

Annex L

Project Evaluation



ANNEX L

PROJECT EVALUATION

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ANNEX L PROJECT EVALUATION

L.1 INTRODUCTION

The delay action dam schemes were evaluated in terms of technical, institutional, social, economical and financial viewpoints. The DADs to be evaluated consisted of 13 proposed DAD schemes or 14 proposed DAD sites, as shown in the following table. Out of them, 10 proposed DAD sites were studied at the feasibility study level and other 4 DAD sites were pre-feasibility study level.

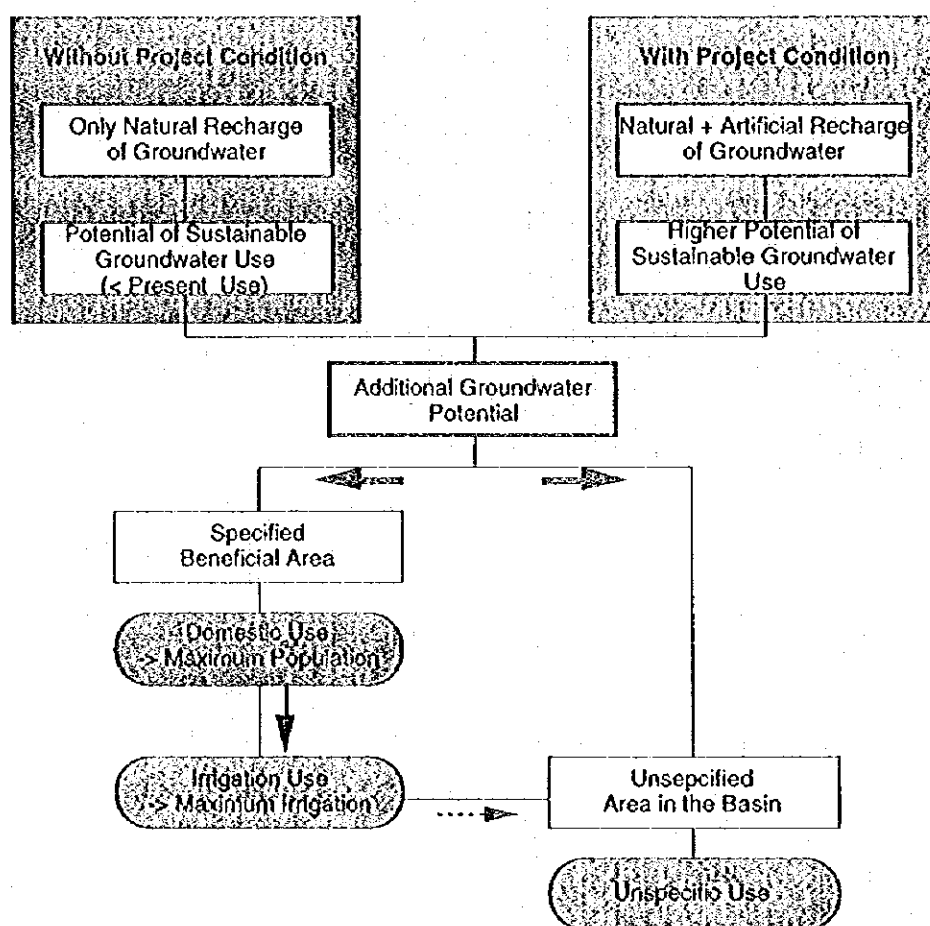
| Delay Action Dams Studied | | | |
|----------------------------------|-------------------|-----------------|-----------------------------|
| | DAD | District | Study Depth |
| 1 | Brewary | Quetta | Feasibility study level |
| 2 | Ghutai Shela | Quetta | Pre-feasibility study level |
| 3 | Wali Dad | Quetta | Pre-feasibility study level |
| 4 | Dara | Quetta | Feasibility study level |
| 5 | Murgi Kotal | Quetta | Feasibility study level |
| 6 | Kach | Quetta | Feasibility study level |
| 7 | Jigda | Pishin | Feasibility study level |
| 8 | Sanzali | Pishin | Feasibility study level |
| 9 | Ghazlona (Arambi) | Qila Abdullah | Feasibility study level |
| | Samaki (Arambi) | Qila Abdullah | Pre-feasibility study level |
| 10 | Sakhel | Mastung | Feasibility study level |
| 11 | Mangi | Kalat/Mastung | Feasibility study level |
| 12 | Kad Kocha II | Mastung | Feasibility study level |
| 13 | Iskalkoo | Kalat | Pre-feasibility study level |

The delay action dams have a main function of artificial recharge of groundwater aiming to secure sustainable water use. At present the water balance falls into significant deficit of natural recharge to exploitation in all sub-basins of Pishin Lora basin. The DAD project accelerates water recharge to groundwater basins and improves the water balance. The benefits of the groundwater recharge are considered to appear in the downstream areas of the DADs, as well as the basin in which the DAD is located, because the water artificially recharged is not fully consumed in the specified beneficiary areas but some portion of the water reserves groundwater resources in unspecified areas of the basin.

The artificially infiltrated water is lifted up by tubewell or flows down for both irrigation and domestic use in the specified beneficial areas. Under the "Without Project" condition, groundwater only naturally recharged is assumed to be used in the beneficial area from the viewpoint of groundwater conservation. It means that exploitation of water under the "Without Project" condition is less than one at the "Present" condition. Under the "With Project" condition, the groundwater potential becomes much larger owing to artificial recharge by the DADs. The difference of water use under these two future conditions comes to the

groundwater recharge benefit of the DADs, counting demand values of domestic and irrigation water in each specified beneficial area.

The recharge volume in water for the unspecified area of the basin is initially allocated from the total recharge volume of the DAD by topographic and hydrogeological consideration of the site. When the recharged water allocated to the specified area is surplus to demand, the surplus water is counted as a part of the unspecified recharge. The most economical cost in the several alternatives of groundwater recharge devices is used as a unit value of additional water resources recharged by the DAD.



Concept of Groundwater Resources in the Study

The hydrogeological and hydrological study on the Study Area offered the groundwater volume expected to be recharged additionally caused by each DAD construction. The artificial recharge would fulfill the demand of domestic water and irrigation water in the specified beneficial area and also contribute additional groundwater potential to the unspecified area of the basins. The

following table gives the expected recharge volume and its distribution among the water use regarding each DAD.

Artificial Groundwater Recharge and Share of Water Use

(Unit: cu.m)

| DAD | Artificial recharge volume | Domestic use in specified area | Irrigation use in specified area | Unspecified use in unspecified area |
|---------------------|----------------------------|--------------------------------|----------------------------------|-------------------------------------|
| 1 Brewery | 510,200 | 10,144 | 290,959 | 204,100 |
| 2 Ghutai Shela | 31,400 | 15,000 | 0 | 16,400 |
| 3 Wali Dad | 137,900 | 12,680 | 70,020 | 55,200 |
| 4 Dara | 389,500 | 7,185 | 183,113 | 199,202 |
| 5 Murgi Kotal | 394,900 | 17,428 | 171,172 | 206,300 |
| 6 Kach | 1,147,000 | 12,680 | 204,142 | 930,178 |
| 7 Jigda | 528,000 | 4,566 | 65,000 | 458,534 |
| 8 Sanzali | 213,300 | 1,522 | 20,083 | 191,695 |
| 9 Ghazlona (Arambi) | 140,700 | 9,741 | 31,659 | 99,300 |
| Samaki (Arambi) | 57,800 | 7,306 | 9,694 | 40,800 |
| 10 Sakhol | 206,100 | 21,637 | 76,763 | 107,700 |
| 11 Mangi | 1,091,300 | 33,218 | 621,582 | 436,500 |
| 12 Kad Kocha II | 508,900 | 27,047 | 278,254 | 203,600 |
| 13 Iskalkoo | 109,300 | 6,044 | 26,056 | 77,200 |

Further, the DADs make additional positive impacts on flood control, because the Study Area is used to be suffered by flooding caused by occasional heavy rain in summer season even though it is considered as arid area. The proposed dams prevent flushing water from mountain range from running down directly to agricultural and residential areas. The dams also perform as check dams which catch soils eroded in denuded mountains. The following diagram briefly explains the anticipated benefit of the DAD scheme.

