

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

Estimation of Social Benefit Cost Ratio of Mhaisal Lift Irrigation Project

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ABSTRACT: The present paper covers Estimation of Social Benefit Cost Ratio for the Mhaisal Lift Irrigation. As per procedure of Central Water Commission (CWC), MoWR, Govt. of India, Techno-Economic Analysis is mandatory. In view of number of limitations of the economic criteria suggested by the Second Irrigation Commission Government of India, changing times & phenomenon and needs of society, it is high time that we need to adopt the Social Benefit Cost Analysis (SBCA) for the Water Resources Projects in general & Government Lift Irrigation Schemes in particular. This technique can be used to economically evaluate projects & evaluate in terms of the explicit National objectives viz. employment generation, redistribution of income & development of backward regions, etc. The paper assesses costs and benefits considering impact of irrigation development. Actual data collection from the Mhaisal Command has helped to carryout this exercise. Efforts are made to convert the social benefits in monetary terms. The economic appraisals/ evaluations or the SBCA of any project should consider serious estimations of the indirect and social benefits & costs. The quantification, estimation & the standardization of social costs & benefits, conversion of all these in monetary terms and developing procedures / methodology to carryout these is the major requirement. The present paper is one step towards achieving it.

KEYWORDS: Economic appraisal, Social Benefits, Social costs, monetary terms, Social Benefit Cost Ratio.

I. INTRODUCTION

The existing criteria for Economic Appraisal & Evaluation of Water Resources Projects (WRPs) viz. the “Benefit-Cost Analysis “ is based on the recommendations of 1972 Irrigation Commission, Govt. of India. The Central Water Commission, Ministry of Water Resources , Govt. of India has given guidelines along with formats, to use Benefit Cost Ratio and Internal Rate of Return (IRR) [4]

The cost of construction of WRPs has been going up continuously, sharply, as compared to the benefits of the WRPs. Good / simpler project sites have almost exhausted. The newer/more difficult dam sites fail to satisfy the present norm / criteria of Benefit Cost Ratio and Internal Rate of Return. Hence to satisfy the said norms using existing procedure, manipulations in the cost and benefit are inevitable. The time has changed leading to more expenditure and at the same time substantial benefits to the society due to project, other than the direct monetary benefits which are considered in the present methodology. Considering these limitations of the economic criteria suggested by the Second Irrigation Commission (1972) Irrigation Commission, there is need for a detailed social benefit-cost analysis of an individual WRP, which can be used to evaluate a project in terms of the national objectives viz. employment generation, redistribution of income and development of backward regions, etc. [15,4]

The literature on social benefit-cost analysis for project appraisal / evaluation mentions two main approaches ,viz. United Nations Industrial Development (UNIDO)[8,9] method and the Little and Mirrlees(LM) approach, also commonly known as the Organisation for Economic cooperation & Development(OECD) method.

On the other hand, in Little-Mirrlees approach all the costs and benefits of the project are systematically broken down into commodities. For instance, project costs are separated into cost values for cement, steel, petroleum products, power, mechanical, electrical, transport equipments etc. Also various categories viz. unskilled labour and skilled labour

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are considered. Then, these commodity quantities are evaluated at their market prices for financial cost & benefit estimates and also at economic prices for the economic or social cost & benefit estimates.

II. THE BENEFIT COST RATIO METHOD & ITS LIMITATIONS

The Report of the Irrigation Commission clearly mentions that the irrigation policy in India will have several objectives besides increasing the production of foodgrains and fibres, etc., and such a policy must also be at par with the declared national objectives of a socialistic pattern of society. In this background, the present procedure for B-C ratio calculation appears inadequate because:

- the objectives of employment generation, income re-distribution and removal of regional disparities do not get reflected explicitly in the benefit-cost ratio used for project selection.
- the consideration of adjustments for the possible divergence between market prices and the opportunity costs of resources is not observed except in the case of capital, for which a 10 per cent rate of interest has been recommended to reflect the prevailing demand for capital. The scarcity of resources such as foreign exchange, surplus of resources such as unskilled and semi-skilled labor in the country are not reflected. But if the benefits and costs are evaluated at shadow prices rather than at market prices, the B-C ratios of different projects may change, thus affecting their ranking and selection.
- the economic criterion does not take into consideration benefits of employment generation in a labor surplus economy, distribution of income among regions and persons and other social welfare factors. The Commission has taken these considerations into account to some extent by accepting a B-C ratio of 1.0 for drought-affected regions instead of 1.5 for other regions [2, 3].

2.1 Benefit Cost Ratio of Mhaisal Lift Irrigation scheme.

2.1.1 Present Status of Mhaisal LIS :

The whole area falling under the Mhaisal LIS, falls under drought area. The total Irrigable command area of Mhaisal is 81697 Ha. While cropped area expected is 82922. By the end of 2014, 25061.00 Ha potential has been created. The work of Mhaisal started in the year 1986. There is no gorge filling for this project. The Mhaisal LIS was tested in the year 2005. [16] It has started irrigating part of the area under scheme. Simultaneously, the work of main canal & distribution network is in progress. The potential creation has been in progress [7, 13].

2.3.2 The survey & data collection:

For the present research study, the data required for economic analysis of the Mhaisal LIS, viz, Benefit –Cost ratio & Internal Rate of Return (IRR) and also estimation of Social Benefit Cost Ratio was collected from secondary & primary source.

The secondary data has been collected from the Krishna Koyna Lift Irrigation Circle (KKLIC) project office. This includes, capital cost of the project, the operation & maintenance costs, the replacement costs of raising main & pumping system, and the pre(without) project & post (with) project crop patterns. The input output prices of the different crops grown in the command have been collected from Agriculture Price Marketing Committee (APMC). In addition, required data especially relating to by product values of agriculture crops have been collected from Mahatma Phule Krishi Vidya Peeth (MPKV) Rahuri which has jurisdiction of western Maharashtra. The data regarding live stock has been collected from Pashu Samvardhana Khate, Panchaayata Samiti, Sangli. Data has also been collected from Tahasil office. [10 to 13 & 16].

The primary data collection was done to collect first hand information from the command. The PhD scholar herself conducted survey along with other investigators, in the command of Mhaisal LIS. A structured questionnaire / schedule was used to collect the data. The total expected potential of 81697.00 hectares will benefit 204 villages in six talukas viz. Miraj, Tasgaon, Kavthemahakal and Jat of Sangli district and also Mangalvedha & sangolatalukas of Solapur district.

Presently, the potential created is 25061 Ha. Around 54 villages are getting benefit directly. Out of these the following 11(20%) sample villages have been chosen.

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Table 2.1 : The information collected from villages under Tahasils& corresponding stages of Mhaisal LIS of the command

| Name of Taluka | No. | Name of village |
|-----------------|--|--------------------|
| Stage I | Mhaisal K.T. Weir, location to lift water. | |
| MirajTaluka | 1 | Arag |
| | 2 | Mhaisal (A) |
| | 3 | Lingnoor |
| | 4 | Belanki |
| | 5 | Laxmivadi |
| | 6 | Salagare |
| | 7 | Belanki(A) |
| KavatheMahakala | 1 | Mhaisal (M) |
| | 2 | KavatheMahakala. |
| | 3 | Gavhan |
| TasagaonTaluka | 1 | Anjani |
| | 2 | Gavhan |
| | 3 | ManeRajuri |
| | | Total 11 villages. |

Representative farmers from these villages were interviewed to collect information. Data was collected through schedules sent through enumerators, representation from all reaches was taken care of.

