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NOTES ON

PLANNING, FORMULATION AND EVALUATION OF BUSINESS PROJECTS

Prepared By:

Vishwesh Shashikant Dange

Assistant Professor

KKW College of ABM, Nashik

PROJECT

Project is an investment activity where we spend capital resources to create a productive asset for realizing benefits over time. Generally "Project is an activity on which we spend money in expectation of returns, which lends itself to planning, financing and implementation as a unit. It also refers to specific activity, with specific starting point and specific end point to achieve a specific objective. It should be measurable in costs and returns. It must have priorities for area development and reach specific clientele group." In sum, the meaning of project may be comprehended as follows.

"It is an investment activity meant for providing the returns for specific clientele group for specific activity, specific objective and specific area development. It should facilitate analysis in planning, financing, implementation, monitoring, controlling and evaluation."

BASIC CONCEPTS OF PROJECT PLANNING

An agricultural project is defined as an investment activity where financial resources are expended to create the capital assets with an anticipation of benefits over time. In other words, it is an activity where money is spent to realise the expected returns and requires planning, financing and implementation as a unit. In fact, the whole complex of activities using resources to gain benefits constitutes the agricultural project. The agricultural project may include projects such as irrigation, dairy, poultry, piggery, rural credit, social forestry, land reclamation/levelling, rural development projects, etc. Moreover, the dividing line between an "investment" and “production" expenditure is an agricultural project. For instance, the fertilizers, pesticides, seeds, etc. that are used up in a single crop season constitute production expenses while an irrigation dam, tractor, milch and draught animals, etc. are called investments where returns are realised over the service period of asset. Likewise, the plantation of fruit crops though constitute an investment yet the paddy transplanting as production expense, i.e., the difference exists in time span to grow plants.

AGRICULTURAL PROJECTS - EVALUATION

The technique of evaluation of projects be it in industry or agriculture, throws light on the capacity of the different projects to offer returns on investments. In order to evaluate the projects, one has to be kept informed about the various concepts and techniques of capital investment among alternative prospects. These aspects are presented in this Chapter.

AGRICULTURAL PROJECTS MEANING, DEFINITION AND CONCEPTS

Projects are the cutting edges of development. They are meant for increasing the output from the given resources Evaluation of projects needs projecting the future trend of output, sales, expected costs, returns, flow of funds, etc. The World Bank has recognised six important aspects in the project preparation. They are technical, administrative, organisational, commercial, financial and economic aspects. All the technological aspects of the project must be thoroughly studied under technical analysis. Goods and services required for the project execution need a detailed assessment. The awareness of the lending agency regarding the technology to be used, i.e., capital intensive technology, labour-intensive technology, latest technology or the existing technology is to be assessed. Another important factor is the technical feasibility which determines the size of the

project based on capital requirement, future and present demand for product, cost-benefit aspects, etc. The selected area for the project must be adequate in the resource endowment base and infrastructural facilities. The need for a particular project picks up the priority in the project implementation. Under administrative coverage, managerial aspects, project staff, extension personnel, credit agencies and farmers (beneficiaries) will be studied. Organisational aspects deal with relationship of project administration and the Government, training arrangements, disbursement of wages etc. Regarding commercial aspects of the projects, arrangements for the supply of input materials, services needed for UN; project, marketing of output, etc., are to be assessed. Regarding the financial aspects, the items which fall under this category are sources of funds, cost of funds, repayment, etc. The estimated costs based on technical aspects, estimated sales based on commercial analysis and probable profits from the operation of the project are to be properly evaluated. Financial gains accrued as well as incentives offered to the farmers (participants) in the project should also be viewed. On the other hand economic analysis concentrates, in determining project's contribution to the development of the economy as a whole and justifying the use of scarce resources. Proper identification of costs and benefits is an important aspect in the economic analysis of projects.

AN AGRICULTURAL PROJECT POSSESSES THE FOLLOWING CHARACTERISTICS;

1. It is an activity with a specific starting and ending points to accomplish the stated objectives.
2. It has a well-defined time sequence of investment and production activities together with the benefits.
3. The projects normally have a specific geographic location or area of concentration and specific clientele group in the region.
4. A project will have a partially or wholly independent administrative structure and set of accounts, funded through a specifically defined financial package.
5. Most agricultural projects are characterized by the existence of externalities; defined as an uncompensated spill over are side effects which possess two properties; (a) interdependency-one person's behaviour creates a cost or benefit to the other persons; and (b) lack of compensation-the one who creates benefits is not completely rewarded for it, nor is the one who creates cost made to pay for it. An externality is revealed in terms of divergence between the private benefits and the social benefits or between the private cost and the social costs of a project.
6. The products of most of the agricultural projects are characterized as collective goods, also called as the public goods, possess intangible benefits and are subject to greater risk and uncertainty.

Projects provide means or vehicle by which the investment expenditures of national plans can be realised. But sound plans require good projects and vice-versa. However, the sound planning depends on a wide range of information pertaining to existing and potential investments and their likely effects on growth and other national objectives. The project format gives an idea of year-wise costs and project analysis tells about the effects of a proposed investment on the participants, In fact, the project format enables to perform the systematic evaluation of alternatives. Moreover, the quality of project analysis depends on the quality of data and cost-benefit forecasts.

OBJECTIVES OF PROJECT:

Implementation of project consists of two sub phases

1) Pre-Operational Phase

2) Operational Phase

1) Pre-Operational Phase

- Completion of project on time: - Delay in the execution of project, nearly 95% projects taken by public sector could not be completed in time resulted in increase of costs and crosses of revenue.
- Completion of project within contemplated costs: - Administrative tasks include estimating and controlling costs, budgeting cash flow, monitoring, devising and using the management information system help for completion of the project within performed cost.
- Completion of Project at a profit to the Company: - When the unit becomes operational, it operates profitably by promoting optimal utilization of the installed capacity.

2) Operational Phase

- The breakdown of the project final objective into various sub-objectives and these objectives into activities and sub-activities.
- The time schedule for starting and completion of each activity and sub-activity and their sequencing.
- Linking of physical work involved in each activity with financial expenditure.
- The timetable indicating the requirements of financial resources during the pre-implementation phase.
- The monitoring and control system to assess the following, what already has been done, what remains to be done, where are the shortfalls likely to occur and what remedial action is required.

COMPONENTS OF A PROJECT:

1. **Investment:** There is some amount of money which has to be committed at the beginning of the project. This is initial investment.
2. **Gestation Period:** Gestation period is the time period between the investment and the time the project starts yielding returns.
3. **Junk Value:** The value of the unspent assets remaining after the life of the project is referred to as junk value.
4. **Cash Flow:** It is the stream of costs and benefits over a period of time.
5. **Life of the Project:** Every project has a define life period based on the life of the most crucial assets on which investments are made.

TYPES OF AGRICULTURAL PROJECTS

1. **Water Resource Development Projects**

   These projects include irrigation projects, ground water projects, and projects for land reclamation, drainage projects, salinity prevention and flood control. These projects are aimed at bringing about overall agricultural development, by bringing water to the project area, providing drainage and reclaiming soil salinity. Suitability of soil to sustain production over time under irrigation must be carefully examined.

2. **Agricultural Credit Projects**

   These are called "on-lending projects". These projects provide credit to the farmers for farm investment for increasing agricultural production, raising their standard of living and the economy as a whole. These projects need to be defined in terms of farm investment and investment on agro industries and ancillary industries, such as investment programmes on livestock, machinery, etc. The end use of the credit on these investment programmes need to be evaluated to assess the benefits that accrue to the beneficiaries. All the financial institutions, i.e., commercial banks, co-operatives and regional rural banks should act as the "credit houses" in the implementation of all these investment activities.

3. **Agricultural Development Projects**

   These are the projects aimed at improving farm economy of individuals and regional development. Here, diversified cropping systems approaches as well as farming systems approach are followed for bringing about the development of agriculture.

4. **Agro-Industries and Commercial Development Projects**

   Projects of input supply, services to farming, projects concerned with processing, storage, market development, projects for fisheries development, and projects for development of co-operative farms are cited under this category. Having known the meaning and types of projects and their uses, now it is relevant to understand the different constituents of projects, and how different phases or stages in a project begin and complete.

ASPECTS OF PROJECT FORMULATION AND APPRAISAL

Gittinger advocates for six aspects' such as technical, institutional/organizational/managerial, social, commercial, financial and economic, which are to be considered while formulating and appraising the project. These aspects have been discussed below: -

i. **Technical Aspects:** The technical analysis examines the possible technical relationships of a proposed agricultural project. Moreover, the technical appraisal or input-output relationship of a proposed project should be done by the competent technical staff, who possess sound understanding of the proposed project, along with the planning officials. However, it should not be done in hurry. For instance, the technical report of a proposed dairy project should provide information such as availability of dry and green fodders, concentrates and other improved feeds, veterinary hospitals, clean drinking water, land for construction of sheds and as pastures, availability of milk plants or refrigeration facilities and adequate clientele in the region.

Likewise, the technical appraisal of proposed minor irrigation project should contain aspects such as the rate of recharge of underground water, the number of wells to be sunk in the area including existing wells, spacing/location of new wells, depth up to which wells are to be sunk, deep/shallow wells required; suitability of underground water for irrigation purposes, the cropping pattern, season wise discharge of water from the well, etc. A similar type of technical scrutiny can also be had for schemes such as horticultural/plantation crops, land levelling/reclamation, fisheries, poultry farming, sheep and goat farming, agricultural machinery, service units, processing units, etc. The technical analysis may also determine the potential yields in the project area, the coefficients of production, etc. along with the marketing and storage facilities required for the successful operation of the project and the processing systems needed. Moreover, the technical appraisal may also identify the information gaps that must be procured either before project planning or at early stages of implementation.

ii. **Institutional/Organizational/Managerial Aspects:** Once proposed project is technically sound, it should also be looked from the angle of existing institutional/organizational/managerial framework of the project area. In fact, for proper institutional setting of the project, the socio-cultural patterns and institutions of those the project would serve must be .considered. To avoid opposition, the local institutions may also be duly involved right from planning to implementation levels. All concerned agencies/institutions should have an opportunity to comment upon the proposed project and their views may be fully incorporated. Similarly, the proposed project should be in accordance to national objective as well as within the legal framework of the country/region. The organizational structure of the proposed project should clearly examine all gamuts such as strengthening or retrenchment of the existing organizational set-up. Ample provisions for managers and supervisors for getting the up to date information about the progress of the project, special monitoring staff and training arrangements needed may also be looked into. Likewise the authority and responsibility imposed to the staff may also be properly linked. The managerial ability of existing staff may be administered before making huge investments. As far as possible the competent staff may be recruited/deputed or provision should be made for training the inadequately skilled staff. Likewise, the managerial skill of participants/beneficiaries should also be evaluated. In fact, entirely new or technical project also requires the adequate technical know-how at the participant's level otherwise it would have adverse impact on the rate of implementation. Therefore, a provision may also be kept for training the participants/beneficiaries while formulating and implementing an agricultural development project.