Anticipated Benefit of Delay Action Dams

| Function of DAD | Effective area | Item of Benefit | Valuation of Benefit |
|--------------------------------------|-------------------------------|--|---|
| Acceleration of Groundwater Recharge | Specified beneficial area | Increase of groundwater potential for sustainable domestic use | Additional supply of domestic water Unit value of domestic water |
| | | Increase of groundwater potential for sustainable irrigation use | Additional supply of irrigation water Agricultural products |
| | Unspecified area in the basin | Conservation of groundwater resources for multiple use | Unit water value equivalent to the most economical artificial recharge cost |
| Flood Control | Downstream area of the DAD | Mitigation of flood damage | Avoidance of expected flood damage |

L.2 ECONOMIC EVALUATION

L.2.1 Basic Assumption

The economic evaluation of the Project are carried out under the following assumption and indicators.

- 1) **Economic useful life:**
The project life limited by sedimentation is 40 years adding 10 years of effectiveness of storage to 30 years of the base design period against sedimentation in principle. Exceptionally, the topographic condition allows only 35-year project life for Murgi Kotal and Jigda, 25-year for Sanzali and 20-year for Kach.
- 2) **Currency:**
All prices are expressed at December 1996 prices in Pakistan Rupee.
- 3) **Foreign currency exchange rate**
The foreign currency exchange rate was at US\$ 1.00 = Rs. 40.00 = ¥ 115.00 as of average during the end of 1996.
- 4) **Standard conversion factor:**
The conversion factor of most commodity prices is the standard conversion factor (SCF) which represents the ratio of prices within the economy to their international prices. The SCF is mainly influenced by the trade policies of the Government. It is approximated by the weighted average of import and export tariffs, with subsidies excluded. The weights used are based on the magnitude of imports and exports in the total trade during the recent years.

An average SCF of 5 years from 1990/91 to 1994/95 is taken to allow for annual fluctuations in trade, taxes and subsidies, as shown in Table ***. Taxes on exports are levied on a range of items including raw cotton, rice, hides and skins. Rebates on excise duties and sales tax are allowed on certain domestically produced goods used in the production of exports. The standard conversion factor is calculated as the following equation.

$$SCF = \frac{M + X}{(M + T_m) + (X - T_x)}$$

where, M is the CIF value of imports

X is the FOB value of exports

T_m is the net value of taxes/subsidies on imports

T_x is the net value of taxes/subsidies on exports

On the basis of the above, the average SCF of 0.87 is applied to domestic cost elements such as transportation, handling and processing for estimation of economic value.

Standard Conversion Factors

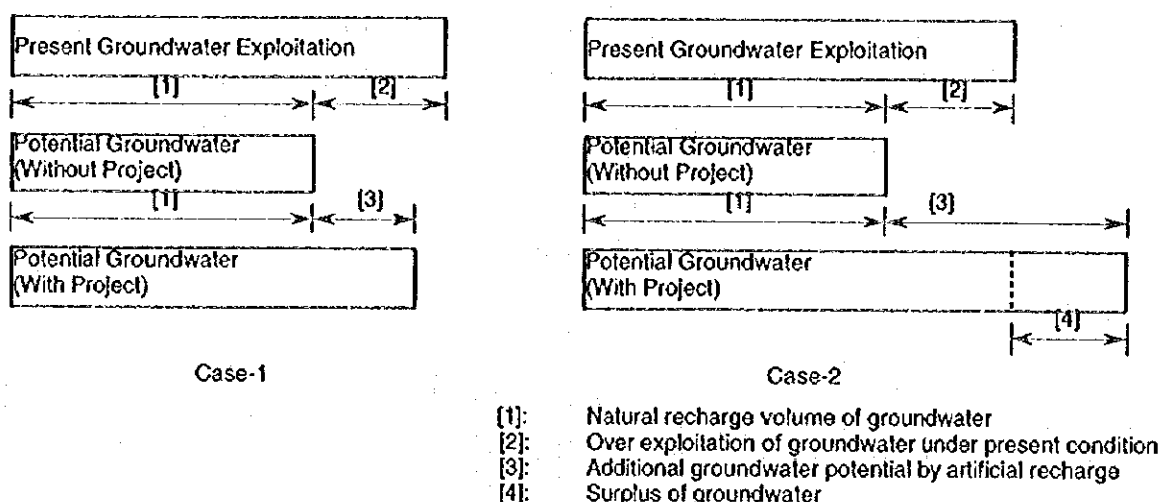
| Description | (Unit: Rs. Million) | | | | |
|-------------------|---------------------|---------|---------|---------|---------|
| | 1990/91 | 1991/92 | 1992/93 | 1993/94 | 1994/95 |
| Total Import | 171,114 | 229,889 | 258,643 | 258,250 | 320,892 |
| Total Export | 138,280 | 171,728 | 177,028 | 205,449 | 251,173 |
| Net Tax on Import | 39,260 | 59,766 | 68,776 | 77,613 | 127,626 |
| Net Tax on Export | 4,087 | 4,700 | 865 | 870 | 1,130 |
| SCF | 0.90 | 0.88 | 0.87 | 0.86 | 0.83 |

- 5) Shadow wage rate:
In labor surplus condition of the economy, the marginal value of labor might lower than wage rate actually paid. Recently, shadow wage rate of unskilled labor is 0.75 in Pakistan.
- 6) Social discount rate:
The opportunity cost of capital in Pakistan is deemed to lie somewhere between 10 to 12 %. For this Project a social discount rate of 10 % has been adopted as the minimum target for the delay action dams schemes.

L.2.2 Benefit on Agriculture in Specified Beneficial Area

There is no doubt that today's rapid growth of agricultural production in the Study Area stands on an over exploitation of groundwater resources. Such excessive water use for irrigation may exhaust the groundwater resources in future. The agricultural production under without-project condition is assumed to be lower than at present due to limitation of groundwater potential. Under with-project condition, the additional groundwater potential derived from the DAD is expected to support the higher production in agriculture sector. This incremental value of the farm products is taken as the benefit of agriculture in the specified beneficial area of the DAD.

The only enlargement of the sustainable irrigation area will bring such agricultural production benefit. The irrigated area in the specified beneficial area of the DAD under without-project condition derived from the present irrigated area multiplied by the percentage of water shortage in the basin. The additional water potential for irrigation use is the additional recharge volume in water excluding the demand for domestic use. The irrigated area under with-project condition is the present irrigated area or maximum irrigated area achieved by balanced water potential. The project does not aim at extending the irrigation outside of the present irrigated area.



Groundwater Potential under With and Without Project Conditions

Assuming that the cropping pattern does not change under the project, the present cropping pattern at each beneficial area is used for unit water requirement and net agricultural production value. The agricultural production value is expressed at economic value using the international prices on wheat and chemical fertilizers (Table L.2.2.1) and the conversion factors on other inputs and outputs. In this evaluation, wheat, tomatoes, apples, onion and fodder is taken up as the representative crops of cereals, vegetables, fruits, other crops and fodder crops, respectively. Those crop budgets are shown in Table L.2.2.2 and the average net income in each beneficial area is estimated as shown in Table L.2.2.3.