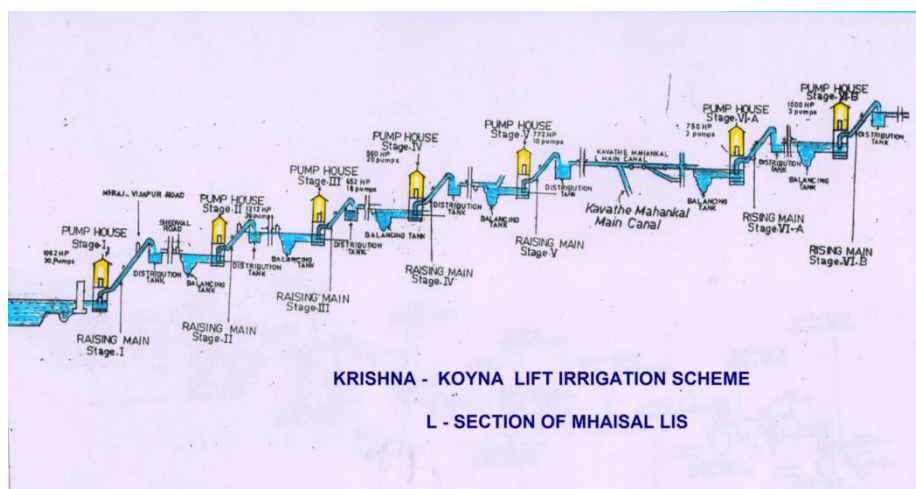


Fig.2.1 L section of Mhaisal LIS

The L-sections shows Mhaisal Lift Irrigation Scheme with five stages of lifting water, & sixth one with VI(a) & VI(b)

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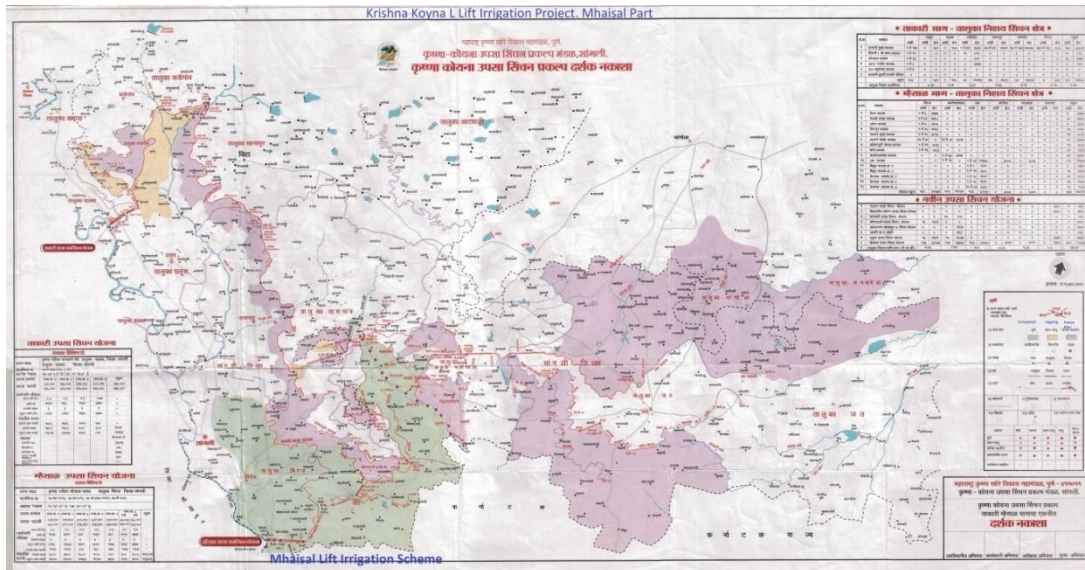


Fig. 2.2 Command of Krishna Koyna LIS - Mhaisal LIS Part.

The area being irrigated (green) & future area expected to be built up as irrigated area is shown in the command map

III. THE SOCIAL BENEFIT COST RATIO

The Little and Mirrlees (LM) approach, also commonly known as the Organisation for Economic Cooperation & Development (OECD) method is being considered here for estimating the Social Benefit Cost Ratio of Mhaisal LIS. All the prices of non-traded goods are converted into world prices using the standard conversion factor of 0.8 [1, 3].

The treatment singles out the values of foreign exchange, savings and unskilled labour as crucial sources of a distorted price mechanism. This method calculates accounting prices, which will correct these distortions and carryout these corrections in an essentially similar manner. This method advocates discounted cash flow analysis & use of present social values. This method works making explicit allowance for inequality and distributional considerations in project through manipulation of shadow wage.

The present actual potential created by the end of 2014 is considered for estimation. Total expected Crop area = 82922, ICA = 81697, till the end of 2014 total potential created is 25061 Ha. And actual area irrigated in the year 2013-2014 is 16565.00.

3.1 As per L-M Method, the following Values are Considered

The world prices are measured in dollars (\$) and domestic prices in rupees (R)

1. Standard conversion factor SCF for converting non traded goods prices into world prices = 0.8
2. Shadow exchange rate = $OER / SCF = [60.2 / 0.8] = 1.25$
3. Shadow price of foreign exchange $(P_F) = 1.25$
4. Shadow wage rate = opportunity cost of labour $(W = P_A)$ (2013-14 prices for laborers; Male = Rs. 182/day and female 102/ day)
5. Value of traded items remains same.

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3.2 Assumption for Calculation of Social Benefit Cost Ratio

For the estimation of social benefit cost ratio Little and Mirrlees (LM) approach is followed with assumptions given below.

- The base year referred is 2013-14. Life of Mhaisal LIS project is 100 years.
- The data regarding cost of pumping system & raising main of Mhaisal LIS is 75% of that of KKLIS.
- The agriculture prices of year 2013-14 are referred. The output price values for without & with project situation for all agriculture crops are considered as given by office of KKLIC. In addition to the direct agricultural income, the income through by-product is also taken into consideration. The total agricultural income is estimated in the proportion 9:1 of direct agriculture benefits with market prices & with minimum support prices respectively.
- For the benefits through drinking water supply from Mhaisal to villages during scarcity time, minimum Rs.2000 per tanker of 10,000 litres is considered, data has been collected from office of KKLIC regarding water supplied through Mhaisal LIS.
- For the minimum support price, the data has been retrieved from internet.
- As Mhaisal project is a lift on Krishna river, people did not displaced hence there no rehabilitation cost incurred.
- All the costs are converted to year 2013-14 by compounding the past values & discounting the future values.
- For estimation of Gross value of farm produce, the table is referred as mentioned in guidelines of CWC.
- For Benefit-Cost Ratio estimation, the format is referred as mentioned in guidelines of CWC.

3.3 Analysis & findings

The primary & secondary data collected has been analysed. The analysed data has been presented in the following tables.

