UNIT 4 MONITORING AND EVALUATION

Structure

4.0 Objectives

4.1 Introduction

4.2 Monitoring of Watershed Projects
   4.2.1 What is Monitoring?
   4.2.2 Selection and Identification of Key Indicators for Monitoring
   4.2.3 Collection of Information/Data
   4.2.4 Monitoring of Identified Indicators

4.3 Monitoring at Various Levels
   4.3.1 Central Level
   4.3.2 State Level
   4.3.3 District Level
   4.3.4 Project Implementation Agency

4.4 Monitoring Tools
   4.4.1 Watershed Programme Monitoring Information System
   4.4.2 Supplementary Observation Mechanism
   4.4.3 Quarterly Progress Report (QPR) based Monitoring

4.5 Evaluation of Watershed Projects
   4.5.1 What is Evaluation?
   4.5.2 Need for Evaluation in Watershed Projects
   4.5.3 Evaluation Indicators
   4.5.4 Evaluation Mechanism

4.6 Project Evaluation Techniques
   4.6.1 Un-discounted Techniques
   4.6.2 Discounted Techniques

4.7 Impact Assessment
   4.7.1 Types of Impact Assessment

4.8 Let Us Sum Up

4.9 Keywords

4.10 Suggested Readings

4.11 Model Answers to Check Your Progress

4.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the concept and importance of monitoring watershed programmes;
- describe the monitoring activities at different levels;
- discuss about the watershed programme monitoring information system;
- justify the need for evaluation of watershed programmes; and
- explain the various techniques of monitoring and evaluation of the watershed programme.
4.1 INTRODUCTION

Can you explain why monitoring and evaluation are required in watershed project? Monitoring and evaluation offers an exciting opportunity to prove the impact of the watershed project. Monitoring and evaluation is a regular, systematic collection and analysis of information to track the progress of project implementation. It can be a crucial signpost that keeps you on track, a chance to re-assess priorities, and an activity that helps compile an evidence base for future proposals. Monitoring and evaluation provides government officials, executive managers, and civil society with better means for learning from past experience, improving planning, organizing and allocating resources, and demonstrating results as part of accountability to key stakeholders. Within the development community, there is a strong focus on results. Further, monitoring is not limited only to the supervision of the project activities, but also it is the process of complete evaluation of the project required for mid-term correction/modification/closing down the existing one and starting a new project. It is the most important managerial tool in ongoing projects. Evaluation helps in identifying the strength and weaknesses, merits and demerits, costs and benefits of the projects. Evaluation is generally applied at a project’s mid-term and at its end. It also helps in further refining the project/programme components. Hence, final evaluation is necessity which will enable us to learn lessons of success or failure. Therefore, monitoring and evaluation is applied to answer following two questions:

a) Are we doing the project right? (Monitoring)
b) Are we doing the right project? (Evaluation)

4.2 MONITORING OF WATERSHED PROJECTS

Monitoring produces timely, accurate and adequate information about the impact of the watershed project. It provides data so that plans can be adjusted and resources managed in answer to the project needs and opportunities. Its aim is to record information in sufficient details to illustrate accountability and to provide future evaluators. So far, you have understood why monitoring is required in a watershed project? Now, let us learn what is monitoring?

4.2.1 What is Monitoring?

Monitoring is a continuous and periodic review and the surveillance by the management at different levels of the implementation of a project to ensure that the deliveries, work schedules, targeted output and other required actions are being carried out as per the plan. Now, you can understand that monitoring is a management function which begins with the start of a project and ends with the completion of the project, but, it is a continuous process during the implementation of project. Monitoring of watershed project focuses on the following aspects:

a) Implementation: It relates to the several activities performed regularly as well as occasionally that are essential for the proper functioning of a project, viz. delivery and distribution of the project resources including credit and inputs, etc.

b) Performance: It relates to the level of achievements of the project targets such as area treated, peoples groups mobilized, area increased under net cropped and gross cropped etc.
**c) Impact:** It deals with effects of the project operation and socio-economic development in the form of changes in the livelihood and nutritional security of the watershed beneficiaries. It further deals with the changes in the local environment and ecology which improves with project operation and performance.

Monitoring is an essential tool for successful implementation of the watershed projects. During the process of monitoring, identify the shortfalls, deviations, problems as well as the lessons for improving future project planning and organization. Monitoring has direct bearing on improving the project outcomes and also the efficiency and efficacy of public spending. Monitoring is done at different levels. The Government of India has adopted multiple monitoring mechanisms to cover the various aspects of the watershed projects.

### 4.2.2 Selection and Identification of Key Indicators for Monitoring

According to the plan of a project, the key indicators should be determined by the project manager, technical staff and the monitoring unit at the very beginning of the project unit. Before identifying indicators, project plan should be carefully examined. The selected indicators should be:

a) Simple and easy to measure

b) Reliable and replicable

c) Sensitive to changes

d) Simple to compute

e) Easy to understand and interpret

Since most of the time, benchmarks data are not available or inadequate, participatory impact evaluation may be adopted, the evolution team may largely use PRA techniques for information/data collection during field visit.