L.2.3 Benefit on Water Supply in Specified Beneficial Area

The common water sources for domestic use in the specified beneficial area is groundwater lifting through tubewells, open wells and karezes, but natural groundwater is running short in the area. The project benefit on domestic water supply is measured as a increment of sustainable water supply capacity to the residents in the specified beneficial area. The additional water demand is represented by the product of the total population, over-exploiting ratio of groundwater and unit water requirement. The benefit is derived from multiplying it by the unit value of domestic water. In this calculation, the unit water requirement is 0.06 cu.m/day/person as an average in the area, and the unit value of domestic water is estimated at Rs. 8.80 /cu.m based on average construction cost, O&M cost and exploitation volume of a tubewell.

L.2.4 Benefit on Groundwater Recharge in Unspecified Area

The general recharge to groundwater basin must bring substantial benefit because the area which faces to crisis of groundwater resources and has no other water resources to be developed need immediate countermeasures of recharge acceleration or water saving. As it is difficult to measure such benefit directly, the cost-effectiveness analysis method is applied for this purpose.

The volume of the additional groundwater recharge in the unspecified area by the DAD is basically estimated by hydrogeological and topographical information of the site. If there is surplus groundwater after using for domestic and irrigation purposes in the specified beneficially area, the surplus volume of water is added to the water potential in the unspecified area. In the evaluation of the benefit on groundwater recharge in the unspecified area, the minimum unit cost among the several alternative measures is used as unit water value in the basin. The benefit is estimated from multiplication of the artificial recharge volume in the unspecified area and the unit water value of Rs. 4.98 /cu.m.

L.2.5 Benefit on Flood Control

The benefit from flood control by each of proposed dams is calculated as flood mitigation effects accruing in proportion to the flood magnitude which is related to the catchment area.

The Irrigation Department has been investigated flood damages in Quetta valley by flood events. Using the historical data of the flood damages, regression equation between flood damage and 12 hour's rainfall related to the flood was derived as follows:

$$(\text{Flood damage ; million Rs.}) = -2.8651 + 0.2308 \times (12 \text{ hour's rainfall})$$

Adopting the above equation, sequential amounts of flood damages corresponding with each of probable 12 hour's rainfalls were estimated below.

| Occurrence Probability (%) | 12 hr.rainfall (mm) | Flood damage (MillionRs.) | Probable- damage (MillionRs.) |
|----------------------------------|------------------------|---------------------------------|-------------------------------------|
| 50.00 | 32.9 | 0.000 | 0.000 |
| 16.70 | 36.9 | 4.722 | 0.789 |
| 13.30 | 45.3 | 5.650 | 0.751 |
| 10.00 | 55.3 | 7.588 | 0.759 |
| 5.00 | 66.1 | 9.887 | 0.494 |
| 1.70 | 74.5 | 12.393 | 0.211 |
| 0.80 | 79.7 | 14.317 | 0.115 |
| 0.50 | 83.5 | 15.522 | 0.078 |
| 0.30 | 86.6 | 16.408 | 0.056 |
| 0.70 | 91.7 | 17.114 | 0.113 |
| 0.30 | 98.5 | 18.305 | 0.062 |
| 0.20 | 103.7 | 19.870 | 0.032 |
| 0.50 | 105.8 | 21.060 | 0.105 |
| 100.00 | | | 3.564 |

the result of above analysis, value of expected flood damage was obtained at 3.564 million Rs. par catchment area of Quetta valley of 413 sq.km. Specific expected flood damage par unit catchment area is 8,630 Rs./sq.km (present value; 18,800 Rs.) by this result. It may be concluded that 18,800 Rs. will be accrued from mitigation of flood damage if a flood occurred from 1.0 sq.km catchment area can be perfectly controlled. Assuming that proposed delay action dam functions to mitigate flood occurred in the catchment area, flood damage related to the catchment area can be accrued. By this conception on the flood control of delay action dam, benefit from flood control were estimated multiplying the specific expected flood damage of 18,800 Rs. and catchment area of the proposed delay action dam.

L.2.6 Economic Project Cost

In the evaluation, the project cost basically consists of construction cost and operation and maintenance cost for the delay action dam and other project facilities. The delay action dams can be considered to have double function to keep flood water and sand, because the design capacity of dams is decided by flood discharge and sediment volume in the reservoir. The erosion control facility is fundamentally necessary to be constructed in the area for the sake of proper maintenance of rangeland as well as farm land in downstream. Although the assessment of the erosion control is ideally to be done, the evaluation method is not established concretely yet. Therefore, the all costs as well as benefit for soil erosion control are excluded from this assessment of the DAD schemes. The project cost is calculated by subtracting the direct and indirect cost on detention bunds to be constructed, if any, and the construction cost of check dam to trap the design sedimentation volume from the total project cost.

The construction cost is converted into the economic cost using some conversion factors. This process is; 1) reducing of transfer costs, 2) multiplying unskilled labor costs by the shadow wage rate of 0.75, 3) multiplying other local costs by the standard conversion factor of 0.87, and 4) multiplying all foreign costs by 1.00. The computed economic cost of the project is shown in the following table (refer to Table L.2.6.1). The economic cost for operation and maintenance is also calculated applying the same conversion method as the construction cost.

Project Cost in Economic Price

(Unit: Rs. '000)

| DAD | DAD Construction Cost* | Cost Owing to Sedimentation** | Project Cost for Evaluation | Annual O&M Cost |
|-------------------|------------------------|-------------------------------|-----------------------------|-----------------|
| Brewary | 40,249 | 20,974 | 19,275 | 69 |
| Ghutai Shela | 12,562 | 6,774 | 5,788 | 99 |
| Wali Dad | 39,077 | 9,535 | 29,542 | 123 |
| Dara | 69,585 | 35,852 | 33,733 | 266 |
| Murgi Kotal | 62,295 | 14,630 | 47,665 | 204 |
| Kach | 128,765 | 44,851 | 83,914 | 285 |
| Jigda | 38,381 | 13,293 | 25,088 | 255 |
| Sanzali | 43,740 | 18,698 | 25,042 | 157 |
| Arambi (Ghazlona) | 21,867 | 9,662 | 12,205 | 119 |
| Arambi (Samaki) | 14,044 | 3,749 | 10,295 | 100 |
| Sakhol | 59,008 | 33,769 | 25,239 | 264 |
| Mangi | 66,535 | 24,825 | 41,710 | 322 |
| Kad Kocha II | 54,573 | 30,618 | 23,955 | 321 |
| Iskalkoo | 19,874 | 5,685 | 14,189 | 107 |

Note *: Excluding direct and indirect cost for erosion control facilities from the construction cost explained in Chapter 7.

Note **: Assuming necessary check dam to store design sedimentation volume.

Source: JICA Study Team

L.2.7 Results of Economic Evaluation

The average annual benefit on the proposed DAD schemes was tentatively estimated on the assumptions mentioned above. The total benefits is evolved by summing up the values of each benefit items (refer to Table L.2.7.1).