- Crop pattern (without project) - Table 3.1
- Crop pattern (With project) - Table 3.2
- The input output values for the potential created so far, for without project – Table 3.3
- The input output values for the potential created so far, for with project – Table 3.4
- Gross value of the farm produce (without project) – Table 3.5
- Gross value of the farm produce (with project) – Table 3.6
- Annual cost calculations (B-C Ratio) Table 3.7
- Annual cost calculations (SBC Ratio) Table 3.8
- The development of live stock & its benefits (Buffalos) - Table 3.9
- The development of live stock & its benefits (cows) - Table 3.10
- The minor projects, percolation tanks, K.T weirs, bandharas filled up through Mhaisal LIS during water scarcity period & total population got benefitted during (2013-14) – Table 3.11
- The number and types of shops that are set up after Mhaisal commissioned & hence generation of employment & its benefits – Table 3.12
- Estimation of Benefit Cost Ratio as per present procedure (as per prescribed by CWC). – Table 3.13
- Estimation of Social Benefit Cost Ratio based on the present actual potential created and quantification of benefits from drinking water supply & live stock development & employment generation – Table 3.14

The Benefit-Cost ratio as envisaged is minimum 1.5 for normal cases & 1.0 for DPA.

3.4 Benefit Cost ratio as per present methodology

The change in crop pattern & hence incremental benefits are estimated as prescribed by CWC. The values are;

Net Annual Benefits = Total Net Annual incremental agricultural Benefits

= 13577.75 (Rs. In Lakhs)

Net annual Costs = 47301.87

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$$\text{Benefit Cost Ratio} = \frac{\text{Net Annual Benefits}}{\text{Net Annual Cost}}$$
$$= 0.288$$

Benefit Cost Ratio is 0.28, with only 25061 (30%) hectares potential created out of expected 81697ha. and actual area irrigated is 16565. Assuming 100% potential creation B/C ratio can be 0.96.

3.5 Estimation of Indirect & Social benefits:

In addition to direct agricultural benefits, following three indirect, social benefits are considered for estimation.

1. Benefit of drinking water supply to people in villages during scarcity period of year 2013-14.
2. Benefit of live stock development
3. Employment generation & its benefits.

There are no social costs for this project as water is lifted at MhaisalK.T.Weir, from the river course, no significant land acquisition due to submergence, hence no displacement of people or submergence of forest area, etc.

3.5.1 Benefit of drinking water supply:

Report of the High Level Committee on Balanced Regional Development Issues in Maharashtra, Government of Maharashtra Planning Department, October 2013, Vijay Kelker, mentions that at present water supply to rural population is made with the norm of 40 litres per capita per day. On the basis of data from Water supply department. However, ground situation is, in the rural areas, even the present lower norm of 40 litres per day per capita is not being fulfilled. The present norm is evidently lower and needs to be revised to 70 litres per day per capita. If we also consider the water requirement in the livestock of rural areas the norm should be set at 140 litres per day per capita. In the present study, water requirement is considered as 40 litres per day per capita and 30 litres for cattle. The savings on expenditure of drinking water supply to drought hit areas in the year 2012-13 from MhaisalLIS have been reported as, Rs 17800.00 lakhs.

Table -3.11 gives details about the same in the year 2013-14. Hence the indirect benefits are In addition, there has been a considerable reduction of use of diesel which has helped for maintaining good environment/atmosphere. Savings through drinking water supply to drought hit rural areas in the year 2013-14.

Or in other words benefits from MhaisalLIS = **Rs. 4136.5134 lakhs.**

3.5.2 Benefit from live stock

Increase in number of cattle from 2007 to till the present study is 22866 (7898 cows +14968 buffaloes) other live stock is not considered here. This data collected from Animal husbandry department of Panchayatsamiti , belongs to only the villages chosen. If the whole developed command area is considered, its number is substantially high.

The details are given in Table – 3.9 & 3.10

Total Benefit (buffaloes) = **Rs.1840.16 Lakhs,**

Total Benefits (Cow) = **Rs.3554.1 lakhs**

Hence total benefits from live stock= **Rs. 5394.26 Lakhs**

3.5.3 Employment generation

The details of generation of direct employment in command area due to Mhaisal LIS is given in Table 3.12 The benefit of employment because of new sugar factories after Mhaisal LIS was commissioned have not been considered. Benefit through employment = **Rs. 42 lakhs.**

3.6 Social benefit Cost ratio [9, 14]:

The incremental agricultural benefits and indirect & social benefits which have been converted in monetary terms add up to get the total benefits. The social costs are estimated by multiplying the costs other than head works (non-tradable) by 0.8, the standard conversion factor and added to cost of head works(tradable) to get the total cost. The Tables, 3.8 & 3.14 give the detailed estimations of social costs & social benefits. The final results are as under.

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Total Agriculture Benefits = **13577.75** (Rs. In Lakhs)

1. Benefits through Drinking water supply = **4136.5134** (Rs. In Lakhs)
2. Live stock benefits = Total Benefit (buffalos) + Total Benefits (Cow)
= **1840.16 + 3554.1**
= **5394.26** (Rs. In Lakhs)
3. Benefit through employment (within command) = 42 (Rs. In Lakhs)

Total Annual Social Benefits = **23150.53**

Total annual Social Costs = **43387.817**

Social Benefit Cost Ratio = $\frac{\text{Net Annual Social Benefits}}{\text{Net Annual Social Cost}}$

Social Benefit Cost Ratio = 0.53

Compared to present Benefit – Cost ratio, the Social Benefit Cost Ratio is higher by 0.242 or 54% .

The Social Benefit Cost Ratio is 0.53 with only 25061 (30%) hectares potential created out of expected 81697ha. and actual area irrigated is 16565. Assuming 100% potential creation Social Benefit Cost Ratio will be 1.77 Which proves that the project will be highly economically beneficial.

Table 3.1 : Mhaisal Lift Irrigation Project , Dist. Sangli
Without project cropping pattern

| Season | Sr.No. | Crops | Area of Mhaisal(in Ha) 81697 | |
|--------|--------|-------------|-------------------------------|------------|
| | | | Crop % | Area in Ha |
| Kharif | 1 | Sugarcane | 4 | 3267.9 |
| | 2 | Kh. Pulses | 16 | 13071.5 |
| | 3 | Groundnut | 16 | 13071.5 |
| Rabi | 1 | Rabi jawar | 44 | 35946.7 |
| | 2 | Bajara | 16 | 13071.5 |
| | 3 | Wheat | 4 | 3267.9 |
| | | Grand Total | 100 | 81697.0 |

Table 3.2 : With Project Crop pattern (Actual)
Cropped area under Mhaisal Project in the year 2013-14

| Seasons | Sr. No. | Name of crop | Area (Actual irrigated 16565 Ha) | |
|--------------|---------|-------------------|----------------------------------|----------|
| | | | % | Ha |
| Perenial | 1 | Sugar cane | 9.9 | 1638.16 |
| | 2 | Pamogranate | 6.8 | 1127.05 |
| | 3 | Grapes | 32.1 | 5317.39 |
| Kharif | 1 | Hy. Jowar | 3.0 | 498.00 |
| | 2 | Maize | 8.0 | 1317.34 |
| | 3 | Soyabean | 3.8 | 629.05 |
| | 4 | Udid | 5.4 | 891.16 |
| | 5 | Gr. Nut | 0.6 | 91.11 |
| | | Bajra | 6.6 | 1087.74 |
| Rabbi Season | 2 | ShaluJawar | 19.4 | 3208.17 |
| | 1 | Wheat | 2.5 | 419.37 |
| | 2 | Jawar | 1.3 | 209.68 |
| | 3 | Gram / Tur | 0.6 | 104.84 |
| | 2 | Chili (Polyhouse) | 0.2 | 26.21 |
| | | | | 16565.28 |