The following are the key indicators for the watershed project:

i) **Physical outputs:** This includes for instance, hectares of trees planted terraces completed, meters of stream bank protected, and their progress, costs, inputs and accomplishments against the original plan and time schedule.

ii) **Land use changes:** Land use changes over time are usually a major concern of watershed projects. By comparing the data of different periods the project can get a picture of land use trends as well as the impact of the project work.

iii) **Erosion, sedimentation, water quality and runoff:** These are also major concerns of watershed projects. One or two may be more important than the others depending on the main objectives of the project. For instance, if on-site erosion is of greater concern than flooding and sedimentation, then the monitoring work should be concentrated on the former. Likewise, if heavy sedimentation of a reservoir is the major concern, the task should include monitoring of both erosion and sedimentation rates.
iv) **Farm income, production and land productivity:** Increase of farm income through an increase of crop or animal production or marketing may be one of the major objectives of watershed projects. In terms of natural resources protection, however, land productivity in the long run may be more important than short-term income. Whatever the major concern is both needs to be monitored.

v) **Sustainability and development:** Whether the watershed or soil conservation work will be sustained after the project is terminated is an important concern. The success or failure of a project is normally judged by its sustainability. Many projects have rural development components. Monitoring of development work, such as kilometers of road built and maintained and numbers of houses improved, is also necessary.

### 4.2.3 Collection of Information/Data

In the process of formulating watershed projects, there must be some inventory data already collected that can serve as baseline information for monitoring uses. These may include soils, rainfall, land use land capability, physical problems of the watershed infrastructure, and socio-economic conditions. Such data are usually essential to serve the needs of the subsequent monitoring work. As a project proceeds, additional data should be sought as required by the monitoring programme. Contact with farmers, interviews, farm planning and supplemental surveys are usually required. For collecting new data, close attention should be paid to the availability and usefulness of the data as well as the time and resource limit. Data that is too expensive to collect or takes too long to obtain should be avoided.

### 4.2.4 Monitoring of Identified Indicators

Monitoring of the following indicators is crucial for the watershed project:

a) **Physical Outputs:** Monitoring of physical outputs is the most essential and straightforward. Each project should design and establish a sound database that includes, for instance, planned work, yearly schedule, overall targets, sub-targets and accomplishments. The database is better linked to various maps and diagrams. Geographic Information Systems (GIS) is essential to establish such monitoring data. In addition, cost of project work needs to be closely monitored.

b) **Land Use Changes:** You know that proper land use in accordance with the capability of each piece of land is probably one of the most important goals for watershed projects. Therefore, monitoring land use changes in a watershed or and area is necessary. In addition to surveying of land using remote sensing techniques, a land capability map should also be produced.

c) **Erosion, Sedimentation, Water Quality and Runoff:** As you may understand that monitoring of all or part of these indicators is normally requires for a watershed project. However, these kinds of environmental data are not easy to collect. Often, the project life is too short to obtain a meaningful result, or the area is too small to produce a significant impact downstream. Generally speaking, to make hydrological data usable for monitoring purposes, a decade of records is required.

d) **Income, Production and Land Productivity:** A baseline socio-economic survey is usually done at the inception of a project. Periodic and repeated
surveys will provide information on the project’s impact and benefit. Beneficiary contact monitoring should be carried out routinely. Land productivity is related to resource conservation, which is both a government and a public concern. Farmers may deplete soil resources in order to make a living. There are many ways to increase farm production and income; yet, for the benefit of the nation as well as future generations, maintaining or improving land productivity is a fundamental task.

e) **Sustainability and Development**: Project sustainability can be monitored by the number of farmers who participate in the project, their maintenance work, and the rates of adoption of new techniques. A higher percentage of farmers adopting the recommended work would indicate higher sustainability. For watershed or conservation projects aimed at rural development, a close monitoring of development work is necessary, which may include housing, road building, maintenance of domestic water, small irrigation, fuel-wood supplies, and marketing facilities.

Check Your Progress 1

Note: a) Use the space given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What is monitoring? Explain its need for watershed programmes?

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

2) List key indicators of watershed projects.

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

4.3 **MONITORING AT VARIOUS LEVELS**

Monitoring has direct bearing on improving the delivery system and also efficiency and efficacy of public spending. Monitoring of watershed programmes is done at various levels and the same is described below:

4.3.1 **Central Level**

In the past, separate systems were established for central projects and for the monitoring of the 20 Point Programme and infrastructure performance. A separate Ministry of Programme Implementation was also responsible for monitoring tasks. Of late, the monitoring system at various levels has got into a stereotyped mechanism, handling routine information. During the Eighth Plan, efforts were made to evolve a system of regular flow of relevant information to make monitoring
Monitoring, Evaluation and Capacity Building

4.3.2 State Level

In the past, government departments had adopted several procedures for collecting and reporting information. The information generated for operation was from annual and other periodical reports, minutes of meetings, etc. However, realizing the merits of the problem, a post of Development Commissioner was created, who was in charge of all the development work under the supervision of the Development Committee, usually chaired by the Chief Minister. Later on, on the Central Government pattern, in some of the states, a separate Ministry of Programme Implementation was also responsible for monitoring tasks. Currently, most the states are having their own Planning Boards/Planning Commissions on the Central Government Pattern. They have developed their own system of regular flow of relevant information to make monitoring an effective tool of management action at all levels.