Average Annual Benefit of the Proposed DADs

(Unit: Rs. '000)

| DAD | Specified Area Domestic Use | Irrigation Use | Unspecified Groundwater Recharge | Flood Control | Total Annual Benefit |
|-------------------|-----------------------------|----------------|----------------------------------|---------------|----------------------|
| Brewary | 89 | 2,809 | 1,016 | 487 | 4,402 |
| Ghutai Shela | 132 | 0 | 82 | 34 | 248 |
| Wali Dad | 112 | 524 | 275 | 102 | 1,012 |
| Dara | 63 | 1,883 | 992 | 312 | 3,250 |
| Murgi Kotal | 153 | 1,430 | 1,027 | 370 | 2,982 |
| Kach | 112 | 2,123 | 4,632 | 829 | 7,759 |
| Jigda | 40 | 484 | 2,283 | 235 | 3,042 |
| Sanzali | 13 | 112 | 955 | 117 | 1,198 |
| Arambi (Ghazlona) | 86 | 274 | 495 | 103 | 957 |
| Arambi (Samaki) | 64 | 64 | 203 | 38 | 369 |
| Sakhol | 190 | 386 | 536 | 419 | 1,532 |
| Mangi | 292 | 3,099 | 2,174 | 1,395 | 4,960 |
| Kad Kocha II | 238 | 2,563 | 1,014 | 681 | 4,496 |
| Iskalkoo | 53 | 137 | 384 | 87 | 662 |

Source: JICA Study Team

The Net Present Value (NPV) and Benefit Cost (B/C) Ratio and Economic Internal Rate of Return (EIRR) are calculated on the assumptions mentioned above, making cash flow of the scheme at the social discount rate of 10 % (refer to Table L.2.7.2). As a key economic indicator, EIRR on each proposed DAD scheme as well as the rank by EIRR is shown in the following table (refer to Table L.2.7.3).

Economic Internal Rate of Return and Its Rank of the Proposed DADs

| DAD | B/C Ratio | Rank |
|-------------------|-----------|------|
| Brewary | 22.5 % | 1 |
| Ghutai Shela | 0.1 % | 14 |
| Wali Dad | 0.9 % | 11 |
| Dara | 8.6 % | 5 |
| Murgi Kotal | 4.6 % | 8 |
| Kach | 6.3 % | 6 |
| Jigda | 10.8 % | 4 |
| Sanzali | 0.3 % | 12 |
| Arambi (Ghazlona) | 6.3 % | 7 |
| Arambi (Samaki) | 0.2 % | 13 |
| Sakhol | 4.0 % | 9 |
| Mangi | 15.9 % | 3 |
| Kad Kocha II | 17.4 % | 2 |
| Iskalkoo | 2.4 % | 10 |

Source: JICA Study Team

Brewary DAD shows the highest EIRR value at 22.5 %, followed by Kad Kocha II at 17.4 %, Mangi at 15.9 % and Jigda at 10.8 %. The EIRR values of the other 10 DADs are lower than the social discount rate of 10 %. In other words, the NPVs of them become minus at the discount rate. The DADs of Iskalkoo, Wali Dad, Sanzali, Samaki and Ghutai Shela are less advantageous in terms of economic efficiency.

L.2.8 Sensitivity Analysis

The sensitivity analysis is done in order to evaluate soundness of the project against possible adverse change in the future. The 3 cases; 1) project cost overrun by 20%, 2) benefit decrease by 20% and 3) delay in construction for 1 years, are analyzed as shown in the following table (refer to Table L.2.8.1 to L.2.8.3).

Sensitivity Analysis of the Proposed DADs (EIRR Value)

| DAD | Cost overrun by 20% | Benefit decrease by 20% | Construction delay for 1 years |
|-------------------|------------------------|----------------------------|-----------------------------------|
| Brewary | 18.7 % | 17.9 % | 22.5 % |
| Ghutai Shela | -0.7 % | -1.7 % | 0.1 % |
| Wali Dad | 0.0 % | -0.4 % | 0.9 % |
| Dara | 6.9 % | 6.4 % | 8.6 % |
| Murgi Kotal | 3.3 % | 2.9 % | 4.6 % |
| Kach | 4.1 % | 3.5 % | 6.3 % |
| Jigda | 8.8 % | 8.1 % | 10.8 % |
| Sanzali | -1.1 % | -1.7 % | 0.3 % |
| Arambi (Ghazlona) | 4.9 % | 4.3 % | 6.3 % |
| Arambi (Samaki) | -0.7 % | -1.3 % | 0.2 % |
| Sakhol | 2.8 % | 2.2 % | 4.0 % |
| Mangi | 13.2 % | 12.5 % | 15.9 % |
| Kad Kocha II | 14.5 % | 13.6 % | 17.4 % |
| Iskalkoo | 1.4 % | 0.9 % | 2.4 % |

Source: JICA Study Team

L.3 FINANCIAL EVALUATION

The financial analysis on the farm economy is made for the evaluation of the impact of the project implementation to the farm income in the beneficiary area. The typical farmers to be analyze are; 1) small-scale fruit producer and 2) medium-scale cereal producer. As a result, fruit producer, even small-scale farmer, is expected to get greater profit than cereal producer.

In addition, the comparative study of the small-scale cereal producer is made in cases of; 3a) no change in cropping pattern, 3b) introducing vegetables, and 3c) introducing fruit crops in future. The following table shows that the incremental annual income under the project increase from Rs. 7,100 in the case 3a to Rs. 53,200 in the case 3b, and eventually to Rs. 150,000 in the case 3c (refer to Table L.3.1). Thus, when the recommended effort toward improvement of cropping is made together with the DAD construction, the additive effects by combining them is significantly expected especially in less-developed farmers.

Financial Impact on Farm Economy

| Type of Farmer (Scale/Cropping System) | Cropping Pattern (Cereal:Fruit:Vegetable, %) | | Incremental Farm Income (Rs./year) |
|---|--|-----------------|---------------------------------------|
| | With Project | Without Project | |
| No change in Cropping Pattern | | | |
| 1 Small Fruits Producer (2ha) | 10:70:20 | 10:70:20 | 51,500 |
| 2 Medium Cereal Producer (6ha) | 80:10:10 | 80:10:10 | 33,300 |
| Change in Cropping Pattern | | | |
| 3a Small Cereal Producer (2ha) | 80:00:20 | 80:00:20 | 7,100 |
| 3b Small Cereal Producer (2ha) | 30:00:70 | 80:00:20 | 53,200 |
| 3c Small Cereal Producer (2ha) | 30:60:10 | 80:00:20 | 150,000 |

Source: JICA Study Team

L.4 SOCIAL IMPACT ASSESSMENT

The benefit from the groundwater recharge accelerated by DAD construction can infiltrate into the beneficiaries without any additional expense to construction and O&M works on the DAD. The Project itself does not make the people change their water use custom, farming practices and social structure. Further, the negative impact in social aspects, such as inundation of house or farm land, is expected to be negligible. Therefore, the Project might be acceptable to the all people who desire security of their water resources.

The interview survey on the opinion to the DAD plan at the sites shows that almost all beneficiaries wish the plan and are willing to participate or cooperate the planning, construction and O&M of the schemes. Although a few people offered the opinions on the security and function of the DAD itself, the explanation and discussion on the technical matters in planning and design will help mutual understanding.

Although it is very hard to directly measure significance of the social impacts in this project, the number of beneficial people and area of irrigated farm land within the specified beneficial area may show the stretch of the social impacts. The following table shows them and the ranking by them for each DAD. The ranking is quite different from it of EIRR.