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Table 3.3

| Mhaisal Lift Irrigation Project , Dist. Sangli | | | | | | | | | | | | | | | | |
|--|---------|-------------|---------------------|---------|--------------------------|--------------|--------------|-------------------------|---------------------------------|-------------------------|--------------------------|----------------------|----------------------|------------|------------------|---------|
| Input & Output prices | | | | | | | | | | | | | | | | |
| Without Project | | | | | | | | | | | | | | | | |
| Seasons | Sr. No. | Crops | Area under the crop | | output prices of produce | | | Input costs | | | | | | | | |
| | | | | | Yield (Q/Ha) | Rate 2013-14 | Total income | Cost of seeds (2013-14) | Total seed cost | Manure & fer. (2013-14) | Total Mannure & fer.cost | Pesticides (2013-14) | Total pesticide cost | Irrigation | Labour (2013-14) | |
| | | | | | Rs/Q | Rs in lakhs | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | Rs./Ha. |
| | | | | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | |
| | | | % | Ha | | | = 6 * 4 * 5 | | = 8 * 4 | | = 10 * 4 | | = 12 * 4 | | = 7 * 0.2 | |
| Kharif | 1 | Sugarcane | 4 | 3267.9 | 500.0 | 233.7 | 3818.5 | 15216.0 | 566.9 | 13159.5 | 430.0 | 1124.2 | 36.7 | 0.0 | 763.7 | |
| | 2 | Kh. Pulses | 16 | 13071.5 | 11.5 | 3164.0 | 4756.2 | 2400.0 | 354.5 | 295.6 | 38.6 | 0.0 | 0.0 | 0.0 | 951.2 | |
| | 3 | Groundnut | 16 | 13071.5 | 4.2 | 3520.0 | 1932.5 | 7033.0 | 1176.7 | 4237.8 | 553.9 | 0.0 | 0.0 | 0.0 | 386.5 | |
| Rabi | 1 | Rabi jawar | 44 | 35946.7 | 5.1 | 2022.4 | 3707.6 | 412.0 | 189.6 | 648.6 | 233.2 | 0.0 | 0.0 | 0.0 | 741.5 | |
| | 2 | Bajara | 16 | 13071.5 | 3.5 | 1408.0 | 644.2 | 72.0 | 12.0 | 1888.3 | 246.8 | 0.0 | 0.0 | 0.0 | 128.8 | |
| | 3 | Wheat | 4 | 3267.9 | 9.5 | 2240.0 | 695.4 | 3272.0 | 136.9 | 3597.2 | 117.6 | 0.0 | 0.0 | 0.0 | 139.1 | |
| | | Grand Total | 100 | 81697.0 | | | 15554.4 | | 2436.6 | | 1620.1 | | 36.7 | 0.0 | 3110.9 | |
| | | | | | | | | | Weightage assigned | | 0.8 | | 1.0 | | 0.8 | |
| | | | | | | | | | Revised input values are | | 1949.3 | | 1296.1 | | 2488.7 | |

* Only pesticide & fertiliser are tradable, so weights assigned are one. And the weightage given to all non tradable commodities is 0.8.

The input output values for without project (Table 3.3), & the potential created so far, with project (Table 3.4) are estimated using the circular of Joint Director Agriculture of the region & data of M.P. Krishi Vidyapeeth Rahuri.

Table 3.4

| Mhaisal Lift Irrigation Project , Dist. Sangli | | | | | | | | | | | | | | | | | | | |
|--|---------|------------------|------|---------|--------|--------|--------------------------|--------------|---------------------------------|-------------------------|-----------------|-------------------------|--------------------------|----------------------|----------------------|---------------|--------------------------|---------------------------------|---------|
| Input & Output prices | | | | | | | | | | | | | | | | | | | |
| With Project | | | | | | | | | | | | | | | | | | | |
| Seasons | Sr. No. | Crops | Area | | | | output prices of produce | | Input costs | | | | | | | | | | |
| | | | | | | | Yield (Q/Ha) | Rate 2013-14 | Total income | Cost of seeds (2013-14) | Total seed cost | Manure & fer. (2013-14) | Total Mannure & fer.cost | Pesticides (2013-14) | Total pesticide cost | Irrigation | Total irrigation Charges | Labour (2013-14) (20% * col 90) | |
| | | | | | | | Rs/Q | Rs in lakhs | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | (Rs. Lakh) | Rs./Ha. | Rs. In lakhs | Rs./Ha. |
| | | | | | | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| | | | % | Ha | | | = 6 * 4 * 5 | | = 8 * 4 | | = 10 * 4 | | = 12 * 4 | | = 14 * 4 | = 7 * 0.2 | | | |
| Perennial | 1 | Sugar cane | 9.9 | 1638.2 | 1500.0 | 233.7 | 5742.57 | 17346.2 | 284.2 | 13159.5 | 215.6 | 1124.2 | 18.4 | 6290.0 | 103.0 | 1148.5 | | | |
| | 2 | Pamogranate | 6.8 | 1127.1 | 86.2 | 8131.0 | 7902.18 | 20404.0 | 230.0 | 24847.6 | 280.0 | 1274.0 | 14.4 | 4720.0 | 53.2 | 1580.4 | | | |
| | 3 | Grapes | 32.1 | 5317.4 | 140.0 | 3325.0 | 24752.44 | 57190.0 | 3041.0 | 63160.3 | 3358.5 | 38112.8 | 2026.6 | 4720.0 | 251.0 | 4950.5 | | | |
| Kharif | 1 | Hy. Jowar | 3.0 | 498.0 | 7.4 | 1792.0 | 65.59 | 1139.2 | 5.7 | 1959.6 | 9.8 | 0.0 | 0.0 | 240.0 | 1.2 | 13.1 | | | |
| | 2 | Maize | 8.0 | 1317.3 | 18.0 | 1472.0 | 349.24 | 4390.4 | 57.8 | 2902.6 | 38.2 | 0.0 | 0.0 | 240.0 | 3.2 | 69.8 | | | |
| | 3 | Soyabean | 3.8 | 629.1 | 17.0 | 2700.0 | 288.74 | 4202.0 | 26.4 | 2376.2 | 14.9 | 425.0 | 2.7 | 240.0 | 1.5 | 57.7 | | | |
| | 4 | Udid | 5.4 | 891.2 | 6.6 | 3951.6 | 233.12 | 1704.2 | 15.2 | 1646.7 | 14.7 | 245.8 | 2.2 | 240.0 | 2.1 | 46.6 | | | |
| Rabi Seasons | 5 | Gr. Nut | 0.6 | 91.1 | 4.2 | 3520.0 | 13.47 | 9002.2 | 8.2 | 4237.8 | 3.9 | 0.0 | 0.0 | 240.0 | 0.2 | 2.7 | | | |
| | | Bajra | 6.6 | 1087.7 | 24.0 | 1488.0 | 388.45 | 933.0 | 10.1 | 1612.0 | 17.5 | 0.0 | 0.0 | 240.0 | 2.6 | 77.7 | | | |
| | 2 | Shahi Jawar | 19.4 | 3208.2 | 5.1 | 2022.4 | 330.90 | 527.4 | 16.9 | 648.6 | 20.8 | 0.0 | 0.0 | 0.0 | 0.0 | 66.2 | | | |
| | 1 | Wheat | 2.5 | 419.4 | 13.2 | 2240.0 | 123.81 | 4188.2 | 17.6 | 3597.2 | 15.1 | 0.0 | 0.0 | 470.0 | 2.0 | 24.8 | | | |
| | 2 | Jawar | 1.3 | 209.7 | 8.4 | 1848.5 | 32.44 | 586.3 | 1.2 | 1179.8 | 2.5 | 0.0 | 0.0 | 397.0 | 0.8 | 6.5 | | | |
| | 3 | Gram / Tur | 0.6 | 104.8 | 11.5 | 3164.0 | 38.15 | 2712.0 | 2.8 | 295.6 | 0.3 | 0.0 | 0.0 | 350.0 | 0.4 | 7.6 | | | |
| | 2 | Chhi (Polyhouse) | 0.2 | 26.2 | 25.0 | 9450.0 | 61.92 | 6750.0 | 1.8 | 3420.0 | 0.9 | 2530.0 | 0.7 | 1042.0 | 0.3 | 12.4 | | | |
| | | | | 16565.3 | | | 40323.0 | | 3718.9 | | 3992.7 | | 2064.9 | | 421.5 | 8064.6 | | | |
| | | | | | | | | | Weightage assigned | | 0.8 | | 1 | | 0.8 | 0.8 | | | |
| | | | | | | | | | Revised input values are | | 2975.2 | | 3992.7 | | 2064.9 | 6451.7 | | | |

