The sample included 12 units from chemical, textile, paper, cement, electrical and automobile industries located in western, southern and northern parts of the country. The amount of investment ranged from Rs.1 crore to Rs.30 crores, and the period covered was from early sixties to late seventies. He observed that companies as promoters are more successful but this leads to concentration of economic
power. According to him promoters indulged in malpractices which forced the unit to become sick. He pointed out that there is no system to evaluate the potentialities of a promoter. The weak monitoring system at the implementation stage, use of short-term sources of finance for meeting project cost overruns and lack of coordination between commercial banks and development banks were the other causes of sickness of newly promoted units.

Rao and Mehta (1984) observed that nearly 76% of the projects assisted by IDBI from 1964-65 to 1979-80 had incurred cost overruns. The average overrun for all the projects was 23% of the initial project cost which was much higher at 30% for projects where cost overruns had occurred. The average delay in implementation was of ten months. The delay was longer in backward areas whereas cost overrun was higher in non-backward areas. Projects promoted by the MRTP companies had less overruns both in time and cost as compared to projects promoted by the non-MRTP companies. High construction costs, high cost of indigenous machinery, import and custom duties were the most important causes of cost overrun. Delays in delivery of machinery, completing financing arrangements etc. were by far the most important reasons for time overrun.

Yadav (1986) made an attempt to systematically analyse the role of financial ratios and to develop a multi-ratio model performing the best overall job in the
prediction of corporate failure or sickness. He empirically tested thirty six financial ratios both univariately and multi-variately on a sample of 78 companies (39 failed and 39 non-failed companies). He found that financial ratios taken individually can predict corporate failure or sickness. But not all the ratios predict equally well. He developed multi-ratio discriminant model containing four independent ratios, viz. earnings before interest and taxes to total tangible assets, current assets to current liabilities, net sales to total tangible assets, and defensive assets to total operating expenditure. He verified that the model is accurate in predicting corporate failure in both homogenous and heterogeneous group of industries though with decreasing probability.

Korgaonkar (1987) analysed and reviewed the Indian experience of time and cost overruns. He noted major shortcomings that have become a rule rather than an exception in project management. But better project management requires strengthening project management capabilities at all stages of project life cycle. He considered two such project experiences - the Kudremukh Iron Ore Project and the Adilabad project of the Cement Corporation of India.