iii. **Social and Commercial Aspects:** The existing social structure of clientele group and social implications of the proposed project may also be carefully examined. For instance, as we know that green revolution in developing countries has widened the gap between rich and poor. A proposed "Integrated Rural Development Programme" which generates income and employment as well as leads to an equitable distribution of benefits amongst rural poor may bridge the gap in due course of time. Therefore, the proposed project may turn out to be a socially desirable entity. Similarly, some irrigation development projects have also created diseconomies or adverse effects in the command area." Therefore, an additional project to overcome these problems may turn out to be socially desirable. However, the proposed project must be within the national objectives. A proposed rural development project, besides

employment and income-generating effects, may also consider provisions for improved rural health services, better domestic water supplies, increased educational opportunities for rural women and/or children, etc. Lastly, the project sites may be chosen in such a way that it should have notable scenic value and/or preserving the unique wildlife habitats. The backward and forward linkages of proposed project such as the supply and demand relationships pertaining to produce, the credit requirements for marketing input and output, timely as well as quality supplies of modem inputs to adopt new technology/cropping patterns, an efficient market channel or new marketing channel for supply of these inputs and the procurement of equipment and supplies should also be examined. Moreover, the supplies may be procured not only in time but at fair price and with proper specifications.

iv. **Financial and Economic Aspects:** The financial aspect of project preparation determines the availability of adequate cash to repay the credit otherwise provision is to be made in proposed project to subsidise the low income families. In this context, the year-wise gross receipts and expenses (including associated costs involved in production and credit repayments) should be worked out to determine the returns to family labour and management or capital. Sometimes the "net incremental income" is consumed up by the farm family there by leading to default of loans. Thus, the farm income analysis may permit the assessment of incentives needed for participants of proposed project.

Financial and economic aspects are complementary to each other, the financial aspect deals with individual participants while economic to that of society. Economic aspects of project preparation determine the economic profitability of proposed project. In other words, it helps to the project analysts to evaluate the contributions of project investments so as to justify the use of scarce resources. Thus, techniques of economic analysis identify viable projects, i.e., those significantly contribute towards national income. In general, the economic analysis determines remuneration to labour and other inputs either at market prices or at shadow prices provided that much amount of resource is transferred from its present use to the project.

THERE ARE SOME IMPORTANT DISTINCTIONS BETWEEN THE FINANCIAL AND ECONOMIC ANALYSES OF PROJECT INVESTMENTS. THESE ARE:

(a) The economic analysis treats taxes and subsidies as a transfer payment. In fact, the income generated by a project includes taxes which project shall bear in the production and also sales taxes which buyers would be paying while purchasing the same. These taxes, which form part of the total project benefit, are transferred to the government, which acts on behalf of the society as a whole, and are not treated as costs. But a government subsidy to the project is a cost to the society since it is an expenditure of resources that economy incurs to operate the project. In financial analysis, taxes are usually treated as a cost and subsidies as a return.

(b) In financial analysis, market prices are normally used which takes in to account taxes and subsidies. However, in economic analysis the market prices are adjusted to more accurately reflect the social or economic values. These adjusted prices are called the "shadow" or "accounting" prices.

(c) The interest on capital is never separated and deducted from the gross return in performing economic analysis as it is part of the total return to the capital available to the society as a whole. In financial analysis, the interest paid to external suppliers of capital is deducted to derive the benefit stream available to the owners of capital. But interest imputed or paid to the entity or project is not treated as cost as interest is part of the total return to the equity capital contributed by entity.

POTENTIAL PROBLEM AREAS IN AN AGRICULTURAL PROJECT

The way in which problems occur vary from project to project but they fall into certain well defined problem areas. These may be summarized as follows:

1. **Institutional problems** can arise when authority, responsibility, or working relationships are not fully clarified, with formal and properly applied lines of communication and proper decision-making authority among the project team and the organizational units. For example, difficulties in obtaining land for production ponds for a large number of farmers may be the result of dealing with a wrong organization, poor project management and staffing, procurement difficulties, and poor monitoring and evaluation.

2. **Conceptual problems** arise from inadequacies in project formulation, resulting from insufficient background studies, or errors in them, or inadequacies in the planning work to be performed. For example, the project may be too inflexible, the objectives may be wrong or non-sustainable, project components may be too many or too large, or the schedule may be unrealistic.

3. **Technical problems** arise from unexpected factors discovered during project implementation, or errors in project implementation work. For example, there might be a consistent shortfall in production from fish ponds, due to seasonal water quality changes or poor quality of feed not foreseen in project formulation, or the standard of engineering design and/or construction may have been poor.

4. **Financial problems** arise when procedures and schedules for funds, manpower, supplies, and equipment, etc., necessary for carrying out project activities, have not been adequately organized, or delays in implementation result in additional costs, or project costs have been under-estimated. For example, there may be recurrent budget shortages due to poor delivery scheduling of heavy earth-moving equipment for digging new canals or dredging, or, as a result, underestimated investment or operational costs. Also, financial problems may occur because of a change in price for the product as a result of competition or other market factors.

5. **Social problems** result from inadequacies in the analysis of social aspects of the project in formulation work, or from changes in social balances/organization during project implementation. Problems may be manifested by, for example, a slow adoption of project techniques by the target group which may find fish farming unattractive or difficult, or there may be an inequitable distribution of benefits as some farms are naturally more productive than others.

6. **Political problems** result from changes in national policy or government, or sudden unexpected political events. Insufficient government commitment may result. For example, there may be a change in government to one which is opposed to financial incentives for farmers and all subsidies and grants are cancelled, or a project may be disrupted as a result of internal strife.

7. **Environmental problems** often arise and affect the project, and/or the project itself may cause environmental damage which is unacceptable. In the former case these may arise either from project-related or external natural factors unforeseen during project formulation, or from other projects which did not exist or were not planned at the time of project formulation. For example, there may be sudden water pollution from new industrial projects nearby, or competition for the same water resources by urban development; there may be a general degradation of resources, or a natural disaster, such as earthquake or hurricane/typhoon. In the second case, examples may be the heavy discharge of nutrients from the system causing algal blooms dangerous to a nearby oyster fishery, or scouring may be destroying more mangroves than initially foreseen and accepted.

8. **Other problems** may occur which may be related to the management and operation of the project itself. These may include the human factor, where, for example, the personality of one member of management team causes minor difficulties to be exacerbated; or there may be a "force majeure".

While it is the concern of the project formulation team to design the project to minimize all these potential problems or risks, so equally the project management must anticipate them as far as possible and minimize their impact when they occur.

It will be apparent from this list of potential problem areas in project implementation that many problems which arise can be foreseen at the time of project design. Satisfactory project implementation, therefore, is dependent on sound project formulation.

PHASES IN PROJECT CYCLE

The important phases in project cycle are:

1) Conception or Identification,
2) Formulation or Preparation of the project,
3) Appraisal or Analysis,
4) Implementation,
5) Monitoring, and
6) Evaluation.

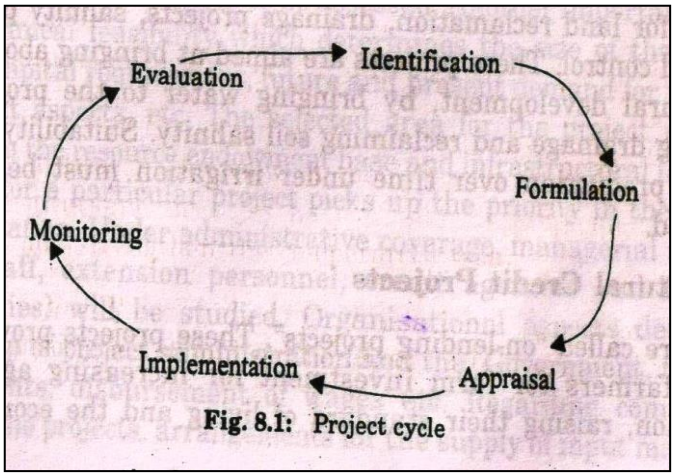


Fig. 8.1: Project cycle

A natural sequence in which the projects are planned and carried out is called as the "project cycle." Gittinger" divides a project cycle into identification, preparation and analysis, appraisal, implementation and evaluation by adapting the sequence listed by Baum (1978). All these aspects are discussed below.

I. **Conception or Identification.** The technical specialists together with local leaders can identify the potential projects for an area. In fact, the technical specialist may identify areas where new investments may be profitable and he can incorporate the suggestions of local leaders. Alternatively, the old projects may be revitalised. The national objectives of developing countries may, however, provide the broad guideline to identify the viable projects. An international agency or such other organization may also conduct surveys to identify the viable projects of mutual interest. For instance, the Ford Foundation Team visited India and identified various pockets where investments were to be made to intensify agricultural production so as to achieve the "Food Self Sufficiency." Consequently, the Government of India started "Intensive Agricultural District Programme" in a few selected districts. The International Bank for Reconstruction and Development also identifies various potential areas for investments in developing countries. The Training and Visit System, an innovation to traditional extension system, and several other projects have been stared in India through World Bank assistance that are of mutual interest within a country, various organizations also identify potential areas for their investments. The National Bank for Agriculture and Rural Development serves an example to identify the potential projects and also refinances them. Moreover, the funding agencies may not permit the implementation of such projects which have in sufficient details. Project is considered as a cycle because, each phase not only grows out of the preceding one, but leads into the subsequent phase and it is a self-renewing cycle, so that new projects come out of the old ones in a continuous manner.

In agricultural projects, costs are easier to identify than benefits because the expenditure pattern is easily visualized.

The various types of costs involved in the project are:

i. **Project Costs:** These include the value of the resources in maintaining and operating the projects.
ii. **Associated Costs:** Costs that are incurred to produce immediate products and services of the projects for use or sale.
iii. **Primary costs or Direct costs:** These include costs incurred in construction, maintenance and execution of the projects.
iv. **Indirect costs or Secondary costs:** Value of goods and services incurred in providing indirect benefits from the projects such as houses, schools, hospitals, etc.
v. **Real costs and nominal costs:** Costs at current market prices are nominal costs, whereas if costs are deflated by general price index, these are termed as real costs.
vi. **Social costs:** These are technological externalities and technological spill-over accrued to the society due to presence of projects, i.e., pollution problems, health hazards, salinity conditions, etc.

Next to identifying the costs, the estimation of benefits is imperative to ascertain the impact of the project. This is generally done by taking into account two situations, i.e., 'with' and 'without' the projects. The difference is the net additional benefit arising out of the project.