Beneficiaries and Irrigated Area in the Specified Beneficial Area

| DAD | Number of Beneficiaries | | Irrigated Area | |
|-------------------|-------------------------|------|----------------|------|
| | (Nos) | Rank | (ha) | Rank |
| Brewary | 2,400 | 8 | 188 | 3 |
| Ghutai Shela | 4,000 | 3 | 41 | 13 |
| Wali Dad | 3,000 | 5 | 71 | 8 |
| Dara | 1,700 | 11 | 133 | 5 |
| Murgi Kotal | 4,600 | 2 | 113 | 6 |
| Kach | 3,000 | 5 | 136 | 4 |
| Jigda | 1,500 | 12 | 56 | 11 |
| Sanzali | 500 | 14 | 21 | 14 |
| Arambi (Ghazlona) | 3,200 | 4 | 69 | 9 |
| Arambi (Samaki) | 2,400 | 8 | 53 | 12 |
| Sakhol | 2,000 | 10 | 60 | 10 |
| Mangi | 4,800 | 1 | 349 | 1 |
| Kad Kocha II | 2,500 | 7 | 303 | 2 |
| Iskalkoo | 1,500 | 12 | 75 | 7 |

Source: JICA Study Team

In conclusion, the Project is judged to be socially sound due to its function of conservation of the groundwater resources and social structure. Since the necessity and of the water conservation might push the plan toward immediate implementation even if the economic feasibility of the project is relatively low.

L.5 ENVIRONMENTAL CONSIDERATION

The delay action dam project which promotes the sustainable use of renewable natural resources is considered as an environmental conservation project. The Project is conformed with the governmental policy of environmental conservation because Balochistan government puts first priority on the preservation of the limited groundwater resources. Consequently even if minor negative impacts caused by DADs are anticipated by environmental study or evaluation in planning or designing phase, it is recommended to implement the Project with employing appropriate countermeasures to remove or reduce negative impacts.

Each study DAD site was exposed to the Initial Environmental Examination (IEE) on natural, physical and social environmental components. As a result of the IEE, all environmental issues do not strongly claim a modification or cancellation of the DAD schemes, except the issue of soil erosion in catchment area. In case that significant reduction of the groundwater recharge function of DAD by the siltation into the reservoir area is anticipated, the DAD scheme includes some retention bunds upstream as well as recommends medium to long term watershed and range management plan to mitigate such sedimentation. In addition, in Sakhol and Kad Kocha II areas the minor conflict with surface water use on flood irrigation is expected to be solved

easily by means of discussion because the scale and dependence of the flood irrigation is negligibly small.

L.6 CONCLUSION

The economic evaluation of each scheme shows a wide range from highly feasible DADs with above EIRR of 10 % to low priority DADs with below EIRR of 5 %. Within the low-priority DADs, however, there exists some DADs having considerable importance in exhibition, social impact or environmental conservation. In this Study, the 14 DADs is classified into 3 groups in consideration of the economic indicator and balance of location, as follows.

Group I High priority DADs with high economic feasibility and high status as a model. Rapid implementation is recommended.

Group II Middle DAD class in economic viability. Implementation is recommended from a viewpoint of medium term development.

Group III Lower priority DADs with possible effect on groundwater basin. Implementation is conditionally recommended from a viewpoint of long term groundwater conservation.

The Study recommends the stage-wise implementation of the DAD schemes due to capability of implementation agency and additive effects obtained by some DADs. The 3 stages is set for each DAD group above. The project implementation plan is concluded as follows.

| Stage I | Stage II | Stage III |
|---|--|--|
| <div> <div>Brewary</div> <div>Kad Kocha II</div> <div>Mangi</div> <div>Jigda</div> <div>Dara</div> <div>Quetta</div> <div>Mastung</div> <div>Kalat</div> <div>Pishin</div> <div>Quetta</div> </div> | <div>Being operational</div> <div> <div>Kach</div> <div>Arambl</div> <div>Murgi Kotai</div> <div>Sakhol</div> <div>Quetta</div> <div>Qila Abdullah</div> <div>Quetta</div> <div>Mastung</div> </div> | <div>Being operational</div> <div> <div>Iskalkoo</div> <div>Wall Dad</div> <div>Sanzali</div> <div>Samaki</div> <div>Ghulal Shela</div> <div>Kalat</div> <div>Quetta</div> <div>Pishin</div> <div>Qila Abdullah</div> <div>Quetta</div> </div> |

Project Implementation Plan

Along with the implementation plan, the integrated scale, benefit and economic efficiency of the DAD groups are analyzed, assuming group I is implemented in the first year, group II in the second year and group III in the third year. When the project achieves at the end of the stage I, the 5 DADs accelerate groundwater recharge at 3.0 MCM/year causing Rs. 22.2 million of benefit. The implementation of group I is judged to be highly feasible due to the integrated EIRR of the stage I of 14.5 % as well as necessity and anxiousness. As progressing to stage II, the integrated EIRR decreases to 10.2 %, which is still higher than opportunity cost of 10 %. The implementation of group I and II is also feasible in public investment. Eventually, the integrated IRR becomes 8.7 % at the end of the stage III. However, the social and environmental importance of the DADs leaves room for consideration toward implementation. If the construction of DADs of group II and III takes medium and long term, instead of continuous implementation within 3 years as this analysis, the economic indicator may become lower.

Accumulative Project Evaluation under Stage Wide Implementation

| DAD | Stage I | Stage I & II | Stage I, II & III |
|------------------------------------|---------|--------------|-------------------|
| Dam Site (Number) | 5 | 9 | 14 |
| Recharge Volume (cu.m/year) | 3,028 | 4,924 | 5,466 |
| Total Beneficiaries (person) | 12,900 | 24,200 | 37,100 |
| Irrigation Area (ha) | 1,029 | 1,368 | 1,667 |
| Financial Project Cost (Rs.'000) * | 370,283 | 683,222 | 854,869 |
| Annual Benefit (Rs.'000) | 22,150 | 35,045 | 38,868 |
| EIRR (%) ** | 14.5 | 10.2 | 8.7 |
| NPV (Rs.'000) ** | 74,569 | 4,696 | -36,210 |

Note: *) Total construction cost at market price.

**) Assuming implementation of group I in the first year, group II in the second year and group III in the third year.

Source: JICA Study Team

Table L.2.2.1 Economic Price Structure of Wheat, Urea and DAP

| Item | Unit | Wheat | Urea | DAP |
|--|----------|--------|--------|--------|
| FOB Price | US\$/ton | 215 | 210 | 220 |
| Freight and Insurance | % | 15% | 15% | 15% |
| CIF Price at Karachi | US\$/ton | 247 | 242 | 253 |
| (Foreign Exchange Rate) | Rs./US\$ | 40 | 40 | 40 |
| CIF Price at Karachi | Rs./ton | 9,890 | 9,660 | 10,120 |
| Shadow Rate of Transportation Charge from Karachi to Quetta | Rs./ton | 505 | 405 | 405 |
| Shadow Rate of Port Charge, Storage Cost, Handling Cost, etc. | Rs./ton | 386 | 163 | 163 |
| Shadow Rate of Transportation Charge from Quetta to Project Site | Rs./ton | -86 | -118 | -118 |
| Farmgate Price (Economic Price) | Rs./ton | 10,695 | 10,110 | 10,570 |
| | Rs./Bag | | 505 | 529 |
| Farmgate Price (Financial) | Rs./ton | 4,000 | | |
| | Rs./Bag | | 336 | 567 |
| Ratio (Economic/Financial) | | 2.67 | 1.50 | 0.93 |

Note: All prices are indicated at 1995/96 constant price.

