

## Analysis and comparison of feasibility study of irrigation projects

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### Abstract

Investment in construction project is able to give higher benefit beside of its high uncertainty. The uncertainty depends on many factors. The influence of the identified Factors then has to be evaluated and calculated towards the project feasibility. Before investment, the feasibility of the project has to be done that gives figures of cash flow during the project duration. This can be one of the considerations for making a decision whether the particular project is feasible or not. For a construction project, it is very important to take into consideration the various risks involved in the project at various stages while assessing the technical and financial feasibility of the project.

**Keywords:** Feasibility Study, Irrigation projects, B/C ratio, Payback Period, Internal Rate of Return

### Introduction

Investment in construction project is able to give higher benefit beside of its high uncertainty. The uncertainty depends on many factors. The influence of the identified Factors then has to be evaluated and calculated towards the project feasibility. Before investment, the feasibility of the project has to be done that gives figures of cash flow during the project duration. This can be one of the considerations for making a decision whether the particular project is feasible or not. For a construction project, it is very important to take into consideration the various risks involved in the project at various stages while assessing the technical and financial feasibility of the project. A comprehensive feasibility study is the basis for the decision makers to decide whether to support or reject the project at an initial

stage. The result of a feasibility study shows the preferred solution which is technically and institutionally feasible, financially viable, socio- culturally acceptable and economically justified. A feasibility report is a part of Initial Project Report (IPR) prepared to present an in depth techno-economic analysis carried out on the projects and contains results of technical as well as economic evaluation of the projects so that the owner can take investment decisions and the projects can be properly planned and implemented. The result of this analysis shows a comparison of technical, economic and financial analysis of two irrigation projects which helps to makes to decide the beneficial project.

**Basic aspects and data collected for analysis**

**Sample 1: Arala Irrigation Project**

**A) Project Details:**

The project is located on Bhima river near village Wada in khed Taluka of Maharashtra, there is a good site for construction of a masonry dam near village Kalmodi about 22 kms upstream of Chaskaman project.

**B) Project Cost:**

The cost of the project is estimated to be Rs. 21272.74 lakhs. The project is to be financed by Government Corporation and therefore it is presumed that this much amount of fund is made available from the financial planning of the state government corporation.

**C) Means of Finance:**

The project comes under the State Government authority and as a separate department and corporation have been setup for the similar type of projects, therefore the funding of the project is entirely done by the water resources department of the state government.

**D) Project Data:**

Net project cost = Rs. 21272.74 lakhs  
 Catchment Area (CCA) = 4061 Ha  
 Irrigated Command Area (ICA) = 5065 Ha

**Sample 2: Tarali Irrigation Project**

**A) Project Details:**

Tarali Irrigation Project is situated in Satara district of Maharashtra State. Dam across river Tarali, a tributary of river Krishna, is located near village Dangistewadi in Patan Taluka.

**B) Project Cost:**

The cost of the project is estimated to be Rs. 105762.81 lakhs. The project is to be financed by Government Corporation and therefore it is presumed that this much amount of fund is made available from the financial planning of the state government corporation.

**C) Means Of Finance:**

The project comes under the state government authority and as for the same

a separate department and corporation have been setup for the similar type of projects; therefore the funding of the project is entirely done by the WRD of the state government through MKKVM.

**D) Project Data:**

Net project cost = Rs. 105762.81 lakhs  
 Cultivable Command Area(CCA)=8145 Ha  
 Irrigable Command Area (ICA) = 22025 Ha

**Analysis and evaluation**

The analysis is done by following three methods:

**Sample 1 Analysis:**

**1) Payback Period (PBP)**

$$\text{Payback period} = \frac{\text{Cost of the project}}{\text{Cash inflows in one year}}$$

$$= 21272.74 / 4530.64$$

$$= 4.69 \text{ years}$$

**Conclusive Statement:** PBP in case of this project is between 4 to 5 year.

**2) Benefit/Cost Ratio**

$$\text{B-C Ratio} = \frac{\text{Total Annual Benefit}}{\text{Total Annual Cost}}$$

$$= \frac{4530.64}{2985.34}$$

$$= 1.52$$

**Conclusive Statement:** B/C Ratio for this project is 1.5.

**3) Internal Rate of Return (IRR)**

$$\text{IRR} = \text{Starting Rate} + \left[ \frac{\text{Surplus at Startig Rate}}{\text{Surplus at Starting Rate} - \text{Surplus at Ending Rate}} \right] \times [\text{Ending rate} - \text{Starting Rate}]$$

$$\text{IRR} = 12 + \left[ \frac{14217.96}{14217.96 - 10665.46} \right] \times [13 - 12]$$

$$= 16\%$$

**Conclusive Statement:** IRR in case of this project is 16% i.e. "annualized effective

compounded return rate" or "rate of return" that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero.