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Table 3.5

| | | Crop | | | | Gross Value of Farm Produce. | | | | | | | | | | | Converting prices for SBCR | |
|--------|---------|-------------|-------------------------|------------|-----------------|------------------------------|-----------------|------------------------|---------------------------|--------------------|-----------------|------------------|--------------------------|--------------------------|--------------------|-----------------------------|---|-----------------------------|
| Season | Sr. No. | Particulars | Area of Mhaisal (in Ha) | | Yield in (Q/Ha) | Area ('000 ha.) | Yield in (T/ha) | Production (Th.Tonnes) | By Production (Th.Tonnes) | Market Price (WOP) | Minimum Support | By Product Price | Market value | Minimum support value | By Product value | Gross value of farm Produce | Conversion factor for traded & non traded | Converted Gross value of FP |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | 81697 | | | | | | | | | | | | | | | |
| | | | Crop % | Area in Ha | | =4/1000 | =5*0.1 | =6*7 | | | | | = $(8 * 10 * 0.9)$ 10 | = $(8 * 11 * 0.1)$ 10 | = $(12 * 9)$ 10 | = 13+14+15 | | =16*17 |
| Kharif | 1 | Sugarcane | 4 | 3267.9 | 500 | 3.27 | 50 | 163.39 | 62.09 | 234 | 210 | 125 | 3436.7 | 343.13 | 74.5 | 3854.30 | 1 | 3854.30 |
| | 2 | Kh. Pulses | 16 | 13071.5 | 11.5 | 13.07 | 1.15 | 15.03 | 19.54 | 3164 | 4300 | 55 | 4280.6 | 646.39 | 0.0 | 4926.97 | 0.8 | 3941.58 |
| | 3 | Groundnut | 16 | 13071.5 | 4.2 | 13.07 | 0.42 | 5.49 | 12.6 | 3520 | 4000 | 277 | 1739.2 | 219.60 | 157.8 | 2116.68 | 1 | 2116.68 |
| Rabi | 1 | Rabijawar | 44 | 35946.7 | 5.10 | 35.95 | 0.51 | 18.33 | 25.7 | 2022 | 1520 | 361 | 3336.9 | 278.66 | 141.2 | 3756.69 | 0.8 | 3005.35 |
| | 2 | Bajara | 16 | 13071.5 | 3.5 | 13.07 | 0.35 | 4.58 | 6.41 | 1408 | 1250 | 188 | 579.7 | 57.19 | 177.4 | 814.36 | 0.8 | 651.48 |
| | 3 | Wheat | 4 | 3267.9 | 9.5 | 3.27 | 0.95 | 3.10 | 5.12 | 2240 | 1400 | 123 | 625.9 | 43.46 | 184.9 | 854.25 | 1 | 854.25 |
| | | Grand Total | 100 | 81697.0 | | | | | | | | | | | | 16323.24 | | 14423.64 |

The Gross values of farm produce for without project (Table 3.5), & with project (Table3.6)are estimated .