4.3.3 District Level

For the district level, provision was made for a District Planning Committee under the chairmanship of the collector, consisting of a District Planning Officer and other officer of technical development departments and some non-official members (Member of Parliament (MP), Members of Legislative Assemblies (MLA) and Village Panchayat, Member of Cooperative Societies and Member of Academic Institutions). A major step was taken with the creation of District Rural Development Agency (DRDA). The staffing structure of the DRDA consist one Economist/Statistician, Credit Planning Officer and a Rural Industries Officer who are together said to constitute the planning team of the DRDA. All these officers are responsible for planning, project formulation as well as implementation in their respective sectors.

4.3.4 Project Implementation Agency

Monitoring system at project implementing agency level is more different as compare with monitoring mechanism developed and adopted by the District Rural Development Agency. In case of centrally and state sponsored development programmes/projects, DRDA is the implementing agency. However, in case of large sized project, self-built evaluation mechanisms are being created to avoid the delay and to improve the quality of information gathered. Sometimes, independent agencies like academicians, private organizations as well as NGOs are assigned this task depending upon the requirements of the sponsoring agencies.

4.4 MONITORING TOOLS

For effecting monitoring of the Watershed Programmes, the following monitoring tools are available:
4.4.1 Watershed Programme Monitoring Information System

Watershed Programmes Monitoring Information System (WPMIS) is a web based application which can be accessed by the URL [http://wpmis.nic.in](http://wpmis.nic.in). The WPMIS is aimed to collect and compile the project-details and Quarterly Progress Reports related to all the watershed projects sanctioned by the Department of Land Resources (DoLR) under all the three area development programmes namely Integrated Wasteland Development Program (IWDP), Drought Prone Areas Program (DPAP) & Desert Development Program (DDP). WPMIS serves the purpose of adding value to the present monitoring system in force and is more in the nature of “On-Line Real-Time Management Information System”.

Under this system, monitoring the registered individuals and the officials of the governmental and non-governmental organizations as the guidelines will carryout the monitoring of the allotted districts. The state authority provides online the QPRs of DDP/DPAP/IWDP Projects. The evaluator uses these proformas and provides the feedback on all the important activities including physical and financial on every quarter. The individual suggestions and feedback are reviewed by the designated officer and the pertinent informations are utilized for refining and improvement of the programmes.

For Districts: List of all the projects and their fund-releases, sanctioned for the concerned district will be presented to the authenticated DRDA/ZP users of WPMIS. The DRDA/ZP officials may compile QPR as per DoLR format by simply filling the related quarter’s data of progress made. The prepared QPR may then be printed and used for the purposes of circulation and/or documentation. Meanwhile, the process will maintain all the QPRs and projects in arranged order; and these will remain available on web for quick reference.

For States: Concerned state officers may also sign-in to view the QPRs and related reports. To get such state-level user account, fill the Request for State level user-account form and send to the concerned officer in DoLR, New Delhi. The state level monitor has to apply to the government of India for the registration on the prescribed form available at the monitoring website of the Ministry of Rural Development.

4.4.2 Supplementary Observation Mechanism

To strengthen the monitoring at the state and the district levels, the services of the identified district and state institutions will be registered with the department. The observer a partnership relationship with district authorities’ state department will be established. These institutions will assist in generating information/feedback based observation taken of the projects. The Institutions will provide timely and precise input regarding the pace and the quality of implementation of the project.

The proposed arrangements will serve the purpose of adding value to the monitoring system in force. The general idea is to supplement the efforts in place by instituting in-house mechanism that will be more in the nature of online real time management information system. The information about the watershed projects will be generated on regular basis. Institutions appointed as the observer will act as guide and adviser to the district authorities and also work as eyes and ears of the government. The institutions will spare the services of an officer assisted by one or two ministerial staff for performing the expected jobs, including identification of leading activity required in each of the watershed projects.
a) **Selection of Institutions:** All district level institutions having proximity to the project area should have necessary and adequate expertise and infrastructure, including manpower dealing with the watershed development programmes. However, the additional work load will be carried out by the existing manpower. In case of non-availability of such institutions, the institutions available nearby will be assigned the job. Reputed and experienced NGOs are also selected in absence of the government Institutions. Similarly, the state level institutions are also identified to coordinate the work of the district level institutions. They should also visit at least one third of the projects of the state.

b) **Methodology for selection of these institutions entails rest with state government.** State government in consultation with the state watershed advisory committee select an institution on the approval of the Department of Land Resources. More than one such institution can be appointed to cater the need huge task. The district level institutions are appointed by the State Government on the recommendations of the Zila Parishad under the information to the Department of Land Resources. The tenure of the district institutions are three years. These institutions are provided funds for the undertaking the tasks.