Benefits are split into two: tangible and intangible benefits.

Tangible benefits: Incremental income due to the existence of projects is obtained from the following changes.

i. Improvement in cropping pattern involving high value crops
ii. An increase in the productivity of crops.
iii. Adoption of recommended package of practices.
iv. Increase in the intensity of cropping.
v. Reduction in the cost of cultivation of crops, and
vi. Large scale economies due to specialisation.

Intangible Benefits: These include better income distribution, national integration, better standard of living, etc.

In identification phase, it is also important to see whether the project is implemented in high priority areas, and whether on *prima-facie* grounds the project is economically feasible. It is also imperative to identify problems and objectives of the projects and whether the Government gives sanction for the project implementation or not.

The important stages in the process of identification are:

i) Preliminary study,
ii) Pre-feasibility study, and
iii) Project report.

In these stages we assess whether the project proposed on the grounds of prima-facie is feasible and the objectives of the project are achieved. On this ground, the preliminary study should embody the investment proposals, benefits extended from the projects and method of implementation. Assessment of the demand for the project's products, technical feasibility of the project, import and export requirements, marketing aspects, investment prospects, etc., should be exhaustively covered by the feasibility studies, including the analysis of sensitivity.

SOME OF THE SOURCES THROUGH WHICH THE PROJECTS ARE IDENTIFIED ARE:

i. Agricultural and allied programmes proposed in the plans of the country as well as States;
ii. Areas identified as potential of further development through Governmental surveys;
iii. Special developmental programmes like IRDP;
iv. Irrigation projects which offer scope for development through forward and backward linkages; and
v. New projects emerging out of existing projects, etc.

II. Formulation or Preparation: A careful review or appraisal of proposed project is must so as to determine its soundness before implementation. In fact, the ex-ante appraisal or feasibility study is to be done to get enough information before advanced planning is made. To achieve the potential benefits, it is quite possible to re specify the project objectives in accordance to the physical and social environment. Moreover, the detailed planning may even lead the involvement

of both time and money. But the complexities of proposed project would determine the staff required for conducting feasibility studies and better results are expected when outside consultant is deputed. The detailed planning should, however, only start once feasibility study recommends the proposed project. A detailed planning often takes time, i.e., a year or two or even longer for the complex agricultural projects. In fact, the hastily prepared and superficially analysed projects are bound to give poor returns, fall behind schedule and consequently the scarce resources may go waste. Therefore, to avoid delays and conserve resources sound planning is must. Again the project can be prepared by a special team for the purpose with sufficient time and resources or by a consultancy agency. However, the proposed projects should have a provision for concurrent evaluation, more preferably to be done by other than implementing agency.

III. **Appraisal or Analysis:** A critical review or independent appraisal has to be done once project is prepared. In fact, it provides an opportunity to re-examine the project proposal before huge investments are made. The appraisal team may even suggest some additional information to be collected or project may be rejected, if serious flaw exists. The investment should only proceed, once appraisal team recommends the project. Furthermore, for the projects to be financed by World Bank, a separate mission is routinely sent to appraise the proposed projects.

IV. **Implementation:** The most important part of project cycle is implementation. Two aspects should be kept in mind before implementing any project. Firstly, a better and more realistic project can be easily carried out and expected benefits are also realized. It emphasizes again for a careful attention to each aspect of project planning and analysis. Secondly, project implementation must be flexible. Thus, project managers may have to intelligently handle the changing circumstances. Technological and price uncertainties do exist as project progresses. Similarly, project's economic or political environment may also change once implemented. Even project operator may like to reshape/replan the project in mid-way itself, either partly or wholly. Hence, implementation is a process of refinements through experience.

    The project analyst usually divides implementation phase into three time periods. Firstly, investment period, i.e., 3-5 years from the start of an agricultural project, during which major project investments are undertaken. In case, project is financed through an external financing agency, the investment period coincides to the agency's period for loan disbursements. Secondly, the development period, i.e., additional 3 to 5 years or more for projects with longer gestation period, in which the production builds up, and thirdly, the development period, in which the farmer's rate of adoption about new techniques can be known.

V. **Monitoring:** Monitoring is the timely collection and analysis of data on the progress of a project, with the objective of identifying constraints which impede successful implementation. This is highly desirable, particularly when projects fail, to be completed as per time schedule or in the process of attaining the set goals. It is imperative to get the feedback on the problems faced so that effective measures can be taken up to plug the deficiencies, which hamper the speedy implementation. Monitoring has to be done continuously to offset various shortcomings that crop up from time to time with regard to various aspects of implementation.

VI. Evaluation: An ex-post evaluation is essential for completed projects while concurrent to those of on-going. In fact, it provides the systematic information pertaining to success or failure of a project. Moreover, the concurrent evaluation is essential to know the weaknesses of on-going projects so that these may be rectified for greater success. However, the overall impact of a project can be assessed once it is over. Project managers/operators themselves may evaluate based on their experience as implementation proceeds. Similarly, the sponsoring agency may also undertake it. In larger projects, it is quite possible to provide a separate evaluation unit which is mainly responsible for the monitoring and implementation, as IRDP has monitoring unit besides a provision for concurrent evaluation. Quite oftenly, the sponsoring organization wants evaluation by an outside agency, i.e., university experts, agro-economic research centres, etc. it is expected that relevant documents are carefully read by the evaluator and thorough discussion is also done with the planners, managers/operators, participant farmers, local leaders, etc. The evaluation team should also examine the fulfilment of project objectives, adequacy of supporting infrastructures, project plan in accordance to objectives as well as the technological, commercial, financial and economic aspects of project. However, the concrete recommendation must emerge from evaluation report so as to revamp the project design and implementation to achieve the planned results. Evaluation is done by the agency other than the implementing one, like financing bank or sponsoring agency or Government.

CRITERIA FOR SELECTION OF AGRICULTURAL PROJECTS

The following criteria are indispensable for evaluating agricultural projects

1. **Work selection criterion:** This relates to immediate needs of the project area and has a direct or indirect relation to increasing prospects of agricultural production, income and employment.
2. **Priority criterion:** Here it deals with whether the project implemented falls under priority area or not.
3. **Social criterion:** It considers the direct employment prospects, ecological balances, externalities, pollution, etc.
4. **Financial criterion:** According to this criterion it is determined whether the required amount of capital is supplied or not for the implementation of the project. In case the execution is delayed, additional capital requirements are to be assessed.
5. **Supply criterion:** This is concerned with available resources, like physical inputs, labour availability and other resource endowment. Supply of skilled labourers and un-skilled labourers and technical personnel are to be evaluated for the completion of the project on time.
6. **Implementation criterion:** This is based on organisational capabilities and managerial abilities of technical personnel.
7. **Project benefits criterion:** Both tangible and intangible benefits must be correctly assessed and evaluated. In this process the benefits accrued due to forward linkages and backward linkages need to be given specific weightage.

IDENTIFICATION OF PROJECT COSTS AND BENEFITS

In economic analyses of agricultural projects we compare costs with benefits and determine which among the alternative projects have an acceptable return. Thus, we not only identify the cost and benefit streams but these are also priced. In project analysis, the costs and benefits are identified and valued "with" the proposed project WO it is compared with the situation "without" project to determine the net incremental benefit. .However, this approach is entirely different to that of "before" and "after" approach where the changes in production without project is not taken into account and leads to an erroneous statement of benefits. In fact, there may be progress even without the project and it would be inappropriate to attribute all the progress to the projects, as if the normal development process had come to a halt. Moreover, a change in output without the project may have two situations. Under first situation, the production in the project area has already started growing with a slow rate and will also continue over project life. However, the objective of a proposed project may be to faster the growth by intensifying production. For instance, The "High Yielding Varieties Programme" and "Intensive Cattle Development Project" are already underway in India. To boost its adoption amongst rural poor and thereby production rate, the Government of India has proposed to distribute the fertilizers, pesticides and weedicides, crossbred cattle and artificial insemination facilities at subsidised rates. Suppose cereal and/or milk production without subsidy has annual growth rate of 4 per cent and it is projected to be 6 per cent per annum after subsidising the critical inputs. The before and after approach, will assume 6 per cent growth rate due to the subsidised input investment. However, the subsidised input investment has only 2 per cent incremental increase in the cereal and/or milk production.

A change in output can also occur without project if production would actually fall in the absence of new investment. For instance, India has a considerable flood affected areas. A proposed project for drainage in these areas will increase the benefit, not because of increase in production but due to the avoidance of losses. A simple before and after approach may fail to identify such benefit.

Sometimes an investment is made to avoid the loss which may also lead to increase in agricultural production. Therefore, the benefits from such type of investment are partially due to the avoidance of loss and partly from increase in production. For example, a proposed investment for lining of canal to reduce the seepage and permitting better drainage between irrigations will arrest salinization, save irrigation water for profitable use and increases the use of modern inputs. Thus, proposed investment not only avoids a loss but also leads to an increase in production. The before and after approach may not identify such type of realized benefit due to avoidance of loss.

The costs and benefits of a proposed project can be categorized as those of tangible and intangible. It is rather easy to identify and value both tangible costs and benefits but not so for the intangible ones. In identifying costs, one must ask himself, will this item reduce the net benefits or net incomes of a farm-firm or the national income.

Tangible costs of agricultural projects

These costs are discussed under the following heads:

(a) Physical goods. These goods may be the concrete for irrigation canals and dam, fertilizers and pesticides for increasing agricultural production, availability of plant materials for afforestation

programme, feeds and fodder in dairy; project, etc. These items are not difficult to identify but technical problem occurs in planning and designing the quantity as well as time of use. Moreover, the increase in variable costs due to feeding, etc. should be duly considered while estimating the incremental benefits from milk production.

(b) Labour. Both skilled and unskilled labour is not difficult to identify but problem may be in valuing them, i.e.., it may require the use of shadow price. In fact, the valuation of family labour in developing countries may involve complexities as their opportunity cost is zero.

(c) Land. The location of land and area required for a proposed project is not so difficult to identify but problem again exists in its valuation, as structure of land market is not so sound as for other goods and services.

(d) Contingency allowance. The huge investment in a proposed project is usually made under certain assumptions such as no modifications in the design which would rather necessitate changes in physical work, no exceptional conditions such as unanticipated geological formations, no adverse phenomena such as floods or unusually bad weather, etc. In general, the project cost estimates also assume no relative changes in domestic or international prices and also absence of inflation during the investment period. These assumptions may not hold true in real practice and, therefore, sound planning requires some provision for these adverse phenomena. Thus, the contingency allowances are included as a regular part of project cost estimates.