Source: Commodity Markets and the Developing Countries, 1996, World Bank
Agriculture Department of Balochistan

Table 1.2.2.2 Net Production Value and Farm Income of Main Crop (1/5)
Wheat

| Item | Description | Value, Market Price (Rs/ha) | Value, Economic Price (Rs/ha) | Conversion Factor |
|---|--|--------------------------------------|--|----------------------|
| Cost | | | | |
| 1. Land preparation | | | | |
| a) Ploughing and leveling | 5 hours rent of tractor, @ Rs 100/hr | 500 | 435 | 0.87 |
| b) Labor (Family) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| c) Labor (Hired) | 3 man-day, @ Rs 50/man-day | 150 | 113 | 0.75 |
| 2. Seed | | | | |
| a) Seed | 110 kg/ha, @ Rs 4/kg | 440 | 383 | 0.87 |
| b) Labor (Family) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| c) Labor (Hired) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| 3. Fertilizer | | | | |
| a) Farm yard manure | 5 truck load every 3 years, @ Rs 700/truck | 1,170 | 1,018 | 0.87 |
| b) Fertilizer application | 2.5 Urea, @Rs336 | 840 | 1,260 | 1.50 |
| | 2 DAP, @Rs567 | 1,134 | 1,055 | 0.93 |
| c) Labor (Family) | 5 man-day, @ Rs 50 | 250 | 188 | 0.75 |
| d) Labor (Hired) | 0 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| 4. Irrigation | | | | |
| a) Labor (Family) | 8 man-day, @ Rs 50 | 400 | 300 | 0.75 |
| b) Labor (Hired) | 10 man-day, @ Rs 50 | 500 | 375 | 0.75 |
| 5. Weeding, earthing, hoeing, etc. | | | | |
| a) Labor (Family) | 6 man-day, @ Rs 50 | 300 | 225 | 0.75 |
| b) Labor (Hired) | 6 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| 6. Plant protection | | | | |
| a) Chemicals | | 750 | 653 | 0.87 |
| b) Labor (Family) | 1 man-day, @ Rs 50 | 50 | 38 | 0.75 |
| c) Labor (Hired) | 0 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| 7. Harvesting | | | | |
| a) Labor (Family) | 10 man-day, @ Rs 50 | 500 | 375 | 0.75 |
| c) Labor (Hired) | 15 man-day, @ Rs 50 | 750 | 563 | 0.75 |
| b) Threshing | 2500kg/ha * 3 kg/40kg, @ Rs 4/kg | 750 | 653 | 0.87 |
| 8. Miscellaneous | | | | |
| | | 800 | 696 | 0.87 |
| Total Cost of Production | | 9,584 | 8,555 | |
| Gross Return | | | | |
| a) Seed | 2500 kg/ha, @ Rs 4/kg | 10,000 | 26,700 | 2.67 |
| b) Wheat straw | 3750 kg/ha, @ Rs 0.75/kg | 2,813 | 2,447 | 0.87 |
| Net Return | | 3,229 | 20,592 | |
| Farm Income (Financial) | | 4,930 | | |
| Net Production Value (Economic) | | | 20,940 | |
| % of production cost to gross return | | 75% | 29% | |
| % of net return to gross return | | 25% | 71% | |

Source: Agriculture Department, Balochistan

Table L.2.2.2 Net Production Value and Farm Income of Main Crop (2/5)
Onion

| Item | Description | Value, Market Price (Rs/ha) | Value, Economic Price (Rs/ha) | Conversion Factor |
|--|--|--------------------------------------|--|----------------------|
| Cost | | | | |
| 1. Land preparation | | | | |
| a) Ploughing and leveling | 5 hours, @Rs100/hour | 500 | 435 | 0.87 |
| b) Labor (Family) | 7 man-day, @Rs50 | 350 | 263 | 0.75 |
| c) Labor (Hired) | 5 man-day, @Rs50/man-day | 250 | 188 | 0.75 |
| 2. Seed | | | | |
| a) Seed | 30 kg, @200 | 6,000 | 5,220 | 0.87 |
| b) Labor (Family) | 2 man-day, @50 | 100 | 75 | 0.75 |
| c) Labor (Hired) | 0 man-day, @50 | 0 | 0 | 0.75 |
| 3. Fertilizer | | | | |
| a) Farm yard manure | 5 truck load every 3 years, @Rs700/truck | 1,170 | 1,018 | 0.87 |
| b) Fertilizer application | 2.5 Urea, @Rs336 | 840 | 1,260 | 1.50 |
| | 2 DAP, @Rs567 | 1,134 | 1,055 | 0.93 |
| c) Labor (Family) | 5 man-day, @ Rs 50 | 250 | 188 | 0.75 |
| d) Labor (Hired) | 0 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| 4. Irrigation | | | | |
| a) Water fee | 15 time, @Rs550 | 8,250 | 7,178 | 0.87 |
| b) Labor (Family) | 10 man-day, @Rs50 | 500 | 375 | 0.75 |
| c) Labor (Hired) | 20 man-day, @Rs50 | 1,000 | 750 | 0.75 |
| 5. Weeding, earthing, hoeing, etc. | | | | |
| a) Labor (Family) | 20 man-day, @Rs50 | 1,000 | 750 | 0.75 |
| b) Labor (Hired) | 30 man-day, @Rs50 | 1,500 | 1,125 | 0.75 |
| 6. Plant protection | | | | |
| a) Chemicals | | 750 | 653 | 0.87 |
| b) Labor (Family) | 5 man-day, @Rs50 | 250 | 188 | 0.75 |
| c) Labor (Hired) | 3 man-day, @Rs50 | 150 | 113 | 0.75 |
| 7. Harvesting & Drying | | | | |
| a) Labor (Family) | 20 man-day, @50 | 1,000 | 750 | 0.75 |
| c) Labor (Hired) | 20 man-day, @50 | 1,000 | 750 | 0.75 |
| 8. Miscellaneous | | 3,000 | 2,610 | 0.87 |
| Total Cost of Production | | 28,994 | 24,944 | |
| Gross Return | 22000kg/ha, @Rs3.48/kg | 76,560 | 66,607 | 0.87 |
| Net Return | | 47,566 | 41,663 | |
| <u>Farm Income (Financial)</u> | | <u>51,020</u> | | |
| <u>Net Production Value (Economic)</u> | | | <u>42,970</u> | |
| % of production cost to gross return | | 38% | 37% | |
| % of net return to gross return | | 62% | 63% | |