4.4.3 **Quarterly Progress Report (QPR) based Monitoring**

The individual can assess the QPR of the allotted watershed and analysis can provide feedback. The QPR, in general, is submitted by all the PIAss to the Government of India. This report provides information, not only on the physical and financial but also highlights the procedures in accomplishing works and activities. In this case also the officials of both governmental and non-governmental organizations are appointed on request.

**Check Your Progress 2**

**Note:**

a) Use the space given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Describe the various levels of monitoring.

2) What do you understand by watershed programme monitoring information system?
4.5 EVALUATION OF WATERSHED PROJECTS

Evaluation takes an objective look at what you’ve been doing and identifies the reasons for both success and failure, and how your future work can learn from both. It is normally carried out at the end of the project. However, an evaluation can be carried out either at a specified time, or as is the case with a multi-phased project, at the end of a phase. Equally, evaluation is a means by which those administering the project are held accountable to both beneficiaries and funding agency. Evaluation as a process determines systematically and objectively the relevance, efficiency, effectiveness and impact of project activities in the light of its defined objectives.

4.5.1 What is Evaluation?

Evaluation can be defined as “a periodical study to measure, establish and analyse the realisation of objectives as well as the process leading up to their realisation, aimed at determining, inter alia, a project’s effectiveness, efficiency, policy and/or significance, and at improving intervention processes”.

The term “evaluation” is also used for routine checks as to see whether monitoring returns are being compiled correctly. To avoid any doubt, this would be considered as concurrent evaluation. Evaluation analyses the judgement of information in order to assess value, worth or impact of a project. Additionally, it looks at the dynamics of development interventions and identifies the reasons for both success and failure and how one can learn from both. Evaluation is an instrument to gain deeper insights into processes and circumstances that influence the implementation of plans. It requires baselines, regular data collection and evaluation frameworks built into the project at the time of implementation.

Two objectives of evaluation are to:

i) learn from experience in order to enable the realization of qualitative improvement and greater effectiveness in future, and

ii) render accountability to donors, with a view to the assessment and approval of new project proposals.

Evaluation is done periodically and serves to analyze a situation to determine why something happened and suggest what might be done to correct undesirable situation. It is a good mechanism to pin down reasons for failure of treatment measure and to devise an alternative solution to avoid such situation and even provide mid-term corrections. There can be a pre-project evaluation or baseline study to assess whether the anticipated effects of a project are materializing. A mid-term evaluation will provide insight into change which can enable a project to meet its objectives more efficiently whereas an ex-post evaluation can be useful for planning similar project in future. An ex-post evaluation is done at end of the project to overall achievements and impact of the project in meeting the intended objectives.

4.5.2 Need for Evaluation in Watershed Projects

Evaluation is done after completion of the watershed project. It is always necessary to evaluate the project so as to identify the strengths and weakness for further refining of the components in the projects. Evaluation will necessary for:
i) measuring the progress and achievements of the project,
ii) determining the need for changing the direction of the whole approach,
iii) making work more effective through better planning in future,
iv) improving monitoring and data collection methods,
v) controlling project costs corresponding with the achievements,
vi) ascertaining the strength and weakness of the project,
vii) sharing the experience and impact of the project, and
viii) comparing project activities with similar other projects.

4.5.3 Evaluation Indicators

Performance indicators are measures of inputs, processes, outputs, outcomes, and impacts for development projects, programs or strategies. When supported with sound data collection—perhaps involving formal surveys-analysis and reporting, indicators enable managers to track progress, demonstrate results, and take corrective action to improve service delivery. Participation of key stakeholders in defining indicators is important because they are then more likely to understand and use indicators for management decision-making. The common indicators in watershed projects are as follows:

i) Physical achievements,
ii) Socio economic,
iii) Efficiency, and
iv) Equity.

4.5.4 Evaluation Mechanism

Ministry of Rural Development, GoI undertakes concurrent evaluation, impact assessment studies and quick evaluations from time-to-time, through reputed and independent Research Institutions/Organizations. The main objectives of these studies are to evaluate the performance of the Schemes at the field level, assess the impact of the programmes and to identify the problems during course of implementation so as to make mid-course corrective measures, wherever necessary.

Monitoring and Review

The Project Implementation Agency shall be responsible to submit progress reports on each of the Watershed Development Projects once in every quarter to the ZP/DRDA. Similarly, each Watershed Committee shall submit a quarterly report to the ZP/DRDA after it is scrutinized and approved by the WDT. The formats for these reports shall be developed on the basis of the success criteria given in the Programme Guidelines. The format will be developed by the Ministry of Rural Development to facilitate computerized reporting.

Monthly review meetings of the WDT, DRDA/ZP are conducted during 3rd and 10th of every month, respectively. State level review may be held once in a quarter. While the usual monitoring of the physical and financial progress of the watershed projects could be done through the quarterly progress reports, the main purpose of the monthly review meetings is to discuss and analyze the performance including the reasons for success and difficulties in the implementation.
of the projects with a view to replicating successes and overcome barriers to effective implementation.