There may be physical and price contingencies. Price contingency allowances may be due to the relative changes in price and general inflation. It is really very difficult to forecast the influence of physical and price contingencies on increases in relative costs. The increase in use of real goods and services, as represented by physical contingency allowance, is a real cost and will reduce the final goods and services available for other purposes. In fact, it will reduce the national income and hence must be considered as cost to the society. Similarly, a rise in the relative cost of an item implies that its productivity has enhanced, elsewhere in the society, i.e., its potential contribution to the national income has risen.

(e) Direct transfer payments. The shift of goods and services from one entity in a society to another which does not reflect changes in national income is generally considered as the direct transfer payments. Taxes, subsidies, loans and debt services (the payment of interest and repayment of principal) are examples of direct transfer payments in an agricultural project. The payment of taxes, including duties and tariffs, does not reduce national income and hence should not be considered as a cost to the society. Thus, in economic analysis, taxes remain a part of the overall benefit stream of the project. However, the government quite often charges for goods supplied and services rendered, e.g. water rates/charges from farmers or stevedoring charge at the port. Thus, a tax is treated as a transfer payment or as a payment for goods and services depends whether the payment is a compensation for goods and services needed to carry out the project or merely a transfer, to be used for general social purposes.

Subsidies are direct transfer payments which flow in opposite direction from taxes. A farmer, who purchases fertilizers and pesticides at subsidised rate, may reduce his total costs and can, therefore, increase his net profit. However, cost of fertilizer in the use of society's real resources remains the same. The raw materials needed to produce the fertilizer (or importing the same) reduce the

national income available to the society and hence in economic analysis of agricultural project the full cost of fertilizer should be considered.

Credit transactions are another kind of direct transfer payment in an agricultural project. Individually, the receipt of a loan generally increases production resources available to a farmer and payment of interest and its principal reduces them. To society, loan does not reduce the national income and merely 'transfer' the control from lender to the borrower. A loan represents the transfer of a claim to real resources from lender to the borrower and repayment of interest and principal back to the lender is again a transfer. None of these, loan amount or repayments, represent the use of resources. In economic analysis, debt service is treated as a transfer within the economy even though project is actually financed -a foreign loan and debt service will be paid abroad.

(f) Sunk costs. These are the costs incurred in the past upon which a proposed new investment is based. In fact, such costs cannot be avoided. In a proposed investment, we consider only future returns to future costs, expenditures in past or sunk costs do not appear in accounts. In practice, if a considerable amount has already been spent on a project, the future returns to future costs of completing the project would be quite attractive.

Tangible Benefits of Agricultural Projects

These benefits in an agricultural project can arise either due to increased value of production or from reduced costs. The tangible benefits are discussed under the following heads:

(a) Increased production. The most common benefit of an agricultural project is the increased physical yield. For instance, an irrigation project provides assured water so that farmers get high crop yields. Likewise, a proposed dairy project, fruit orchard project, credit project (which increases the physical yield via increased use of current operating inputs as well as investment items) also enhance the physical production from the farm. However, in many agricultural projects the benefits may include increased production as consumed by the farm family. Since home consumed production contributes to project objectives as marketed production, it forms part of the project benefits in both financial and economic analysis. The returns to agricultural investment will be, however, under-estimated if home-consumed production is not considered.

(b) Quality improvement. The quality of product also improves due to the agricultural project. For instance, the Intensive Cattle Development Programme' benefitted Indian farmers not only in terms of increased milk yield but also by improving breed of their animals. Similarly, loans to small dairy farmers in the Rajasthan Small holder Dairy Improvement Project are intended to enable these farmers not only to increase the output but also to improve the quality of their product.

(c) Change in time of sale. Benefits from an agricultural project may also arise due to the improved marketing facilities. For instance, the storage facilities available due to a proposed project, i.e., cold storage for perishable commodities, milk plant, warehouse for food grains, etc.., may permit the beneficiaries to sell their product even in lean periods to fetch higher prices. Thus, benefit from such project investments may arise due to the change in its 'temporal value'. The timely milk collection through `Amul Co-operative Milk Union' in

Gujarat State enables better returns to the beneficiaries of much animals under "Integrated Rural Development Programme."

(d) Change in location of sale. An investment in tractor and its transport equipment may enable a farmer to sell his produce at distant markets to realize the greater returns. Some private market trader may also invest in trucks and other transport equipments to carry products from an area of low prices to the distant markets where prices are high. The benefits from such projects arise due to the change in locational value'.

(e) Changes in product form. The projects of agricultural processing industries expect benefits due to change in the form of agricultural produce. For instance, paddy sold to rice millers who sell polished rice, raw pulses sold to dal millers, oilseeds sold to oil millers, maize sold to millers who prepare corn flakes, fruits and vegetables sold to fruit and vegetable processing industries, etc. provide benefits due to the changes in product form. The "Himachal Pradesh Apple Marketing Project", provides greater values for apples produced by the farmers due to sorting. In fact, the best fruits are sold for fresh consumption purposes and poorer ones are used for the soft drinks. Cost reductions through mechanization or transports. The "Custom Service" project for an area may reduce the cost of labour on the one hand and timely performance of agricultural operations during the peak periods. The total production may not increase but benefits result due to trimming the costs. The better feeder roads or highways may also reduce the transportation costs from producer to ultimate consumer. The benefit realised has to be, however, distributed amongst farmers, truckers and consumers.

(f) Losses avoided. In some projects the benefits may arise due to avoidance of losses. In fact, such benefit streams are not easy to identify. A project for drainage in flood affected areas or lining of canal water to check the seepage are common examples.

Secondary costs and benefits

The economic analysis of a project investment should also consider the benefits created or costs incurred outside the project. Hence, the public works projects should estimate the secondary costs and benefits and those may be added to the direct costs and benefits. It is also possible to adjust the values used in economic analysis or incorporate secondary costs and benefits in the analysis to convert them as direct costs and benefits. International agencies advocate for the use of shadow prices in project analysis. The secondary costs or benefits in project analysis act as vehicle to account for the value added which arose outside the project but resulted due to project investment. In shadow pricing every item is valued either at its opportunity cost or at a value determined by the consumer's willingness to pay for that item.

There can also be "technological spill over or technological externalities." Adverse ecological effects and side effects of irrigation development are the common examples. In case the technological externalities are significant, i.e., identified and valued, these may be considered as a direct cost of the project or cost of avoiding them may be included as project costs.

The project investments may also give rise to secondary benefits through a "multiplier effect." The multiplier effect considers economies having excess capacity. If excess capacity exists the investment may cause additional increases in income as successive rounds of spending reduce excess capacity. The likelihood of such excess capacity to result additional benefits through multiplier is little specially in developing countries. As opportunity cost of using excess capacity is cost of raw material and labour, only variable costs will enter in project analysis.

Intangible Costs and Benefits

Almost every agricultural project has costs and benefits that are intangible. These may include creation of new job opportunities, better health and reduced infant mortality as a result of more rural clinics, better nutrition, reduced incidence of waterborne disease as a result of improved rural water supplies, national integration, or even national defence. Such intangible benefits are real and reflect true values. They do not, however, lend themselves to valuation. How does one derive a figure for the long-term value of a child's life saved, or for the increased comfort of a population spared preventable, debilitating disease? Benefits of this kind may require a modification of the normal benefit-cost analysis to a least-cost type of analysis, a topic we will take up when we discuss valuation. Because intangible benefits are a factor in project selection, it is important that they be carefully identified and, where at all possible, quantified, even though valuation is impossible. For example, how many children will enroll in new schools? How many homes will benefit from a better system of water supply? How many infants will be saved because of more rural clinics?

In most cases of intangible benefits arising from an agricultural project, the costs are tangible enough: construction costs for schools, salaries for nurses in a public health system, pipes for rural water supplies, and the like. Intangible costs, however, do exist in projects. Such costs might be incurred if new projects disrupt traditional patterns of family life, if development leads to increased pollution, if the ecological balance is upset, or if scenic values are lost. Again, although valuation is impossible, intangible costs should be carefully identified and if possible quantified. In the end, every project decision will have to take intangible factors into account through a subjective evaluation because intangible costs can be significant and because intangible benefits can make an important contribution to many of the objectives of rural development.

Most common examples of intangible benefits in agricultural projects may include creation of new job opportunities, better health and reduced infant mortality as a result of more rural clinics, better nutrition, reduced incidence of water-borne diseases due to improved rural water supplies, reduction of house and crop losses as a result of improved drainage projects in flood affected areas, reduced salinization due to lining of canals to reduce seepage, scenic value due to irrigation dam and afforestation projects, better social life due to integrated Rural Development Programme, etc. Such intangible benefits are real and reflect true values but cannot be valued monetarily. In fact, these benefits are important to be identified and may also be quantified, wherever, possible.

Intangible costs do exist in agricultural project. These costs may be increasing ecological imbalances, loss in scenic values, increased pollution, harmful effects on human health and incidence of disease problems due to excess use of fertilizers, insecticides and pesticides under High Yielding Varieties Programme, etc. Again although valuation is impossible yet intangible costs may be carefully identified and if possible quantified.

METHODOLOGICAL ISSUES IN FINANCIAL AND ECONOMIC EVALUATION OF AGRICULTURAL PROJECTS:

A project can be either accepted or rejected once project costs and benefits are identified, priced and valued. Moreover, the realistic estimation of costs and benefits is a pre-requisite for the successful evaluation of project investment. Most of the projects, and particularly those in agriculture, suffer from incomplete identification usually resulting into over estimation of benefits and under- estimation of costs. In practice, the projects may have large life with varying sizes of future cost and benefit streams.

The compounding and discounting are the techniques to enable the benefits and costs streams (or cash inflows and cash outflows) from different projects to a particular point of time to examine: (a) the profitability of each project, and (b) the relative profitability of each project.

Usually, following discounted measures are applied to evaluate the agricultural projects:

(a) Net Present Worth (NPW), -

(b) Internal Rate of Return (IRR),

(c) Benefit-Cost ratio (B/C), and

(d) Net-benefit-Investment ratio (N/K).

The relative merits of these methods are though discussed ahead yet there is no single best technique for estimating the project-worth, some are better than others and some are specially deficient. In fact, these financial and economic measures of project investment are only the tools of decision-making. Besides, there are also certain undiscounted measures to assess the project worth.

It is a general practice that the benefit-cost analysis of the projects is worked out considering the market prices at the time the project is proposed to be taken up. But, such procedure will not be sufficient for economic analysis of agricultural projects, because the project is not going to be operated in perfect marketing situations, wherein, prices reflect the relative scarcity value of various goods and services. But, in developing countries a market is protected through various Governmental measures and there will be scarcity of foreign exchange and hence, market price of goods and services often do not provide a reliable guide to the costs and returns of the projects. So, it is appropriate to consider the costs and values of the inputs and outputs of the projects at the international exchange rates, i.e., border rates excluding the effects of domestic tariff, subsidies, excise and other taxes in the economic analysis of the projects.