Source: Agriculture Department, Balochistan

Table L.2.2.2 Net Production Value and Farm Income of Main Crop (3/5)
Tomato

| Item | Description | Value, Market Price (Rs/ha) | Value, Economic Price (Rs/ha) | Conversion Factor |
|--------------------------------------|------------------------------------|--------------------------------------|--|----------------------|
| Cost | | | | |
| 1. Land preparation | | | | |
| a) Ploughing and leveling | 5 hours, @Rs100 | 500 | 435 | 0.87 |
| b) Labor (Family) | 6 man-day, @Rs50 | 300 | 225 | 0.75 |
| c) Labor (Hired) | 4 man-day, @Rs50 | 200 | 150 | 0.75 |
| 2. Seed | | | | |
| a) Seed | 1.5 kg, @Rs800 | 1,200 | 1,044 | 0.87 |
| b) Labor (Family) | 6 man-day, @Rs50 | 300 | 225 | 0.75 |
| c) Labor (Hired) | 6 man-day, @Rs50 | 300 | 225 | 0.75 |
| 3. Fertilizer | | | | |
| a) Farm yard manure | 2 truck load every 3 years, @Rs700 | 1,170 | 1,018 | 0.87 |
| b) Fertilizer application | 2.5 Urea, @Rs336 | 840 | 1,260 | 1.50 |
| | 2 DAP, @Rs567 | 1,134 | 1,055 | 0.93 |
| c) Labor (Family) | 6 man-day, @Rs50 | 300 | 225 | 0.75 |
| d) Labor (Hired) | 2 man-day, @Rs50 | 100 | 75 | 0.75 |
| 4. Irrigation | | | | |
| a) Water fee | 10 time, @Rs550 | 5,500 | 4,785 | 0.87 |
| b) Labor (Family) | 15 man-day, @Rs50 | 750 | 563 | 0.75 |
| c) Labor (Hired) | 20 man-day, @Rs50 | 1,000 | 750 | 0.75 |
| 5. Weeding, earthing, hoeing, etc. | | | | |
| a) Labor (Family) | 5 man-day, @Rs50 | 250 | 188 | 0.75 |
| b) Labor (Hired) | 0 man-day, @Rs50 | 0 | 0 | 0.75 |
| 6. Farming materials | | | | |
| a) Sticking & Lope | | 5,000 | 3,750 | 0.75 |
| 7. Plant protection | | | | |
| a) Chemicals | | 750 | 653 | 0.87 |
| b) Labor (Family) | 8 man-day, @Rs50 | 400 | 300 | 0.75 |
| c) Labor (Hired) | 0 man-day, @Rs50 | 0 | 0 | 0.75 |
| 8. Harvesting & packing | | | | |
| a) Labor (Family) | 30 man-day, @Rs50 | 1,500 | 1,125 | 0.75 |
| c) Labor (Hired) | 20 man-day, @Rs50 | 1,000 | 750 | 0.75 |
| 9. Miscellaneous | | 3,000 | 2,610 | 0.87 |
| Total Cost of Production | | 25,494 | 21,411 | |
| Gross Return | 15000kg/ha, @Rs5.1/kg | 76,500 | 66,555 | 0.87 |
| Net Return | | 51,006 | 45,144 | |
| Farm Income (Financial) | | 54,510 | | |
| Net Production Value (Economic) | | | 46,450 | |
| % of production cost to gross return | | 33% | 32% | |
| % of net return to gross return | | 67% | 68% | |

Source: Agriculture Department, Balochistan

Table L.2.2.2 Net Production Value and Farm Income of Main Crop (4/5)

| Apple | | | | | | | | | | | | | | | Rs./ha | | |
|--------------------------------------|-----------------------------|---------|---------|---------|---------|---------|---------|---------|--------|--------|---------|---------|---------|------------|----------------------|------------------------|-------------------|
| Item | Description | 1 year | 2 year | 3 year | 4 year | 5 year | 6 year | 7 year | 8 year | 9 year | 10 year | 11 year | 12 year | 13-40 year | Average Market Price | Average Economic Price | Conversion Factor |
| Land Preparation | | 20,300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 508 | 427 | |
| Ploughing | 10 hours, @Rs210/hr | 2,100 | | | | | | | | | | | | | 53 | 48 | 0.87 |
| Pit Making | | | | | | | | | | | | | | | | | |
| Labor (Family) | 10 mandays, @Rs100/md | 1,000 | | | | | | | | | | | | | 25 | 19 | 0.75 |
| Labor (Hired) | 10 mandays, @Rs100/md | 1,000 | | | | | | | | | | | | | 25 | 19 | 0.75 |
| Tree Plantation | 120 trees/ha, @Rs40/tree | 4,800 | | | | | | | | | | | | | 120 | 104 | 0.87 |
| Labor (Family) | 10 mandays, @Rs100/md | 900 | | | | | | | | | | | | | 23 | 17 | 0.75 |
| Labor (Hired) | 6 mandays, @Rs100/md | 600 | | | | | | | | | | | | | 15 | 11 | 0.75 |
| Farm Yard Manure | 12 truck load, @Rs700/truck | 8,400 | | | | | | | | | | | | | 210 | 183 | 0.87 |
| Labor (Family) | 9 mandays, @Rs100/md | 900 | | | | | | | | | | | | | 23 | 17 | 0.75 |
| Labor (Hired) | 6 mandays, @Rs100/md | 600 | | | | | | | | | | | | | 15 | 11 | 0.75 |
| Fertilizer | | 0 | 1,728 | 1,728 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,595 | 3,415 | 3,816 | |
| DAP | 3 bag, @Rs567/bag(50kg) | 851 | 851 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,701 | 1,616 | 1,503 | 0.93 |
| Urea | 4 bag, @Rs336/bag | 672 | 672 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,277 | 1,055 | 1.50 |
| Transportation | | 25 | 25 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 48 | 41 | 0.87 |
| Labor (Family) | 5 mandays, @Rs100/md | 250 | 250 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 475 | 356 | 0.75 |
| Labor (Hired) | 0 mandays, @Rs100/md | | | | | | | | | | | | | | 0 | 0 | 0.75 |
| Irrigation | | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 7,750 | 6,283 | |
| Water Charge | 5 times, @Rs750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,750 | 3,253 | 0.87 |
| Labor (Family) | 20 mandays, @Rs100/md | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 1,500 | 0.75 |
| Labor (Hired) | 20 mandays, @Rs100/md | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 1,500 | 0.75 |
| Plant Protection | | 0 | 0 | 0 | 1,250 | 1,250 | 1,250 | 1,250 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,188 | 1,708 | |
| Chemicals | 1500g/year | | | | 750 | 750 | 750 | 750 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,313 | 1,142 | 0.87 |
| Labor (Family) | 10 mandays, @Rs100/md | | | | 500 | 500 | 500 | 500 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 875 | 656 | 0.75 |
| Labor (Hired) | 0 mandays, @Rs100/md | | | | | | | | | | | | | | 0 | 0 | 0.75 |
| Training & Pruning | | 0 | 0 | 0 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 483 | 347 | |
| Labor (Family) | 5 mandays, @Rs100/md | | | | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 483 | 347 | 0.75 |
| Labor (Hired) | 5 mandays, @Rs100/md | | | | | | | | | | | | | | 0 | 0 | 0.75 |
| Picking & Harvesting | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 3,938 | 2,953 | |
| Labor (Family) | 20 mandays, @Rs100/md | | | | | | | | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 1,650 | 1,238 | 0.75 |
| Labor (Hired) | 30 mandays, @Rs100/md | | | | | | | | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 2,288 | 1,718 | 0.75 |
| Miscellaneous | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 2,810 | 0.87 |
| Total Cost of Production | | 31,050 | 12,548 | 12,548 | 18,095 | 18,095 | 18,095 | 18,095 | 19,845 | 20,345 | 20,845 | 21,345 | 21,845 | 22,345 | 21,260 | 18,213 | |
| Gross Return | @12.2 Rs/kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 81,000 | 85,400 | 122,000 | 158,600 | 176,900 | 189,100 | 147,488 | 128,297 | 0.87 |
| Production (kg) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,600 | 7,000 | 10,000 | 13,000 | 14,500 | 15,500 | | | |
| Net Return | | -31,050 | -12,548 | -12,548 | -18,095 | -18,095 | -18,095 | -18,095 | 41,155 | 65,055 | 101,155 | 137,255 | 155,055 | 166,755 | 126,207 | 110,084 | |
| Farm Income (Financial) | | | | | | | | | | | | | | | 131,749 | | |
| Net Production Value (Economic) | | | | | | | | | | | | | | | | 111,392 | |
| % of production cost to gross return | | | | | | | | | 33% | 24% | 17% | 13% | 12% | 12% | 14% | 14% | |
| % of net return to gross return | | | | | | | | | 87% | 76% | 83% | 87% | 88% | 89% | 86% | 86% | |