Table 3.6

| Mhaisal Lift Irrigation Project, Dist. Sangli | | | | | | | | | | | | | | | | | | |
|---|---------|-------------------|-------------------------|--------|--------------|------------------------------|-----------------|------------------------|---------------------------|--------------|-----------------|------------------|--------------------------|--------------------------|--------------------|-----------------------------|---|-----------------------------|
| With Project - Gross Value of Farm Produce. | | | | | | | | | | | | | | | | | | |
| | | Crop | | | | Gross Value of Farm Produce. | | | | | | | | | | | Converting prices for SBCR | |
| Seasons | Sr. No. | Crops | Area of Mhaisal (in Ha) | | Yield (Q/Ha) | Area ('000 ha.) | Yield in (T/ha) | Production (Th.Tonnes) | By Production (Th.Tonnes) | Market Price | Minimum Support | By Product Price | Market value | Minimum support value | By Product value | Gross value of farm Produce | Conversion factor for traded & non traded | Converted Gross value of FP |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | 25061 | | | | | | | | | | | | | | | |
| | | | % | Ha | | | | | | | | | = $(8 * 10 * 0.9)$ 10 | = $(8 * 11 * 0.1)$ 10 | = $(12 * 9)$ 10 | = 13+14+15 | | =16*17 |
| Perennial | 1 | Sugar cane | 9.9 | 1638.2 | 1500.0 | 1.638 | 150.0 | 245.724 | 93.3751 | 233.7 | 210 | 126 | 5168.3 | 516.0 | 1176.53 | 6860.86 | 1 | 6860.86 |
| | 2 | Pamogranate | 6.8 | 1127.1 | 86.2 | 1.127 | 8.6 | 9.71859 | 0 | 8131.0 | 0 | 0 | 7902.2 | 0.0 | 0.00 | 7902.18 | 1 | 7902.18 |
| | 3 | Grapes | 32.1 | 5317.4 | 140.0 | 5.317 | 140 | 74.4434 | 0 | 3325.00 | 0 | 0 | 24752.4 | 0.0 | 0.00 | 24752.44 | 1 | 24752.44 |
| Kharif | 1 | Hy. Jowar | 3.0 | 498.0 | 7.4 | 0.498 | 0.7 | 0.36603 | 0.51244 | 1792.0 | 1500 | 269 | 59.0 | 5.5 | 13.78 | 78.31 | 0.8 | 62.65 |
| | 2 | Maize | 8.0 | 1317.3 | 18.0 | 1.317 | 1.8 | 2.37253 | 3.81978 | 1472.00 | 1310 | 236 | 314.3 | 31.1 | 90.15 | 435.54 | 0.8 | 348.43 |
| | 3 | Soyabean | 3.8 | 629.1 | 17.0 | 0.629 | 1.7 | 1.06939 | 7.96 | 2700.0 | 2560 | 130 | 259.9 | 27.4 | 103.48 | 390.72 | 1 | 390.72 |
| | 4 | Udid | 5.4 | 891.2 | 6.6 | 0.891 | 0.7 | 0.58995 | 0.22635 | 3951.6 | 4300 | 180 | 209.8 | 25.4 | 4.07 | 239.25 | 0.8 | 191.40 |
| | 5 | Gr. Nut | 0.6 | 91.1 | 4.2 | 0.091 | 0.4 | 0.03827 | 0.08801 | 3520.0 | 0 | 145 | 13.5 | 0.0 | 1.28 | 14.75 | 1 | 14.75 |
| | 6 | Bajra | 6.6 | 1087.7 | 24.0 | 1.088 | 2.4 | 2.61057 | 5.54164 | 1488.0 | 1250 | 166 | 349.6 | 32.6 | 91.99 | 474.23 | 0.8 | 379.38 |
| Rabi Seasons | 1 | Shahu Jawar | 19.4 | 3208.2 | 8.4 | 3.208 | 0.8 | 2.68524 | 7.89852 | 2022.4 | 1520 | 269 | 488.8 | 40.8 | 212.47 | 742.04 | 0.8 | 593.63 |
| | 2 | Wheat | 2.5 | 419.4 | 24.3 | 0.419 | 2.4 | 1.01865 | 0.09771 | 2240.0 | 1400 | 123 | 205.4 | 14.3 | 1.20 | 220.82 | 1 | 220.82 |
| | 3 | Jawar | 1.3 | 209.7 | 8.4 | 0.210 | 0.8 | 0.17551 | 0.51624 | 2022 | 1500 | 360 | 31.9 | 2.6 | 18.58 | 53.16 | 0.8 | 42.53 |
| | 4 | Pulses(Gram) | 0.6 | 104.8 | 11.5 | 0.105 | 1.2 | 0.12057 | 0.00898 | 3164 | 3100 | 148 | 34.3 | 3.7 | 0.13 | 38.20 | 0.8 | 30.56 |
| T.S. | 1 | Chili (Polyhouse) | 0.2 | 26.2 | 25.0 | 0.026 | 2.5 | 0.06553 | 0 | 9450.0 | 0 | 0 | 61.9 | 0.0 | 0.00 | 61.92 | 1 | 61.92 |
| | | | 25061.3 | | | | | | | | | | | | | 42264.43 | | 41852.28 |

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Table 3.7
Annual Cost for Benefit Cost ratio

| Annual cost calculations | | |
|--------------------------|---|---------|
| a) | Interest on the total cost of the project @ 10% on 378328 | 37833 |
| b) | Depreciation @ 1% of the cost of the project excluding ETP & c & d is 343088 | 3431 |
| c) | Depreciation of Pumping system(Assuming Life of Machinery 12 Years) at 8.33% on Rs. 1209 | 1007.7 |
| d) | Depreciation of Rising Main (Assuming Life of Rising Main30 Years) @ 3.33% on Rs. 20169.4 | 503.7 |
| e) | Power charges for Lift Irrigation (Year 2013-14) | 1873.57 |
| f) | O & M charges Rs. 455.24 per Ha. for Cropped Area =81697 Ha | 371.9 |
| g) | Maintenance cost @1% of cost of Head works Rs.228140 | 2281 |

Table 3.8
Annual Cost for Social Benefit Cost Ratio

| | | Rs, in Lakhs |
|---------------------------------------|--|-----------------|
| Annual cost calculations | | 348220 |
| a) | Interest on the total cost of the project @ 10% on 348220 | 34822 |
| b) | Depreciation @ 1% of the cost of the project excluding ETP & c & d is 343088 | 2785.76 |
| c) | Depreciation of Pumping system(Assuming Life of Machinery 12 Years) at 8.33% on Rs. 12097.37 | 1007.7 |
| d) | Depreciation of Rising Main (Assuming Life of Rising Main30 Years) @ 3.33% on Rs. 20169.84 | 503.7 |
| e) | Power charges for Lift Irrigation (Year 2013-14) | 1873.57 |
| f) | O & M charges Rs. 455.24 per Ha. for Cropped Area =81697 Ha | 114.0877 |
| g) | Maintenance cost @1% of cost of Head works Rs.228140 | 2281 |
| Total of C in lakhs = (a to g) | | 43387.82 |

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Table 3.9
Live Stock Details Buffalo

| Name of village | 2007-08 | Period of study |
|------------------|-------------|-----------------|
| | Number | Number |
| Arag | 1500 | 3220 |
| Mhaisal (A) | 1500 | 3100 |
| Lingnoor | 425 | 1565 |
| Belanki | 566 | 1253 |
| Laxmivadi | 205 | 877 |
| Salagare | 230 | 605 |
| KavatheMahakala. | 890 | 2436 |
| Gavhan | 297 | 765 |
| Anjani | 375 | 697 |
| ManeRajuri | 300 | 450 |
| TOTAL | 6288 | 14968 |

Increase in number of Buffalos = $14968 - 6288 = 8680$.

| A) Details of Income through one buffalo (in rupees) | |
|--|----------------|
| 1. Six litres/ day for six months @ Rs. 30/litre. = $6 * 180 \text{days} * 30 =$ $6 * 180 * 30 =$ | 32400 |
| 2. Cow dung mannuare = one trolley / buffalo = | 4000 |
| Baby buffalo | 2000 |
| Total income / buffalo per yr.= | 38400 |
| B Expenditure per buffalo | |
| Fodder & Pend = 50% of income | 16200 |
| other | 1000 |
| Total expenditure = | 17200 |
| Net benefit per buffalo / year = | Rs.21200 |
| $Rs.21200 * 8680 =$ | 192696000 |
| Total Benefit (buffalos) Rs. In Lakhs = | 1840.16 |

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Table 3.10
Live Stock Details Cows

| Name of village | 2007-08 | till study period | Increase in |
|------------------|-------------|-------------------|-------------|
| | Number | | |
| Arag | 832 | 1500 | 668 |
| Mhaisal (A) | 1000 | 1800 | 800 |
| Lingnoor | 367 | 1868 | 1501 |
| Belanki | 350 | 1000 | 650 |
| Laxmivadi | 267 | 506 | 239 |
| Salagare | 190 | 560 | 370 |
| Belanki(A) | 350 | 1000 | 650 |
| KavatheMahakala. | 1273 | 3250 | 1977 |
| Anjani | 409 | 640 | 231 |
| Gavhan | 340 | 835 | 495 |
| ManeRajuri | 350 | 667 | 317 |
| TOTAL | 5728 | 13626 | 7898 |

| | | | | |
|---|--|--|--|------------------------|
| Increase in Number of cows = 13626-5728= 7898 | | | | |
| A) Details of Income through one cow (in rupees) | | | | |
| 1. 20 litres/ day for six months @ Rs. 20/litre. = $20 \times 180 \text{ days} \times 20 = 20 \times 180 \times 20 =$ | | | | 72000 |
| 2. Cow dung mannuare = two trolley /cow @ 4000 = | | | | 8000 |
| 3. Baby bullock/cow = | | | | 2000 |
| Total income per cow = | | | | 82000 |
| B Expenditure per cow | | | | |
| 1. Fodder & Pend = 50% of income = | | | | 36000 |
| 2. Others= | | | | 1000 |
| Total expenditure = | | | | 37000 |
| Net benefit per cow / year = | | | | 45000 |
| TOTAL BENEFITS (Cow) = $\text{Rs.}44000 \times 7898 =$ | | | | Rs.3554.1 lakhs |