**Evaluation and Process Documentation**: The Ministry of Rural Development and the State Governments may appoint independent institutions organizations to carry out concurrent as well as post-facto evaluations of the Watershed Development Projects. The Success Criteria laid down in the programme guidelines are the basis for such evaluations. At the same time, independent consultants may be asked to undertake action research projects to document the actual process of project implementation, in a representative sample, to analyse and assess the implementation processes. The results of these evaluations and process documentation should be submitted to the State Level Implementation and Review Committee and the Central Government with suggestions on policy issues as well as improvement of working procedures.

**Evaluation needs to be conducted in accordance with the following points:**

i) Evaluating a project closely against its plan of work.

ii) Use as much the project’s existing monitoring data as possible.

iii) Remain objectives rather then subjective.

iv) Make goodwill recommendations as well as constructive criticism.

v) Study the project documents and reports before visiting site.

vi) Listen attentively to the project’s report during briefing.

vii) Interview individual staff with understanding and encouragement.

viii) Evaluate big picture of the project (performance, achievements, efficiency and impact) rather than smaller items.

ix) Closely evaluate each of indicators.

x) If shortcomings are found, determine whether it was due to project design flaws or implementation.

xi) Use cost benefit analysis to examine the economic efficiencies of project, if necessary.

xii) Compare areas with or without project to evaluate impact and sustainability of project.

xiii) Draw up reasonable and operable conclusions and recommendations.

---

**Check Your Progress 3**

**Note**: a) Use the space given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What is evaluation and explain its two important objectives?

..................................................................................................................
..................................................................................................................
..................................................................................................................
..................................................................................................................
..................................................................................................................
..................................................................................................................

..........................................................
2) List common indicators used for evaluation of watershed projects.

4.6 PROJECT EVALUATION TECHNIQUES

The important techniques used for the quantification and drawing inferences on measurable projects objectives are discussed below:

4.6.1 Un-discounted Techniques

The un-discounting technique, the following are the important measure:

i) Urgency

ii) Payback period

iii) Return per Rupee of Investment

iv) Average annual Return per Rupee of Investment

i) Urgency

According to this measure, projects which are deemed to be more urgent get priority over project which are not regarded as urgent. The problem with this criterion is, how can the degree of urgency be determined? In certain situation, of course, it may not be difficult to identify highly urgent investment. In many cases, however, it is difficulty to determine the relative degree of urgency because of lack of an objective and qualifiable basis. Therefore, in general, this criterion should not be used for investment making except under exceptional cases.

ii) Pay Back Period (PBP)

In any investment decision, the objective is to recover the initial cost of resources invested as quickly as possible. If the time factor is an important consideration, then the project which yields income in a shortest possible time should be preferred. Payback period as an investment criterion would give a ranking of project on the basis of how quickly investment cost can be recovered.

Suppose, we have four projects A, B, C and D, with pay back period and ranking as under:

<table>
<thead>
<tr>
<th>Project</th>
<th>Pay Back Period in Years</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.0</td>
<td>I</td>
</tr>
<tr>
<td>B</td>
<td>2.0</td>
<td>I</td>
</tr>
<tr>
<td>C</td>
<td>2.8</td>
<td>IV</td>
</tr>
<tr>
<td>D</td>
<td>2.7</td>
<td>III</td>
</tr>
</tbody>
</table>

The payback period ranking makes project A and B more acceptable as compared to C and D.
Limitation

Investment decisions are not only based on the recovery of the initial investment as quickly as possible but also on getting the maximum return on investment though the project may be slow yielding.

iii) Return per Rupee of Investment

By choosing return per rupee of investment as an investment criterion, we have shifted our emphasis from quick recovery of investment to return per unit of cost. In the pay back period, we ignored the return of the project after the pay back period. The method of calculating return per rupee of investment is given as under:

<table>
<thead>
<tr>
<th>Project</th>
<th>Capital Investment</th>
<th>Net Return</th>
<th>Return per Rupee of Investment</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td>20.00</td>
<td>1.00</td>
<td>IV</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>20.97</td>
<td>1.05</td>
<td>III</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td>23.50</td>
<td>1.18</td>
<td>I</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>23.50</td>
<td>1.18</td>
<td>I</td>
</tr>
</tbody>
</table>

Based on this criterion project C and D occupy higher rank while B and A are relegated to the background. Thus, the investment decision depends upon the criterion applied.

Limitation

In this criterion, we ignore the accrual of return over a time period.

iv) Average Annual Return per Rupee of Investment

In this criterion net return first divided by the number of years to arrive at the average return per year and then the average return per year is divided by the original investment cost to find average annual return per rupee of investment. The procedure is given as under:

<table>
<thead>
<tr>
<th>Project</th>
<th>Project Duration (years)</th>
<th>Total Cost</th>
<th>Net Return</th>
<th>Average Net Return</th>
<th>Average Annual Return per Rupee of Investment</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>20</td>
<td>20.00</td>
<td>10.0</td>
<td>0.50</td>
<td>I</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>20</td>
<td>20.97</td>
<td>6.99</td>
<td>0.35</td>
<td>IV</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>20</td>
<td>23.50</td>
<td>7.83</td>
<td>0.39</td>
<td>II</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>20</td>
<td>23.50</td>
<td>7.83</td>
<td>0.39</td>
<td>II</td>
</tr>
</tbody>
</table>

Thus, by using this criterion, the Project A has put at top as by pay back period criterion. This criterion has again ignored the length of time of the return stream and has thus given preference implicitly to projects with higher return in a short period.
Time Value of Money: In the cases discussed above, we have not taken into account an important element i.e. time value of money. In a project or between two projects, inputs incurred and output realized may not have the same time period. We cannot compare such project and cost-benefits items simply as discussed in the undiscounted measures.