Cost Aspects: Annual capital costs of the project at current prices must be ascertained and then they should be weighted by the price index in order to get the costs at constant prices. Afterwards the same is multiplied by the Construction Conversion Factor (CCF) to get the economic costs of the project.

The CCF also plays a crucial role in giving Weightage to the different commodities and inputs of the projects, such as traded commodities, non-traded commodities and services and unskilled labourers. The traded commodities include capital-intensive works which require imported machinery and material. In this case the Conversion Factor (CCF) is taken as one. The non-traded commodities

(goods) and services include works, which require skilled labourers and locally manufactured material. In this case, a conversion factor of 0.8 is used to get the economic value of these goods and services. The conversion factor of unskilled labourer employed in the project work is around 0.75. This is based on the rationale of considering the extent of employment and unemployment and migration of labourers from agriculture to other sectors.

Farm Level Input Costs: These costs are to be valued at the projected world market prices. In doing so, it is also necessary to make allowance for duties, subsidies, taxes, marketing costs, etc., for which again conversion factor is used Economic shadow wage rate for farm labourer, fodder values and miscellaneous expenditure are generally weighted by the Standard Conversion Factor (SCF) to convert the same into economic prices. The SCF is calculated using the following formula:

$$SCF = \frac{X + M}{X + Sx + M + Tm} \qquad (8.1)$$

where,

X = F.O.B. (free on board) value of exports at the official exchange rate(OER)

M = C.I.F. (cost insurance and freight) value of imports at OER

Sx = Export subsidies, and

Tm = Import duties

Generally SCF is taken as 0.80 in the economic analysis of irrigation projects in India. The following conversion factors have been used to derive the economic costs of four input factors.

Seeds	= 1.0
Bullocks	= 1.0
Fodder	= 0.8
Farm implements	= 0.88

Benefit Estimation

Agricultural commodities produced under project area need to be valued based on the border prices at the Official Exchange Rate (OER) in the economic analysis of the projects. The economic prices for non-traded food grains, vegetables, pulses, etc. have been derived applying Food- grain Conversion Factor (FCF) to the market prices (financial prices). The following formula is employed to arrive at the FCF.

$$FCF = \frac{(Q \text{ rice} \times PE \text{ rice}) + (Q \text{ wheat} \times PE \text{ wheat})}{(Q \text{ rice} \times PF \text{ rice}) + (Q \text{ wheat} \times PF \text{ wheat})}$$

Where,

Q = Production in the project region,

PE = Economic price, and

PF = Financial price.

Methodology for Social Benefit-Cost

In ranking agricultural projects and assessing the socio-economic objectives of the projects, a realistic attempt is necessary through adoption of appropriate methodology. UNIDO Method (1978) suggests that all the items, i.e., costs and benefits involved in the projects are to be valued in terms of present aggregate consumption. Considering the market prices, which are inadequate in reflecting the real social costs and benefits of the projects, the goods and services are to be valued in terms of shadow prices, which indeed, reflect social costs and benefits.

The various parameters involved in the agricultural projects are as follows:

1) Social rate of discount;
2) Shadow price of investment;
3) Shadow prices of labour;
4) Shadow prices of foreign exchange; and
5) Income distribution: Weights which are proxies for regional income differentials.

The estimates of these parameters are .specified by the National Planning Agencies and the concerned project authorities.

Social Rate of Discount (SRD)

There is a time lag between the investment and the returns from the agricultural projects, which is termed as "Gestation period". As a result, different values are to be attached in the economic analysis of the projects, particularly to costs and benefits. The present value of the future benefits/costs (called discounting) depends on the magnitude of social rate of discount and this considerably brings about change in the values of costs and benefits. For instance, a higher social discount rate will reduce the net present value of the benefits or costs and vice-versa. Hence, the choice of appropriate Social Rate of Discount (SRD) is of vital importance, especially in agricultural projects where there is a long gestation period.

SRD is used in computing the Benefit-Cost Ratio (BCR), Net Present Worth (NPW) of the project, Internal Rate of Return (IRR), etc. It is the opportunity cost of the capital which just reflects, the choice made by the society as a whole, between the present and future returns and hence, it represents the approximate amount of total income, the society as a whole is willing to save over time. Finding out the correct discount rate entails many problems. In practice, by the rule of thumb an approximate and agreeable social discount rate is adopted in the economic analysis of the projects. The popular choice is 12 per cent discount rate and in some countries, in the evaluation of agricultural projects it varies from 8 to 15 per cent.

The factors that determine the social rate of discount are:

1) Society's present level of consumption,
2) Expected growth of consumption,
3) Expected growth of population,
4) The marginal utility of consumption, and
5) Pure time preference.

Compiled By: Prof Vishwesh Shashikant Dange, Department of Agriculture Business Management, Nashik

Shadow Price:

If any country faces the problem of balance of payments (BOP) foreign exchange becomes scarce for that country. Under such situation the official exchange rate does not reflect true value of foreign exchange earned or spent. In order to get real foreign exchange impact on EXIM policies*, it is important to make adjustment by using shadow foreign exchange rate.

Shadow prices are otherwise known as accounting prices. These are subject to criticism and controversy. In the financial analysis of the projects usually market prices are considered, but, in the economic analysis, true value of the prices is needed. This is due to imperfect market situations in the economy. If the economy is operating in a perfect marketing situation, the market prices are considered to be true values, if not, there will be bias in the prices of goods and services and the economic analysis of the projects becomes erroneous.

For example, if the price of foreign exchange is low compared to the market prices of the economy, there will be an error tending to favour the projects with high import content. If the wages are high in the market, capital-intensive projects are favoured over labour- intensive projects.

To avoid such errors in the economic analysis of projects, we generally use shadow prices, in place of market prices to reflect the true values of commodities. Hence, in the project analysis there is need to compute shadow prices for foreign exchange, labour, capital, etc.

If the capital is scarce in an economy, where the projects are proposed to be implemented, a general practice of including borrowing rate of capital, in the project analysis does not appear to be realistic and rational because, the borrowed capital must reflect the opportunity cost of capital. To do so, shadow prices of the capital are to be considered in the economic analysis of the projects.

Shadow Prices of Investment (Savings)

Shadow price of investment (savings) is defined as the present value of additional consumption generated by additional unit of investment in a project.

Shadow Price of Labour:

It is also called shadow wage rate. Agricultural projects require large number of skilled, semi-skilled and unskilled labourers during their implementation. Assessment of employment of labourers is one of the objectives of the projects. In order to assess the employment levels, shadow wage rates are considered against the market wage rates of labourers. In labour surplus economies, the wage rates are not equal to social opportunity cost of labour. The following factors are to be considered in working out the social opportunity cost of labour.

1) The output foregone elsewhere in the economy as a result of employing labourers in the project.
2) Cost of migration, training and additional consumption, when a labourer is moved from rural area to project site.
3) The potential difficulty encountered by the labourer in finding out a new job in the new area, and
4) The cost in terms of increased aggregate consumption due to increased employment in the project.

A. UNDISCOUNTED MEASURES

The undiscounted measures are the naive methods of choosing among the alternative projects. The methods listed under these measures often mislead in ranking of the projects and hence, choices go wrong. The various undiscounted measures of project-worth are:

i. **Ranking by inspection.** Based on the "investment cost" and "shape" of the stream of "net value of incremental production" it is possible to reject or accept a project. However, it is quite possible that: (a) with same investment, although two projects produce same net value of incremental production in a single period yet one may continue longer than the other and (b) for the same investment, the total net value of incremental production may be the same but one project has more of the flow earlier in the time sequence. Amongst two alternative investments, the one which costs more but yield no more return, can be rejected even on the basis of eye inspection, i.e., the project which has cheapest means to realise a given end.

ii. **Payback period.** It is the length of time period from the beginning of the project that equates the net value of incremental production streams to the initial capital investments, i.e., the present value of total cash in-flows from an investment equals (recovers) the total cash out-flows. Hence the flow of net returns/benefits, i.e., cash inflows from an investment after payback period is a positive gain. It is a common and rough method for choosing among investments in business enterprises specially when the choice entails a high degree of risk. However, in agricultural projects it is not often used. This method is simple and provides some indication about the liquidity of project investment. Moreover, it fails to consider the earnings after net benefit recovers the net investment and the timing to proceeds, i.e., earlier a benefit is received earlier it can be reinvested or consumed. The payback period of the project is estimated by using the straight forward formula:

$$P = \frac{I}{E}$$

Where,
P = Payback period of the project in years,
I = Investment of the project in rupees, and
E = Annual net cash revenue in rupees.

iii. **Proceeds per unit of outlay**. The investments can also be ranked on the basis of "proceeds per unit of outlay". It is the total net-value of incremental production divided by the total amount of investment. It also fails to consider the timing of proceeds.

iv. **Average annual proceeds per unit of outlay.** It is obtained by dividing the total net value of incremental production first by the number of years in which it will be realized and then this average proceeds is further divided by the original outlay for capital. It does not take adequate account of the timing of the benefit stream. It also does not take into account the timing of benefit streams, consequently, biased towards short-lived investments with high cash proceeds.

v. **Average income on book value of the investment.** It is the ratio of average income to the book value of assets, after deducting depreciation, stated in percentage terms. It is quite often used to measure the performance of an individual firm and also as an investment criterion.

B. DISCOUNTED MEASURES

The discounting techniques permit us to determine whether to accept the projects for implementation that have different time streams, i.e., the patterns when costs and benefits fall during the life of the project that differ from one another. To do so, one has to subtract the year wise costs from those of benefits so as to arrive at the incremental net benefit stream, called the cash flow. Afterwards the incremental net benefit stream has to be discounted. "Discounting" is a technique to "reduce" the future benefit and cost streams to their "present worth." In fact, it looks backward from the future to present while compounding assumes a view point from present to future. The interest rate assumed for discounting is the "discount rate." Thus, one can see the differences between these present worths (i.e., net present worth); the discount rate can be determined which equates the net present worth to zero (the interest paying capacity of the project popularly known as internal rate of return); a ratio of present worth of benefit and cost streams can be determined (the benefit-cost ratio); or the present worth of net benefits can be compared with the present worth of investments (net benefit-investment ratio).

Cash flows are yearly net benefits accrued from the project. It they are weighted by discount rate, they become discounted cash flows. These discounted cash flows are the best estimates to decide on the worth of the project. This approach will give the Net Present Worth of the project. The present worth of the costs is subtracted from the present worth of the benefits in order to arrive at the Net Present Worth of the project every year.