Data from PashuSamvardhanaKhate , PanchaayataSamiti

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Table 3.11

The details of minor , medium projects, tanks, K.T weirs, bandharas filled up through Mhaisal LIS during water scarcity period & total population got benefitted. (2013-14)

| Tahukas | Medim Project | Minor I Project | K.T.Weir | Percolati on Tanks | Village tank | Cement bandhara | Vasant Bandhara | Soil Bandhara | Farm Pond (SherTake) | No. of villages water : through Canal | Total | Benefitted Villages | Benefitted Population |
|---|---------------|-----------------|---|--------------------|--------------|-----------------|-----------------|------------------------------------|----------------------|---------------------------------------|-------------|--|-----------------------|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Mhaisal LIS | | | | | | | | | | | | | |
| Miraj | 0 | 1 | 0 | 11 | 1 | 1 | 24 | 0 | 27 | 17 | 82 | 26 | 124412 |
| Tasgaon | 0 | 1 | 0 | 6 | 0 | 0 | 146 | 0 | 597 | 6 | 750 | 14 | 28392 |
| Kavthe-Mahakal | 0 | 2 | 15 | 3 | | | | | | | | 25 | 87912 |
| Jat | 1 | 8 | 16 | 10 | 0 | 0 | 22 | 0 | 0 | | 57 | 40 | 125145 |
| | | | | | | | | | | | 889 | 105 | 365861 |
| Total capacity | - | 6.89 | 2.18 | 2.39 | 0.009 | 0.07 | 7.449 | | 1.2309 | | | | 20.2189 |
| Releases during scarcity | - | 1.61 | 2.24 | 1.77 | 0.009 | 0.7 | 7.219 | | 2.433 | | | | 15.981 |
| Area irrigated through water from Mhaisal = | | | | | | | | | | | | | |
| 1 m ³ = 35.315 cubic feet | | | 1 Mm ³ = 1000000 m ³ = 10 ⁹ litres | | | | | One m ³ = 35.315 cub.ft | | | | | |
| Total water requirement per day per capita @ 40 litres / day in rural area. | | | | | | | | | | = | 14634440 | litres per day | |
| Water requirement for @ 30litres per day per cattle | | | | | | | | | | = | 3086910 | litres per day | |
| Total water requirement per day | | | | | | | | | | = | 17721350 | litres per day | |
| Water supplied through Mhaisal to 105 villages in three tahukas as per data given | | | | | | | | | | = | 15981000000 | litres | |
| Number of water tankers for supplying water (for one day) as per requirement | | | | | | | | | | = | 1772.135 | | |
| Expendiure per day @ Rs. 2000/ tanker with 10000litres of water | | | | | | | | | | = | 3544270 | | |
| | | | | | | | | | | = | 35.4427 | Rs. in Lakhs | |
| For 135 days @ 35.443 lakhs/ day | | | | | | | | | | = | 4136.5134 | Rs.in lakhs for 135 days during scarcity | |

Table 3.12

Number of shops / Employment

| Number of shops / Name of village | Fertiliser & seeds | | Pipes/pumps (one) | | Garages (one each) | | Repair shops (one) | | Petrol Pumps | | Two Wheeler | | Four Wheeler | | Slab Building RCC | | Hotels (3 for each) | |
|--|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|------|----------------------|-----|
| | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % | Change/ increase | % |
| Arag | 5 | 120 | 1 | 100 | 1 | 100 | 6 | 120 | 1 | 100 | 4500 | 225 | 1404 | 702 | 1860 | 930 | 7 | 220 |
| Mhaisal (A) | 2 | 60 | 2 | 100 | 2 | 100 | 5 | 90 | 2 | 100 | 930 | 372 | 210 | 210 | 480 | 480 | 4 | 210 |
| Lingnoor | 1 | 40 | 1 | 100 | 1 | 100 | 2 | 100 | 0 | | 1380 | 552 | 132 | 165 | 444 | 555 | 2 | 240 |
| Belanki | 2 | 120 | 1 | 100 | 1 | 60 | 1 | 100 | 1 | 100 | 630 | 420 | 92 | 201 | 627 | 836 | 5 | 240 |
| Laxnivadi | | | 0 | | 0 | | 0 | | 0 | 100 | 53 | 106 | 9 | 129 | 113 | 1031 | 1 | 100 |
| Salgare | 2 | 120 | 7 | 165 | 3 | 300 | 3 | 100 | 2 | 100 | 711 | 99 | 169 | 940 | 1071 | 1648 | 8 | 390 |
| KavatheMahakala. | 2 | 40 | 7 | 65 | 4 | 72 | 8 | 120 | 0 | 0 | 4380 | 199 | 1692 | 940 | 1062 | 379 | 19 | 192 |
| Mhaisal (M) | 0 | | 0 | | 0 | | 0 | | 0 | | 612 | 128 | 27 | 225 | 21 | 1050 | 1 | 100 |
| Anjani | 1 | 60 | 1 | 100 | 1 | 60 | 1 | 60 | 0 | | 762 | 152 | 441 | 315 | 173 | 785 | 1 | 100 |
| Gavhan | 1 | 60 | 0 | | 1 | 100 | 1 | 60 | 0 | | 679 | 133 | 92 | 420 | 171 | 684 | 2 | 180 |
| ManeRajuri | 4 | 72 | 2 | 45 | 1 | 60 | 2 | 240 | 1 | 100 | 1425 | 143 | 301 | 172 | 205 | 379 | 0 | 0 |
| No. of mandays = | 22 | | 20 | | 16 | | 29 | | 12 | | 16061 | | 4570 | | 6227 | | 146 | |
| Opportunity cost of labour = | 182 | | 182 | | 182 | | 182 | | 182 | | | | | | | | | |
| Total No. of days = | 200 | | 200 | | 250 | | 250 | | 300 | | | | | | | | | |
| Benefit Rs. in Lakh = | 7.9 | | 7.4 | | 7.1 | | 13.1 | | 6.6 | | | | | | | | | |
| RS. 42 lakhs has been employment benefit in the villages chosen for survey | | | | | | | | | | | | | | | | | | |