We have to consider the stream of costs and benefits accruing over a period of time of the same value to us, which is not the case in reality. Hence, the discounting of costs and benefits occurring at different periods of time would alone make comparisons of costs and benefits valid in order to arrive at the correct investment decision. Therefore, the last three criteria described earlier suffer from the limitation of costs and benefits occurring at different periods of time not being comparable. In the place, first they should be reduced to a common time period, i.e. one should compare costs and benefits on a uniform basis to arrive at an investment decision to utilize the resources more efficiently.

4.6.2 Discounted Techniques

The technique of discounting permits us to determine whether to accept for implementation projects that have variously shaped time streams i.e. patterns of when costs and benefits fall during the life of the project that differ from one another and that are of different durations. The most common means of doing this is to subtract year-by-year the costs from the benefits to arrive at the incremental net benefit stream—the so-called cash flow and then to discount that. This approach will give one of three discounted cash flow measures of project worth: the net present worth, the internal rate of return, or the net benefit-investment ratio. Another discounted measure of project worth is to find the present worth of the cost and benefit streams separately and then to divide the present worth of the benefit streams by the present worth of the cost stream to obtain the benefit-cost ratio. Because the benefit and cost streams are discounted, the benefit-cost ratio is a discounted measure of project worth. But because the benefit and cost streams are discounted separately rather than subtracted from one another year by year, the benefit-cost ratio is not a discounted cash flow technique.

The investment criteria based on the discounting techniques are given below:

i) Net Present Value (NPV)

ii) Benefit Cost Ratio (BCR)

iii) Internal Rate of Return (IRR)

iv) Social benefit-cost analysis below

i) Net Present Value

This is simply the present worth of the cash flow stream. Sometimes, it is referred to as Net Present Value (NPV). NPV is helpful in working out benefit-cost ratio of the project. Selection criterion of the projects depends upon the positive value of the net present worth, when discounted at the opportunity cost of the capital this could be satisfactorily done, provided there is a correct estimate of opportunity cost of capital. NPV is an absolute measure, but not relative.

NPV of the project is estimated using the following equation:

\[
NPV = \frac{P_1}{(1+i)t_1} + \frac{P_2}{(1+i)t_2} + \ldots + \frac{P_n}{(1+i)t_n} - C
\]
Where,
\[ P_1, P_2, \ldots, P_n = \text{Net cash flow in first year, second year, \ldots, nth year;} \]
\[ t_1, t_2, \ldots, t_n = \text{Time period in first year, second year, \ldots, nth year;} \]
\[ i = \text{Discount rate; and} \]
\[ C = \text{Initial cost of the investment.} \]

Projects with positive NPW are given weightage in the selection compared to those with negative present values, while zero NPW makes the investor indifferent.

ii) Benefit-Cost Ratio

The benefit-cost ratio is derived by dividing the present value of benefit, by the present value of cost. The ratio between the two would indicate benefit per rupee of cost.

Benefit cost ratio \((BCR)\) = \(\frac{\text{Present value of benefit}}{\text{Present value of cost}}\)

\[ BCR = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+r)^n}}{\sum_{t=1}^{n} \frac{C_t}{(1+r)^n}} \]

The decision rules associated with the benefit cost ratio are:

a) In case of single project accept the project. If \(BCR\) is positive and reject the project if \(BCR\) is negative. In case benefit cost ratio is one it is a matter of indifference.

b) In the case of more than one project, rank the projects in descending order of \(BCR\). The number of projects to be chosen will depend upon the availability of investment funds.

Limitations of BCR as Investment Criteria

- Choice of discount rate.
- \(BCR\) discriminates against projects with relatively high gross returns and operational cost.
- Inclusion or exclusion of certain costs in the calculation of \(BCR\).

While limitations second and third can be taken care of in arriving at an investment decision, the first factor i.e. selection of proper discount rate is the main limitation of this method. Which discount rate should be chosen and why remains the major hurdle. While the market rate of interest, due to various market imperfections, does not correctly reflect the time preference of society for present over the future, the choice of social discount rate or opportunity cost of capital is very difficult to derive. Based on the prevailing market rate of interest, the distribution of income in the economy and the planner’s preference for the present over the
In order to take care of limitation, another investment criterion which is considered more scientific and which does not require the assumption of a discounting rate, is the internal rate of return.