(a) Net present Worth (NPW):

It represents the present worth of incremental net benefit or incremental cash flow stream, i.e., the income stream generated by an investment. In computing net present worth of a project, the discount rate which reflects the price of investment funds, is used to get the benefits and costs to a common point of time and compared. These "costs" are then subtracted from the "benefits" to get the net present worth of the project. However, it is easier to compute by discounting the incremental net benefit stream or incremental cash flow. A positive net present worth reflects that the investment is worth-while and its size indicates the capacity of project in utilizing the resources to maximise income. Projects with positive NPW are given Weightage in the selection compared to those with negative present values, while zero NPW makes the investor indifferent.

(b) Benefit-Cost Ratio (B-C Ratio):

Here, we compare the present worth of costs with present worth of benefits. Absolute value of the benefit-cost ratio will change based on the interest rate chosen While ranking the projects depending upon the B-C ratio, the most common procedure of selecting projects is, to choose the projects, having B-C ratio of more than one, when discounted at opportunity cost of capital. Finally, the given project is opted for implementation, among alternatives based on the highest B-C ratio.

(c) Internal Rate of Return (IRR):

In the computation of Internal Rate of Return (IRR), the time value of money is accounted. The method of working IRR provides the knowledge of actual rate of return from the different projects. Thus IRR is known as 'marginal efficiency of capital or yield on the investment'. It is the discount rate at which the present values of the net cash flows are just equal to zero, i.e., NPW = zero. When NPW is set equal to zero, the equation is solved for T. This is the internal rate of return. The IRR must be found out by trial and error with some approximation.

(d) Profitability Index:

Here we relate the NPV of the cash flows of the project to the total capital required (cr) for a project through "profitability index". It is defined as the ratio of net present values of the cash flows to the initial capital expenditure (co).

STUDY OF INTER - RELATIONSHIP BETWEEN NPV, BCR AND IRR

The three investment criteria - NPV, BCR and IRR are related to the discounted Cash flow measure the preference for present over, the future. In all three criteria. The discount is the key factor and there is an inverse relationship between the discount rate and the net present value of the project. What it means is that if you put a heavy premium on the present, future benefits would look very small and the converse is true if les premium is placed on the present. The selection of a project is, therefore, in fact a function of a premium on present over the future. If one places a higher value on future benefits of the project and therefore, a relatively ever premium on the present needs/ requirements. Then at given rate of -interest the projects would look attractive, and in a converse situation. The project would look attractive, and in a converse situation. The project would look less attractive and would not be selected.

This psychology of an investor / society is quantified in three investment criteria - NPV, BCR and IRR While NPV given an absolute measure of benefits, i.e. so many rupees. BCR gives a measure of benefits per rupee of investment. BCR Therefore is a relatively better measure of acceptability of the project compared to NPV. However, there is a direct relationship between NPV and BCR and vice versa and both are inversely related to the rate of discount.

In NPV and BCR what we really do is select a discount rate which measures the degree of our preference for present over the future given that rate when NPV and BCR are greater than zero and one respectively, we conclude that the project is benefits in the future.

But the difficulties arise when we have to select a rate of discount. It is again a matter of the situation in which one is placed. If one's resources are limited, one's capacity to fall back upon something is very meagre and expectations about the future, bleak. One's premium for the present is very high. Therefore with a higher rate of discounting, NPV and BCR being less would confirm to one's decision investment in the project. Thus NPV and BCR measure the psychology of an investor considering various factors, and especially measuring his preference for present over future through the discounting rate.

If that is the case then why go in for IRR? What does it tell us which NPV and BCR fail to tell us? IRR as explained earlier is nothing but a rate of discount where NPV = 0 and BCR = 1. IRR is thus a ceiling

limit of our preference for present over the future. But IRR, alternatively, also shows the capacity of the project. A higher IRR expresses the higher capacity of the projects to general benefits over a period of time. The generation of benefits of the projects would again depend upon the cost incurred over a period of time. Thus, if the cost go up, the income generation of the project remaining the same, the capacity of the project to generate benefit would decrease and this will reduce IRR and vice - versa. IRR therefore is function of relationship of the project's estimated cost and benefits over a period time. IF benefits are higher than the costs involved, over a period of time, then IRR would therefore, depends on;

1) Difference in cost structure and the time period over which the cost is incurred.
2) Income generation over a period of time.
3) Income gestation period - life span of the project

Since these three factors would differ from project to projects, IRR would be higher or lower. Some general guidelines can therefore be provided.

a) If the net benefits of two projects are the same. But in one project the gestation period is very long. While in another it is comparatively less. Then IRR would normally be lower for the former as compared to the latter.
b) If the life span of the project is the same, then the interrelationship between costs and benefits is important.

If the initial investment in the project is very high but operating cost are low, the income generated over the lifetime of the project would give a higher IRR compared to the project where initial investment may be lower but operating cost are higher with the same income generating pattern as that of the former project.

STUDY OF CASH FLOW STATEMENT

Cash Flow:

It is a broad term, and indicates the stream of costs and benefits over a period of time. Basic principle of cash flow is total income and expenditure should be counted only at a time. Therefore depreciation is not included in cash flow items. To avoid double accounting depreciation, interest and principal interest not included in cash flow.

Cash Flow Statement

This is also known as cash flow summary or cash flow budget or flow of funds statement. Earlier, we have discussed about balance sheet and income statement. These two financial management tools inherent weaknesses in presenting certain valuable information, hence another tool in the form of cash flow statement bridges these deficiencies. Cash flow statement is a summary of cash inflows and cash outflows of a business organisation in a particular period, say a season or a year. It is usually prepared for the future, hence the name cash flow budget. The merit of this particular statement is that, it helps to assess the time at which the funds are required for farming and other allied enterprises, sources from which these can be raised, the purpose for which the loan is required, the need' of sale and purchase of capital assets, the time and quantum of repayment, etc.

Now, let us see why a farmer borrows funds from a particular source or sources; why he resorts to transactions like selling of farm products and livestock products and selling and buying of capital assets. The answers to these questions are that the small and marginal farmers have poor resource base, and therefore, borrowings aid them in continuing the farm business. Large farmers too borrow for farm operations depending upon the need and time during which they cannot properly recycle the funds. Farmers resort to sale of farm assets like milch cattle, machinery, etc., because they might have become worn out, for which replacements are to be made through purchases.

Cash flow statement is prepared at the beginning of the agricultural year and checked every quarterly. For convenience, quarterly checks are made. The statement prepared over the years serves the purpose of studying the pattern of expenditure and cash receipts and cash balance that have been raised. A close scrutiny of the statement throws light on the performance of the business.

Cash Flows are of two types: **Cash Outflows and Cash Inflows.** The difference between the two is the **Net Cash Flow.**

Cash Outflows occur in the business because of purchase of raw materials, purchase of assets and payment of loans while Cash Inflows occur in the business because of sale of produce, sale of assets and borrowing.

Advantages of Cash Flow Budget:

It is a summary of all the financial matters of the farmer in a comprehensive report. This helps

i. To estimate the total credit needs (ST, MT and LT) of the farmers along with time and quantum.
ii. To plan the repayment schedule.
iii. In making purchases and sales at the appropriate time, thereby helping to minimize the credit dependence.
iv. To keep ready input requirement well in advance so that last minute rush can be avoided.
v. To know household expenditure pattern, so that the farmers can keep limits to avoid wastage.
vi. The farmer to exercise a check on farm costs.
vii. The farmers in preparing the farm business plan for the ensuing years.
viii. The banker for revising the scales of finance and rescheduling loans etc.
ix. Finally as a tool of financial control to the farmer.

SENSITIVITY ANALYSIS

The economic evaluation of agricultural projects assumes that both cash inflows outflows are known with certainty. However, in real world these factors or assumptions may not hold true and project profitability may be, thus, questioned. Therefore, the economic analysis of agricultural projects is to be done under the changing circumstance which is termed as "Sensitivity analysis". The agricultural projects are usually sensitive to changes in the factors such as price, delay in implementation, cost overrun and yield.

The worthwhileness, of agricultural projects should be tested for different alternative future prices of the project output or various shadow prices may be assumed while applying various discounted

measures of a project. In case shadow prices are not easy to establish then the market prices may be considered for economic analysis.

Failure of anticipated rate of adoption of new practices by the beneficiaries or underestimation of the proposed new technique affects the implementation of agricultural projects. The projects implemented may also be delayed due to unavoidable administrative problems as well as ordering and receiving of the new equipments/materials. Therefore, the testing of effects of such delays on various discounted measures of proposed project investment form an important aspect of sensitivity analysis.

A proposed project with attractive return may become marginally acceptable or even unacceptable, in case costs rise significantly in the early phase of implementation. Usually, the cost estimates, i.e., prices actually paid for supplies and equipment, etc., are quite uncertain. Quite often, the project analysts become more optimistic about the implementation schedule and input prices used in the project. In fact, the sensitivity analyses of agricultural projects caution the project investment decision-makers about firm cost estimates before they take the final decision, even though firm estimates may delay the start of a project.

The project analysts are usually quite optimistic about the potential yields of agricultural project. The application of sensitivity tests for different discounted measures of project worth (specially for lower yields) will, therefore not only provide the alarming information before implementing the project but would also thrust upon other essential infrastructural development.

Project appraisal techniques above, provide us certain measure of project's worth and this is related to a certain period of time and we will be forming this measure of the project under the assumption that the data used in the project evaluation remain unchanged over a length of time. But, in reality this is not a valid assumption because our estimates of costs and returns go awry over time, as prices of agricultural produce as well as the costs of inputs are subject to change. Under these conditions our estimates of economic analysis will be misleading.

Hence, there is a need for considering the probable changes in the data required for the project appraisal. It is also sometimes necessary to know, how far our estimates of project appraisal remain constant under the changing situation of costs, prices and yields. If any analysis is able to provide clues to all these questions, we call such analysis as 'sensitivity analysis'. If a thought is given to the forecasting behaviour of costs and prices in the sensitivity analysis, indeed, it becomes very much useful to the policy makers and planners of development. Since forecasting process is a difficult proposition, our project appraisal tends to go wrong. But, a simplified procedure of sensitivity analysis, which is not subject to criticism, is always welcome.

The sensitivity analysis of the project appraisal includes the following points:

1. Consideration of the length of the period over the existing one;
2. Changes (increase or decrease) in the prices of goods and services by certain proportions of the project say by 10 per cent, 20 per cent, 30 per cent, 40 per cent, 50 per cent, etc.
3. Changes (increase or decrease) in the levels of costs say by 10 per cent, 20 per cent, 30 per cent, 40 per cent, etc.;
4. Changes (increase or decrease) in the yield levels of crops and livestock; and

5. Delays in the implementation, i.e., varying gestation periods.

Assuming the changed values for the above parameters, by a definite proportion, the project worth is calculated time and again. This procedure deals with the question of risk and uncertainty to a certain extent in the project analysis. But, in fact, this is not adequate. Elaborate risk analysis using probability analysis and simulation models employing the randomization, are the most appropriate tools to indicate the real worth of the project under the conditions of risk and uncertainty.