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Table 3.13 : Benefit Cost Ratio

| Calculation of benefit cost ratio | | | | | |
|-----------------------------------|---|------------------|------------------|----------------------------|-----------------|
| | | | | Rs.in lakhs | |
| | Particulars | | | Without Project | With Project |
| A | GROSS RECEIPTS | | | A.1. | A.1 |
| 1 | Gross value of farm produce | | | 14423.64 | 41852.28 |
| 2 | Dung receipts @ 30% of the fodder expenditure | | | 519.25 | 1004.45 |
| 3 | Total (A): Gross Receipts (1+2) | | | 14942.89 | 42856.73 |
| B | EXPENDITURE | | | | |
| 1 | Expenditure on seeds | | | 1949.25 | 2975.15 |
| 2 | Expenditure on manure, Fertiliser, pesticides etc. | | | 1325.50 | 6057.59 |
| 3 | Expenditure on hired labour | | | 2488.71 | 6451.68 |
| | | Without Project | With Project | | |
| 4 | Fodder expenses | 15% of Item A.1 | 10% of item A.1 | 1730.84 | 3348.18 |
| 5 | Depreciation on implements | 2.7% of item A.1 | 2.7% of item A.1 | 389.44 | 1130.01 |
| 6 | Shared and Cash rent | 5% of Item A.1 | 3% of item A.1 | 721.18 | 2092.61 |
| 7 | Land Revenue | 2% of Item A.1. | 2% of item A.1. | 288.47 | 837.05 |
| 8 | Irrigation water Charges | | | 0.00 | 337.20 |
| 9 | Total (B): Expenses (1 to 8) | | | 8893.39 | 23229.48 |
| C. | NET VALUE OF PRODUCE: | | | | |
| 1 | Total Gross receipts (Total A.3) | | | 14942.89 | 42856.73 |
| 2 | Minus total expenses (Total B.9) | | | 8893.39 | 23229.48 |
| 3 | Net Benefit of produce: (1-2) | | | 6049.50 | 19627.26 |
| D. | ANNUAL AGRICULTURAL BENEFITS: | | | | |
| 1 | Net Benefit With Project (C.3) | | | 19627.26 | |
| 2 | Net Benefit Without Project (C.3) | | | 6049.50 | |
| 3 | Loss of agriculture benefits due to submergence. | | | 0.00 | |
| 4 | Net Annual Benefits (Net Incremental Benefits) (D): (1-2) | | | 13577.75 | |
| | TOTAL AGRICULTURE BENEFITS | | | 13577.75 | |
| | Revenue through water charges | | | 46.25 | |
| | Grand total of benefits | | | 13624.00 | |
| | Total annual Costs = | | | 47301.87 | |
| | Benefit Cost Ratio = | | | Net Annual Benefits | |
| | Benefit Cost Ratio = | | | Net Annual Cost | |
| | Benefit Cost Ratio = | | | 0.288 | |

The Benefit Cost Ratio estimated is only 0.288 for the year 2013-14 with around 30% potential creation, so with 100% potential creation this can be estimated as 0.864 which shows economic infeasibility of the project

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Table 3.14 : Social Benefit Cost Ratio

| Calculation of Social Benefit Cost Ratio | | | | | |
|---|--|------------------------------------|-----------------------------------|--------------|-----------------|
| | | | | Rs.in lakhs | |
| Particulars | | | | | |
| | | | Without Project | With Project | |
| A. GROSS RECEIPTS | | | A.1. | | A.1 |
| 1 | Gross value of farm produce | | 14423.64 | | 41852.28 |
| 2 | Dung receipts @ 30% of the fodder expenditure | | 519.25 | | 1004.45 |
| 3 | Total (A): Gross Receipts (1+2) | | 14942.89 | | 42856.73 |
| B. EXPENDITURE | | | | | |
| 1 | Expenditure on seeds | | 1949.25 | | 2975.15 |
| 2 | Expenditure on manure, Fertiliser, pesticides etc. | | 1325.50 | | 6057.59 |
| 3 | Expenditure on hired labour | | 2488.71 | | 6451.68 |
| 4 | Fodder expenses | Without Project 15% of Item A.1 | With Project 10% of item A.1 | 1730.84 | 3348.18 |
| 5 | Depreciation on implements | 2.7% of item A.1 | 2.7% of item A.1 | 389.44 | 1130.01 |
| 6 | Shared and Cash rent | 5% of Item A.1 | 3% of item A.1 | 721.18 | 2092.61 |
| 7 | Land Revenue | 2% of Item A.1. | 2% of item A.1. | 288.47 | 837.05 |
| 8 | Irrigation water Charges | | 0.00 | | 337.20 |
| 9 | Total (B): Expenses (1 to 8) | | 8893.39 | | 23229.48 |
| C. NET VALUE OF PRODUCE: | | | | | |
| 1 | Total Gross receipts (Total A.3) | | 14942.89 | | 42856.73 |
| 2 | Minus total expenses (Total B.9) | | 8893.39 | | 23229.48 |
| 3 | Net Benefit of produce: (1-2) | | 6049.50 | | 19627.26 |
| D. ANNUAL AGRICULTURAL BENEFITS: | | | | | |
| 1 | Net Benefit With Project (C.3) | | 19627.26 | | |
| 2 | Net Benefit Without Project (C.3) | | 6049.50 | | |
| 3 | Loss of agriculture benefits due to submergence. | | 0.00 | | |
| 4 | Net Annual Benefits (Net Incremental Benefits) | | 13577.75 | D3 | |
| TOTAL AGRICULTURE BENEFITS | | | 13577.75 | | |
| Benefits through Drinking water supply | | | | | |
| | | | 4136.5134 | | |
| Total Benefit (buffalos) = | | | 1840.16 | | |
| Total Benefits (Cow) = | | | 3554.1 | | |
| Benefit through employment | | | 42 | | |
| Total Annual Social benefits = | | | 23150.53 | | |
| Total annual social Costs = | | | 43387.8177 | | |
| Social Benefit Cost Ratio = | | | Net Annual Social Benefits | | |
| | | | Net Annual Social Cost | | |
| Social Benefit Cost Ratio = | | | 0.53 | | |

The Social Benefit Cost Ratio estimated is 0.53 for the year 2013-14 with around 30% potential creation, so with 100% potential creation this can be estimated as more than 1.5, satisfying the norm & project proves to be economically infeasible.

IV. CONCLUSIONS

- The actual potential created as on June 2014 has been 25061 hectares and actual area irrigated is 16565 hectares. The Mhaisal lift Irrigation Scheme has not only benefitted for agriculture irrigation project In addition the scheme has supplied water to fillup a total of 889, minor, medium projects, tanks, K.T weirs, bandharas during water

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scarcity period & a population of 365861 from 105 villages have got benefit of drinking water in the year 2013-14. The benefit cost ratio estimated is only 0.288 for the year 2013-14, which shows economic infeasibility of project. However the social & indirect benefits quantified for the villages chosen for study account for a very significant benefits to people in the command.

2. The total expected irrigable command area of Mhaisal is 81697 Ha. Presently, the potential created is around 30% only. The social benefit cost ratio is estimated as 0.53. Hence if the total potential gets created, the b/c ratio will definitely satisfy the norm of economic viability.
3. In the view of, number of limitations of the economic criteria suggested by the Second Irrigation Commission Government of India, changing times & phenomenon and needs of society, it is high time that we need to adopt the Social Benefit Cost Analysis(SBCA) for the Water Resources Projects in general & Government Lift Irrigation Schemes in particular. This technique can be used to economically evaluate projects & also evaluate in terms of the explicit National objectives viz. employment generation, redistribution of income & development of backward regions, etc.
4. The economic appraisals/ evaluations or the SBCA of any project should consider serious estimations of the indirect and social benefits & costs. The quantification, estimation & the standardization of social costs & benefits, conversion of all these in monetary terms and developing procedures / methodology to carryout these is the major requirement.

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