### iii) Internal Rate of Return (IRR)

The internal rate of return of a project is the discount rate which makes present value equal to zero or benefit cost ratio equal to one. Internal rate of return does not depend on the externally given rate of discount. In fact, IRR itself is a discount rate at which net present value (NPV) = 0 and BCR = 1. It represents the average earning power of money used in the project, over the project life.

In the working procedure, an arbitrary discount rate is assumed and its corresponding NPW is arrived at. The positive NPW value of the project indicates that IRR is still higher and the next assumed arbitrary IRR value must be comparatively higher than the initial level. This process is continued until NPW becomes negative. Then by interpolation method the exact IRR is found out using the following formula:

\[
\text{Internal rate of return} = \text{Discount rate} + \frac{\text{Difference between the two discount rates}}{\text{Absolute difference between the present worth of the cash flow at the two discount rates}}
\]

It is important to note that IRR at its own does not provide a criterion for selection of projects. It needs some other variable, i.e. that market rate of interest or the social rate of discount for comparison to arrive at the decision. IRR as an investment criterion can be used as follows:

- Choose a single project if IRR \((r_1)\) is greater than market rate of interest \((r_2)\)
- With more than one project, rank the project in a descending order of value of IRR and choose that set of projects for which \(r_1\) is greater than or equal to \(r_2\) subject to available investment fund.

### iv) Social Benefit-Cost Analysis (SCB)

For a private commercial entrepreneur project choice is a simple exercise. If he has his own objectives, which seem to be a reasonable assumption, all he has to do is to ascertain which project satisfy his objective best. In general, profit maximization remains main objective of an entrepreneur. For a planner, the picture is somewhat more complex. In choosing projects he has to ascertain which ones best satisfy the interest and objectives of the nation. His personal objectives are unimportant; he must choose the best thing for the society.

The reason for doing social benefit-cost analysis in the choice project is that the choice of one project rather than another must be viewed in the context of their total national impact, and this total impact has to be evaluated in terms of a set of national objectives. When one project is chosen rather than another, the choice has consequences for employment, output, consumption, savings, foreign
exchange earning, income distribution and other things of relevance to national objectives. The purpose of social benefit-cost analysis is to see whether these consequences taken together are desirable in the light of the objectives of national planning.

The simplest possible full social benefit-cost analysis will put a social price on everything (costs and benefits); subtract the cost from benefit, add up for each year, thus reaching a net social profit or loss for that year; and discount these total by the average rate of interest to give the present social value.

### 4.7 IMPACT ASSESSMENT

Impact assessment is the systematic identification of the effects – positive or negative, intended or not – on individual households, institutions, and the environment caused by a given development activity such as a program or project. It helps us better understand the extent to which activities reach the poor and the magnitude of their effects on people's welfare. Impact assessments can range from large scale sample surveys in which project population and control groups are compared before and after, and possibly at several points during program intervention; to small-scale rapid assessment and participatory appraisals where estimates of impacts are obtained from combining group interviews, key informants, case studies and secondary data.

**What can we use it for?**

- Measuring outcomes and impacts of an activity and distinguishing these from the influence of other, external factors.
- Helping to clarify whether costs for an activity are justified.
- Informing decisions on whether to expand, modify or eliminate projects, programs or policies.
- Drawing lessons for improving the design of future activities.
- Comparing the effectiveness of alternative interventions.
- Strengthening accountability for results.

**Advantages and limitations**

It provides estimates of the magnitude of outcomes and impacts for different demographic groups, regions or over time and provides answers to some of the most central development questions – to what extent are we making a difference? What are the results on the ground? How can we do better? Systematic analysis and rigor can give managers and policy-makers added confidence in decision-making. However, some impact assessment approaches are very expensive and time-consuming. It also reduces utility when decision-makers need information quickly. Further, it is always difficult to identify an appropriate counter-factual.

**4.7.1 Types of Impact Assessment**

Policy impact assessment is only one type of impact assessment and the other kinds of impact assessment include:
Environmental and social impact assessments are the specific contexts within which the impact assessment takes place. Social impact assessment prospectively assesses the potential social impacts of a specific policy or program initiative. For example, the Health Ministry is often asked to report on the social impacts of the introduction of a new health scheme under National Health Mission within a given area. The impacts addressed in an environmental impact assessment are wide ranging. For example, an environmental impact assessment of a major development project will look at the impact(s) on the socio-economic environment, human health, aboriginal archaeology, non-indigenous heritage, noise and vibration, air quality, greenhouse gas emissions, transport and recreation and amenity with the intent of assessing the overall impact on the environment.

Check Your Progress 4

Note:  

a) Use the space given below for your answers.  
b) Check your answers with those given at the end of the unit.

1) What do you understand by NPV?

2) What are the limitations of BCR?

4.8 LET US SUM UP

- Monitoring and evaluation is a regular, systematic collection and analysis of information to track the progress of project implementation. It offers an exciting opportunity to prove the impact of the watershed project. Monitoring is not limited only to the supervision of the project activities, but also it is the process of complete evaluation of the project required for mid-term correction/modification/closing down the existing one and starting a new project.