The various methods/techniques of sensitivity analyses to be used in project analyses are discussed below:

1. Straight forward method

In this method, the sensitivity of proposed project is analysed by considering certain percentage cost over-run, i.e., the discount rate is adjusted to account for the degree of risk involved, or decline in the price of output In general, the projects tend to be more sensitive to cost over-runs (which occur only in the project life) than to the price changes that occur latter. Therefore, risky projects may have slightly higher discount rate as compared to the projects with little or no risks, the determination of risk premium is though quite essential so as to compensate the risk involved in proposed projects yet is it not an easy task. In fact a given proportionate change in a major cost or return item would usually have a more than proportionate effect on the discounted measures of project worth. Moreover, the sensitivity analysis eof proposed project investments is quite helpful for planners and policy-makers to make the estimates of loss in opportunities to generate the wealth (due to delay in implementation) or to redesign them for less sensitive in delays.

2. Switching-value

A variation in sensitivity analysis is called the "switching value". In straight forward method an important element of the project is allowed to change by certain amount or percentage and project worthwhileness is tested. However, a switching value determines the extent of unfavourable change in an element before the project meets its minimum level of acceptability, as indicated by the discounted measures of project worth. Afterwards, those who feel to proceed with the project can ask themselves the magnitude of change that will occur.

One switching value test can be to determine the net present worth at assumed levels of benefit short-fall. Suppose the net present worth still turns out to be positive at 20 per cent benefit shortfall (with 10 per cent opportunity cost of capital) and it becomes negative at 30 per cent shortfall. Therefore, the project analyst should interpolate between positive and negative net present worth, just like interpolation of the internal rate of return, so as to determine the shortfall essential to make the net present worth zero.

Another switching value method, determines the maximum delay in benefit before net present worth of a project falls to zero. Let the benefit is delayed by three years and net present worth is still positive (at 10 per cent opportunity cost of capital) and the same becomes negative in case benefits are delayed for 4 years. Therefore, the project analyst can report that "benefits would have to be lagged by more than 3 years without losing costs so that rate of return falls below the opportunity cost of capital".

3. Probability approach

In this approach the probabilities are assigned to the range of possible outcomes and expected annual cash flow is worked out. Based, on this expected value information, the standard deviation and coefficient of variation can be worked out to know the degree of risk attached with IRR and NPW methods.

Social Rate of Discount (SRD)

There is a time lag between the investment and the returns from the agricultural projects, which is termed as "Gestation period". As a result, different values are to be attached in the economic analysis of the projects, particularly to costs and benefits. The present value of the future benefits/costs (called discounting) depends on the magnitude of social rate of discount and this considerably brings about change in the values of costs and benefits. For instance, a higher social discount rate will reduce the net present value of the benefits or costs and vice-versa. Hence, the choice of appropriate Social Rate of Discount (SRD) is of vital importance, especially in agricultural projects where there is a long gestation period.

SRD is used in computing the Benefit-Cost Ratio (BCR), Net Present Worth (NPW) of the project, Internal Rate of Return (IRR), etc. It is the opportunity cost of the capital which just reflects, the choice made by the society as a whole, between the present and future returns and hence, it represents the approximate amount of total income, the society as a whole is willing to save over time. Finding out the correct discount rate entails many problems. In practice, by the rule of thumb an approximate and agreeable social discount rate is adopted in the economic analysis of the projects. The popular choice is 12 per cent discount rate and in some countries, in the evaluation of agricultural projects it varies from 8 to 15 per cent.

The factors that determine the social rate of discount are:

- **i.** Society's present level of consumption,
- **ii.** Expected growth of consumption,
- **iii.** Expected growth of population,
- **iv.** The marginal utility of consumption, and
- **v.** Pure time preference.

THE SIX PHASES OF PROJECT FORMULATION:

Phase I: Preparatory Organization

Phase II: Reconnaissance and Preliminary Project Design

Phase III: Project Design

Phase IV: Analysis of Expected Project Results

Phase V: Project Documentation and Submission

Phase VI: Project Negotiation

PHASE I: Preparation for Project Formulation

Step 1 -Project inception

Step 2 - preparation of a formulation work plan.

The output is the programme of work for project formulation.

PHASE II: Reconnaissance and Preliminary Project Design

Step 3 - analysis/diagnosis of the situation from an overall perspective;

Step 4 - analysis/diagnosis of the situation from the perspective of the main interest groups involved;

Step 5 - assessing the future without the project

Step 6 - outline specification of a possible project.

The output of this phase is the preliminary design of a project, including identification of its main features, such as location, type of participants, main activities, size, timing, organizational structure, and management system. It may be called a project reconnaissance and preliminary design report and also called a project prefeasibility study.

PHASE III: Project Design

Step 7 - detailed technical and socio-economic investigations,

Step 8 - more precise definition of project objectives, targets, and design criteria,

Step 9 - design of individual project components,

Step 10 - design of project organization, structure, and management arrangements, and

Step 11 - project cost and revenues estimation, and first financing proposal.

The output of the phase is a full description and costing of the project, together with a proposed financing plan.

PHASE IV: Analysis of Expected Results

Step 12 - financial analysis,

Step 13 - economic analysis,

Step 14 - social analysis, and

Step 15 - environmental impact analysis.

The output of the phase is the determination of effects and impacts of the project.

PHASE V: Project Documentation and Submission

Step 16 - project documentation and submission.

The output of the phase is the project document.

PHASE VI: Negotiating the Project

Step 17 - project appraisal and negotiation.

The output is a project fully ready for implementation.

PROJECT EVALUATION AND REVIEW TECHNIQUE/CRITICAL PATH METHOD (PERT/CPM)

PERT: PERT is used where the emphasis is on shortening and monitoring the project execution time without too much concern for its costs implications.

CPM: CPM is used where the emphasis is on optimising resources allocation and minimising overall cost for a given project execution time.

Net work logic and terminology: The core of PERT-CPM is a net work diagram which is also known as Arrow diagram. A network diagram consists of arrows and circles. Any project can be broken into a number of activities; the start and end of every activity can be recognised and are known as events in PERT terminology.

Activity

An activity is also known by other names such as job tasks, assignment, work etc. An activity consumes either time or resource or both, some examples of activities are.

(A) Prepare project report
(B) Prepare plan for water distribution
(C) Prepare drawings
(D) Dig jack well
(E) Erect pump
(F) Construct high level tank
(G) Prepare field channels

Event

An event is also known as a junction, node, stage, milestone etc., An event is a clearly definable movement of time which is the beginning or end of an activity or a number of activities. Examples of events are:

(A) Preparation of project report started.
(B) Drawing prepared
(C) Boiler erected
(D) Indents prepared
(E) Materials received
(F) Installation of machine started

Compiled By: Prof Vishwesh Shashikant Dange, Department of Agriculture Business Management, Nashik

Net work paths

From the network beginning event to any specific event there may be a number of net work paths or chains of sequential events and activities. An activity begins in a start event or a tail event and ends in a completion event or head event. An event is represented by-a numbered circle. If an event represent a joint completion of more than one activity it is called 'merge events' and if an event represents a joint initiation of more than one activity a 'burst event' (Fig 8.1).

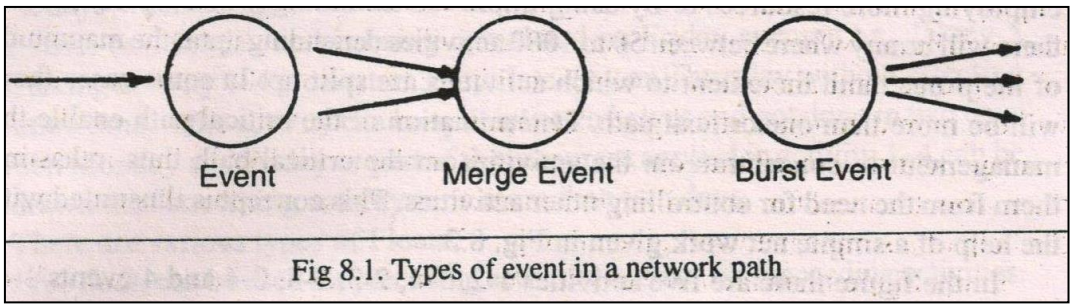


Fig 8.1. Types of event in a network path

Simple net work: Net work is a graphical representation of a job plan showing the inter-relationships of the various activities. The Fig. 8.2 shows that a simple net work consisting of 5 events (1 to 5) and its activities to be performed are designated as A to F. Activities A to -F can be referred to as 1-2, 2-3, 3-4, etc., The logic of the net work is that activities B and C cannot start until event 2 is reached, i.e. when activity A is completed B and C can be done concurrently. Activity E can start when event 3 is reached. i.e., when B is completed. Activity D connecting 3 and 4 shown by a broken arrow in the diagram is called a 'Dummy activity'. A dummy activity does not consume either time or resource but is used only to show inter-dependencies among activities.

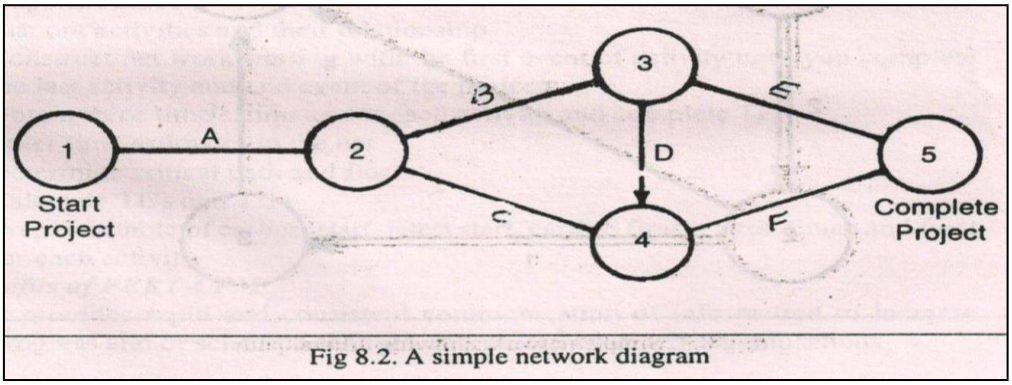


Fig 8.2. A simple network diagram

For instance activity F depends not only on the completion of activity C but also on completion of activity 13. It may be noted that E depends only on B while F depends on completion of activity C but also on completion of activity of both B and C. The project is completed when E and F are completed which can be done concurrently. Thus the net work shows the interdependencies among activities and sequences in which they are to be performed.