**Sample 2 Analysis:**

**1) Payback Period (PBP):**

$$\begin{aligned} \text{Payback period} &= \frac{\text{Cost of the project}}{\text{Cash inflows in one year}} \\ &= 105762.28 / 14073.58 \\ &= 7.51 \text{ years} \end{aligned}$$

**Conclusive Statement:** PBP in case of this project is between 7 to 8 year.

**2) Benefit/Cost Ratio:**

$$\begin{aligned} \text{B-C Ratio} &= \frac{\text{Total Annual Benefit}}{\text{Total Annual Cost}} \\ &= \frac{14073.58}{12478.15} \\ &= 1.13 \end{aligned}$$

**Conclusive Statement:** B/C Ratio for this project is 1.13.

**3) Internal Rate of Return (IRR):**

IRR = Starting Rate +

$$\begin{aligned} &\left[ \frac{\text{Surplus at Startig Rate}}{\text{Surplus at Starting Rate} - \text{Surplus at Ending Rate}} \right] \times \\ &[\text{Ending rate} - \text{Starting Rate}] \\ \text{IRR} &= 12 + \left[ \frac{1174.73}{1174.73 - (-5447.74)} \right] \times [13-12] \\ &= 12.18 \% \end{aligned}$$

**Conclusive Statement:** IRR in case of this project is 12.18 % i.e. "annualized effective compounded return rate" or "rate of return" that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero.

**Results and conclusion**

The sample case studies considered for the seminar are of Irrigation projects gravity dam for Feasibility analysis, the Arala (Kalmodi) Irrigation Project and the Tarali Irrigation Project.

The Analysis covers Project Details, Project cost, Means of finance, Net project cost, Cash Flow Statement, Benefit cost ratio, Payback Period determination, Internal Rate of Return. The data collected gives all the basic entities to work out the required entities, the analysis for the same have been done and the following have been found out:

❖ **Sample 1: Arala Irrigation Project**

- The benefit cost ratio of the scheme works out to 1.52 which is more than 1.5 as prescribed for medium projects. The scheme will improve socio economic condition due to employment, small scale industries, poultry and other supplementary works of areas by providing irrigation facilities.
- The payback period is between 4 to 5 years.
- The IRR for the project is 16%, the value is positive and therefore acceptable.

❖ **Sample 2: Tarali Irrigation Project**

- The benefit cost ratio of the scheme works out to 1.13 which is more than 1.0. The scheme will improve socio economic condition due to employment, small scale industries, poultry and other supplementary works of areas by providing irrigation facilities. Besides this the project will help survive the drought prone talukas of Khatav and Maan
- The payback period is between 7 to 8 years.
- The IRR for the project is 12.18 %, the value is positive and therefore acceptable.

Feasibility analysis of these projects is done and it is found that the projects are technically and institutionally feasible, financially viable, socio-culturally acceptable and economically justified for the purpose they are meant for.

Risk identification, its mitigation and sustainability needs to be focused on the outcome and impact that are foreseen that

are directed towards increasing irrigation potential. Risk management will result in increased cropping and irrigation intensity for sustainable development, outcomes and project achievements.

### **Future scope**

The work conducted in this Paper comprises of the study of various parameters of Infrastructure projects with regard to irrigation project, also various analysis such as Benefit cost analysis, Internal rate of return, Payback period have been studied for a particular samples.

In future the same shall be applied for similar type of another samples and analysis shall be carried out by following a possible comparative analysis. After the analysis of data collected for these samples a detailed study of comparison to determine the appropriate beneficial project can be done on the basis of results obtained so as to reach a comparative conclusion and further detailed study.

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