- The key indicators for the watershed project are physical outputs, land use changes, erosion, sedimentation, water quality, and runoff, farm income, production, and land productivity and sustainability and development.
• Monitoring has direct bearing on improving the delivery system and also efficiency and efficacy of public spending. Monitoring of watershed programmes is done at various levels viz. central, state, district and PIA.

• For effecting monitoring of the watershed programmes, the monitoring tools include Watershed Programmes Monitoring Information System, supplementary observation mechanism and quarterly progress report based monitoring.

• Evaluation takes an objective look at what you’ve been doing and identifies the reasons for both success and failure, and how your future work can learn from both. It is normally carried out at the end of the project. Evaluation is generally applied at a project’s mid-term and at its end. It also helps in further refining the project/programme components.

• Performance indicators are measures of inputs, processes, outputs, outcomes, and impacts for development projects, programs, or strategies. When supported with sound data collection—perhaps involving formal surveys—analysis and reporting, indicators enable managers to track progress, demonstrate results, and take corrective action to improve service delivery. Ministry of Rural Development, GoI undertakes concurrent evaluation, impact assessment studies and quick evaluations from time-to-time, through reputed and independent Research Institutions/Organizations.

• Project Evaluation Techniques include un-discounting and discounting techniques. The un-discounting technique includes Urgency, Payback period, Return per Rupee of Investment and Average Annual Return per Rupee of Investment. The discounting technique includes Net Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR), Social benefit-cost analysis.

4.9 KEYWORDS

Benefit-Cost Ratio: It is defined as the ratio of the present value of benefit to the present value of cost.

Concurrent Evaluation: It is done during the execution stage of the project and is meant to identify and analyze any pitfalls in the execution of the project.

Impact: It deals with effects of the project operation and socio-economic development in the form of changes in the livelihood and nutritional security of the watershed beneficiaries.

Implementation: It relates to the several activities performed regularly as well as occasionally that are essential for the proper functioning of a project.

Payback Period: It refers to the period of time required to recover the cost of an investment.

Performance: It relates to the level of achievements of the project targets such as area treated, peoples groups mobilized, area increased under net cropped and gross cropped etc.
4.10 SUGGESTED READINGS


4.11 MODEL ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Monitoring is a continuous and periodic review and the surveillance by the management at different levels of the implementation of an activity to ensure that the deliveries, work schedules, targeted output and other required actions are being carried out as per the plan.

Monitoring is the second most important aspect after planning for the successful implementation of watershed programmes. During the process of monitoring, identify the shortfalls, deviations, problems as well as the lessons for improving future project design and performance.

2) Key indicators for the watershed project are as follows:

- Physical outputs
- Land use changes
- Erosion, sedimentation, water quality and runoff
- Farm income, production and land productivity
- Sustainability and development

Check Your Progress 2

1) WPMIS is a web based application which can be accessed by the URL http://wpmis.nic.in. The aim of WPMIS is to collect and compile the project-
details and Quarterly Progress Reports related to all the watershed projects sanctioned by the Department of Land Resources (DoLR) under all the three area development programmes namely Integrated Wasteland Development Program (IWDP), Drought Prone Areas Program (DPAP) & Dessert Development Program (DDP).

2) Various levels of monitoring are as under:
   i) Central Level
   ii) State level
   iii) District level
   iv) PIA level

Check Your Progress 3

1) Evaluation can be defined as "a periodical study to measure, establish and analyse the realisation of objectives as well as the process leading up to their realisation, aimed at determining, inter alia, a project's effectiveness, efficiency, policy and/or significance, and at improving intervention processes".

Two objectives of evaluation are to:
   i) learn from experience in order to enable the realization of qualitative improvement and greater effectiveness in future, and
   ii) render accountability to donors, with a view to the assessment and approval of new project proposals.

2) Following are the common indicators used for evaluation of watershed projects:
   i) Physical achievements
   ii) Socio economic
   iii) Efficiency
   iv) Equity

Check Your Progress 4

1) It is referred to as Net Present Value \((NPV)\). \(NPV\) is helpful in working out benefit-cost ratio of the project. Selection criterion of the projects depends upon the positive value of the net present worth, when discounted at the opportunity cost of the capital this could be satisfactorily done, provided there is a correct estimate of opportunity cost of capital. \(NPV\) is an absolute measure, but not relative.

\(NPV\) of the project is estimated using the following equation:

\[
NPV = \frac{P_1}{(1+i)^t_1} + \frac{P_2}{(1+i)^t_2} + \ldots + \frac{P_n}{(1+i)^t_n} C
\]

Where,

\(P_1, P_2, \ldots, P_n\) = Net cash flow in first year, second year, \ldots nth year;
\(t_1, t_2, \ldots, t_n\) = Time period in first year, second year, \ldots nth year;
\(i\) = Discount rate; and
\(C\) = Initial cost of the investment.
Projects with positive NPV are given weightage in the selection compared to those with negative present values, while zero NPV makes the investor indifferent.

2) Main limitation of BCR are as follows:

- Choice of discount rate.
- BCR discriminates against projects with relatively high gross returns and operational cost.
- Inclusion or exclusion of certain costs in the calculation of BCR.