Critical paths: Whatever may be the size and nature of a project whether it is building a house, land reclamation, lift irrigation, the project can be broken into a convenient number of activities. It has been observed that in any project 10 to 20 per cent of the total number of activities control the time required for the entire project. Any delay or speeding up of these activities will affect the final completion date. Others though essential to be performed do not affect the project time. In the simple net work shown above there are three paths 1-2-3-5 and 1-2-4 5. If the time required for

each of the activities laying in these paths is estimated the time for each path can be calculated. Time required for each path will be different (usually). The path taking the longest time is called the critical path.

Evidently the time for the critical path is the minimum time within which the project can be completed. If it is required to complete the project in less time the duration of the activities lying in critical path will have to be shortened by employing more resources or by using improved technology. In a typical project there will be anywhere between 50 to 1000 activities depending upon the magnitude of the project and the extent to which activities are split up. In some cases there will be more than one critical path. Determination of the critical path enables the management to concentrate on the activities on the critical path thus, releasing them from the need for controlling other activities. This concept is illustrated with the help of a simple net work given in Fig. 8.3.

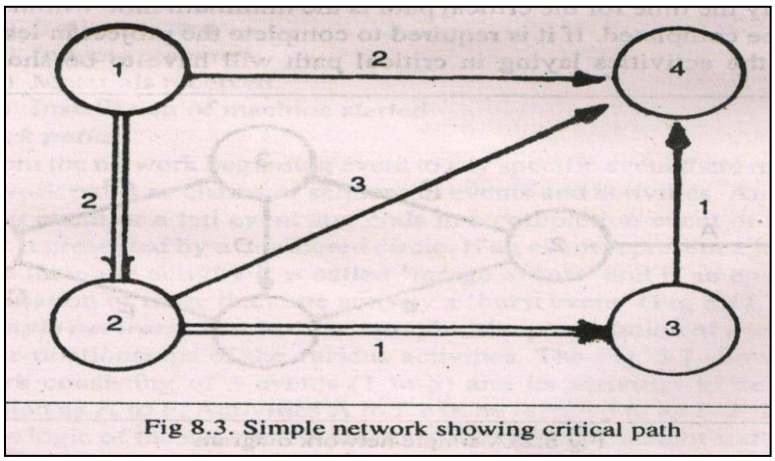


Fig 8.3. Simple network showing critical path

In the figure there are five activities 1-2, 1-4, 2-3, 2-4, 3-4 and 4 events 1-4. Duration times given in the middle of the arrows are 2, 2,1,3,1 days.

Activity	Time for Activity
1-2	2 days
1-4	2 days
2-3	1 day
2-4	3 days
3-4	1 day

Taking the various paths and calculating the path times.

Path	Time
1-2-3-4	4 days
1-2-4	5 days
1-4	2 days

Float

The next important concept in PERT-CPM is that of float which is also known as slack. Taking the same net work in Fig. 8.3, it can be seen that path 1-4 takes only 2 days when compared to the critical path time of 5 days. Assume that the work starts on Monday and is being completed on Friday evening i.e., taking 5 days, taking activity 1-4 it can start 3 days late, Say on Thursday without

affecting execution time or the activity can be split into two halves and got done in two days between Monday and Friday or part of the resources applied in activity 1-4 can be withdrawn thus stretching activity time more than two days.

There are various types of Floats.

Free float: can be used for preceding activities and not for succeeding activities.
Interfering Float: can be transferred to succeeding activities.
Independent float: can be used only on the activity concerned.
Total float: Free float + Interfering float.

Critical activity:

For an activity to be critical
(a) There should be no slack at the tail or head events.
(b) The maximum available time for doing that activity got by subtracting the earliest expected time of the tail event from the latest allowable time of the head event should be equal to the time required for the activity.

Net work rules

1. Before an activity may begin all activities preceding it must be completed (this does not mean that the preceding activity should be completed simultaneously).
2. Arrows simply indicate logical precedence only having no vectorial significance, i.e., length and direction do not signify anything except in time scaled net works.
3. Net work again has no predecessor and end event is no successor.

STEPS IN THE DEVELOPMENT OF PERT-CPM NET WORKS

1. Determine project objectives and organisation
2. Determine sequence of events
3. List out key events; determine sequence of events and departmental responsibilities
4. List out activities and their relationship
5. Construct network starting with the first event of activity until you complete the last activity and end event of the project
6. Obtain three time estimates for each activity and complete TE
7. Enter time estimates in the net
8. Determine critical path and floats
9. Calculate TE's and TL's
10. Prepare a table of earliest start, latest start, earliest finish latest finish and float for each activity

Where *TE=Earliest Time and TL=Latest Time.

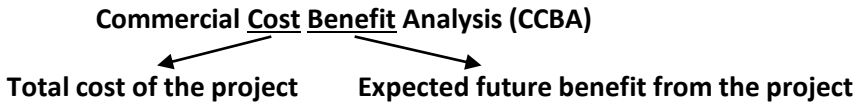
Benefits of PERT-CPM

- **i.** It provides rapid and consistent communication of information to increase progress and or schedule changes as reported by diverse organisations.
- **ii.** Control cost and resource allocation.
- **iii.** Promote team spirit and group judgement.
- **iv.** It aids better planning, scheduling, coordinating and controlling the project.
- **v.** Focuses management attention on critical areas and promotes management by exception.

Compiled By: Prof Vishwesh Shashikant Dange, Department of Agriculture Business Management, Nashik

SOCIAL COST-BENEFIT ANALYSIS (SCBA)

The social cost-benefit analysis (SCBA) is an instrument facilitating the weighing up of all current and future social advantages and disadvantages of various alternatives. The word 'social' indicates that costs and benefits are analysed and valued from the point of view of society as a whole. The focus is not only on the costs and benefits that can be expressed in monetary terms, but also on the costs and benefits which have not (or not yet) been expressed in monetary terms, relating to all kinds of other matters valued by society, such as the environment, safety and nature.



- Benefit > Cost is desirable here.
- So it is nothing but a profitability analysis.
- But what will be the costs and/or the benefits that a society may have to bear and/or get from the proposed project are not considered here.

For example:

Suppose, a manufacturer produces cigarettes and sell it Rs.40 a packet and another manufacturer produces soaps and sell it Rs.20 a bar.

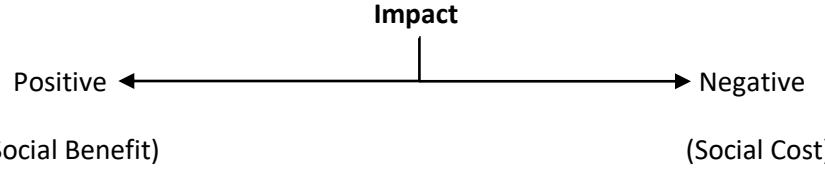
Now, if we think about the impact of soaps & cigarettes on the society, the questions may be –

- Does the price of cigarettes take account of the smokers' higher probability of heart disease or cancer?
- Does the price of soap take note of the benefits from the use of soap, e.g., reduced risk of spread diseases?

Obviously, a commercial entrepreneur can't give well answer to these questions.

What is Social Cost Benefit Analysis?

So, to reflect the real value of a project to society, we must consider the impact of the project on society.



Thus, when we evaluate a project from the view point of the society (or economy) as a whole, it is called Social Cost Benefit Analysis (SCBA)/Economic Analysis.

Core differences between CCBA & SCBA

CCBA	SCBA
Limited range of effects is considered as it measures the profitability of individuals who are only a part of the society.	The evaluator has to take a **wider view** as it tries to measure social values of the whole society.
It is quantitative in nature.	It can be quantitative or qualitative.

Scope of SCBA

SCBA can be applied to both Public & private investments –

Public Investment:

SCBA is important especially for the developing countries where govt. plays a significant role in the economic development.

Private Investment:

Here, SCBA is also important as the private investments are to be approved by various governmental & quasi-governmental agencies.

Objectives of SCBA

The main focus of Social Cost Benefit Analysis is to determine:

i. Economic benefits of the project in terms of shadow prices;
ii. The impact of the project on the level of savings and investments in the society;
iii. The impact of the project on the distribution of income in the society;
iv. The contribution of the project towards the fulfillment of certain merit wants (self-sufficiency, employment etc).

Significances of SCBA

CCBA is unable to reflect social values. Hence SCBA has been emerged with some interesting significances. These significances also make the SCBA different from the CBA.

- Market Imperfections
- Externalities
- Taxes & Subsidies
- Concern for Savings
- Concern for Redistribution
- Merit Wants

Market Imperfections: Market prices, the basis for CCBA, do not reflect the social values under imperfect market competition.

Externalities: A project may have beneficial or harmful external effects that are considered in SCBA, not in CCBA.

Taxes & Subsidies: From the social point of view, taxes & subsidies are nothing but transfer payments. But in CCBA, taxes & subsidies are treated as monetary costs and benefits respectively.

Concern for Savings: In SCBA, the division between benefits & consumption is relevant wherein higher valuation is placed on savings. But in CBA such division is irrelevant.

Concern for Redistribution: In SCBA, the distribution of benefits is very much concerning issue where commercial private firm does not bother about it.

Merit Wants: Merit wants are important from the social point of view and therefore, SCBA considers these wants.

Approaches to SCBA

There are two principal approaches for Social Cost Benefit Analysis.

A. UNIDO Approach, and

B. L-M Approach.

A. UNIDO Approach: This approach is mainly based on the publication of UNIDO (United Nation Industrial Development Organization) named *Guide to Practical Project Appraisal* in 1978.

The UNIDO approach of Social Cost Benefit Analysis involves five stages:

- Calculation of *financial profitability* of the project measured at market prices.
- Obtaining the net benefit of the project at *shadow (efficiency) prices*. (Objective of SCBA-1)
- Adjustment for the impact of the project on *Savings & Investment*. (Objective of SCBA-2)
- Adjustment for the impact of the project on *Income Distribution*. (Objective of SCBA-3)
- Adjustment for the impact of the project on *Merit and Demerit Goods* whose social values differ from their economic values. (Objective of SCBA-4)

B. L-M Approach: I.M.D Little & J.A.Mirlees have developed this approach for analysis of Social Cost-Benefit in *Manual of Industrial Project Analysis in Developing Countries* and *Project Appraisal & Planning for Developing Countries.*

- I.M.D. **L**ittle and James A. **M**irrlees have developed an approach to SCBA which is famously known as L-M approach.
- The core of this approach is that the social cost of using a resource in developing countries differs widely from the price paid for it.
- Hence, it requires ***Shadow Prices*** to denote the real value of a resource to society. (mentioned earlier)

The resources – inputs & outputs – of a project are classified into mainly:

- Labor
- Traded Goods
- Non-traded Goods

Therefore, to find out the real value of these resources, we should calculate –

a) Shadow wage rate (SWR)
b) Shadow price of Traded Goods
c) Shadow price of Non-traded Goods