Note: 1 acre = 2.5 ha, 1 mand = 40 kg, 1 bag = 50 kg
Source: Agriculture Department, Balochistan

Table L.2.2.2 Net Production Value and Farm Income of Main Crop (5/5)

Fodder

| Item | Description | Value, Market Price (Rs/ha) | Value, Economic Price (Rs/ha) | Conversion Factor |
|---|---------------------------------|--------------------------------------|--|----------------------|
| Cost | | | | |
| 1. Land preparation | | | | |
| a) Ploughing and leveling | 5 hours, @Rs100/hour | 500 | 435 | 0.87 |
| b) Labor (Family) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| c) Labor (Hired) | 3 man-day, @ Rs 50/man-day | 150 | 113 | 0.75 |
| 2. Seed | | | | |
| a) Seed | 100 kg, @Rs5/kg | 300 | 261 | 0.87 |
| b) Labor (Family) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| c) Labor (Hired) | 2 man-day, @ Rs 50/man-day | 100 | 75 | 0.75 |
| 3. Fertilizer | | | | |
| a) Farm yard manure | 0 truck loads, @Rs700/truck | 0 | 0 | 0.87 |
| b) Fertilizer application | 0 Urea, @Rs336 | 0 | 0 | 1.50 |
| | 0 DAP, @Rs567 | 0 | 0 | 0.93 |
| c) Labor (Family) | 0 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| d) Labor (Hired) | 0 man-day, @ Rs 50 | 0 | 0 | 0.75 |
| 4. Irrigation | | | | |
| a) Labor (Family) | 5 man-day, @Rs50/man-day | 250 | 188 | 0.75 |
| b) Labor (Hired) | 5 man-day, @Rs50/man-day | 250 | 188 | 0.75 |
| 5. Weeding, earthing, hoeing, etc. | | | | |
| a) Labor (Family) | 0 man-day, @Rs50/man-day | 0 | 0 | 0.75 |
| b) Labor (Hired) | 0 man-day, @Rs50/man-day | 0 | 0 | 0.75 |
| 6. Plant protection | | | | |
| a) Chemicals | | 0 | 0 | 0.87 |
| b) Labor (Family) | 0 man-day, @Rs50/man-day | 0 | 0 | 0.75 |
| c) Labor (Hired) | 0 man-day, @Rs50/man-day | 0 | 0 | 0.75 |
| 7. Harvesting | | | | |
| a) Labor (Family) | 10 man-day, @Rs50/man-day | 500 | 375 | 0.75 |
| c) Labor (Hired) | 12 man-day, @Rs50/man-day | 600 | 450 | 0.75 |
| 8. Miscellaneous | | | | |
| | | 600 | 522 | 0.87 |
| Total Cost of Production | | 3,450 | 2,757 | |
| Gross Return | | | | |
| | Production 26000kg/ha, @0.42/kg | 10,920 | 9,500 | 0.87 |
| Net Return | | 7,470 | 6,743 | |
| Farm Income (Financial) | | 8,420 | | |
| Net Production Value (Economic) | | | 7,000 | |
| % of production cost to gross return | | 32% | 29% | |
| % of net return to gross return | | 217% | 245% | |

Source: Agriculture Department, Balochistan

Table L.2.2.3 Unit Production Value of Crops in Each Beneficiary Area

| | Brewary | Ghuzai Shala | Wall Dad | Dara | Murgi Kotai | Kach | Ujda | Sanzali | Arambi (Gharzons) | Arambi (Samaki) | Saktol | Mangi | Kad Kocha II | Iskalkoo |
|--------------------------|---------|-----------------|----------|---------|-------------|---------|---------|---------|----------------------|--------------------|---------|---------|-----------------|----------|
| Net Benefit (Rs/ha. net) | 99,426 | 63,420 | 63,601 | 73,251 | 94,361 | 81,037 | 62,005 | 38,772 | 96,416 | 50,364 | 36,074 | 35,817 | 91,653 | 40,926 |
| Wheat | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 | 20,940 |
| Apple | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 | 111,390 |
| Onion | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 | 42,970 |
| Vegetable (Tomato) | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 | 46,450 |
| Fodder | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 |
| Cropping Pattern (ha) | 188.9 | 38.7 | 57.9 | 135.0 | 129.2 | 140.5 | 69.4 | 22.9 | 70.0 | 51.1 | 60.0 | 349.2 | 351.9 | 73.6 |
| Babi | 13.1 | 11.7 | 20.5 | 47.2 | 23.1 | 41.3 | 37.3 | 13.4 | 1.0 | 21.4 | 30.9 | 187.1 | 50.9 | 42.1 |
| Wheat (Irrigated) | 7.3 | 8.9 | 15.5 | 45.8 | 4.4 | 38.4 | 5.6 | 11.8 | 1.0 | 18.0 | 25.3 | 102.9 | 36.2 | 27.7 |
| Barley | 0.0 | 0.7 | 1.2 | 1.4 | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 5.6 | 1.9 | 2.0 | 3.4 |
| Cumin | 0.0 | 0.5 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 67.3 | 0.0 | 4.3 |
| R. Vegetables | 3.3 | 1.0 | 1.8 | 0.0 | 0.5 | 2.9 | 26.1 | 1.6 | 0.0 | 0.5 | 0.0 | 1.9 | 7.1 | 0.4 |
| R. Fodder | 2.5 | 0.6 | 1.1 | 0.0 | 3.2 | 0.0 | 5.6 | 0.0 | 0.0 | 0.6 | 0.0 | 13.1 | 5.6 | 6.3 |
| Kharif | 175.8 | 27.0 | 47.4 | 87.8 | 106.1 | 99.2 | 32.1 | 9.5 | 69.0 | 29.7 | 29.1 | 162.1 | 301.0 | 31.5 |
| Apple | 51.0 | 8.1 | 14.2 | 48.3 | 62.5 | 60.5 | 11.2 | 0.0 | 33.1 | 5.3 | 0.0 | 6.5 | 165.8 | 7.5 |
| Apricot | 24.6 | 0.6 | 1.1 | 21.1 | 17.0 | 20.8 | 0.6 | 0.0 | 13.1 | 3.0 | 0.0 | 0.0 | 15.0 | 1.0 |
| Grape | 82.6 | 8.1 | 14.2 | 2.6 | 6.4 | 3.0 | 0.0 | 1.2 | 6.9 | 5.3 | 3.8 | 0.0 | 20.0 | 3.7 |
| Cherry | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Almond | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 |
| Onion | 0.0 | 1.5 | 2.6 | 0.0 | 1.1 | 0.0 | 0.0 | 3.8 | 6.2 | 3.7 | 23.3 | 150.7 | 72.0 | 12.2 |
| Potato | 0.0 | 0.3 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.9 | 2.2 | 2.0 | 0.0 | 1.7 | 5.2 |
| K. Vegetables | 15.8 | 4.9 | 8.6 | 15.8 | 11.7 | 14.9 | 16.4 | 0.7 | 4.8 | 2.0 | 0.0 | 0.0 | 11.7 | 0.0 |
| Melon | 0.0 | 2.6 | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.0 | 6.6 | 0.6 |
| K. Fodder | 1.8 | 0.9 | 1.6 | 0.0 | 7.4 | 0.0 | 3.9 | 0.0 | 0.0 | 0.8 | 0.0 | 4.9 | 6.5 | 1.3 |
| Tobacco | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.8 | 0.0 | 2.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Net Cropped Area (ha) | 188.0 | 40.5 | 70.9 | 133.0 | 113.0 | 136.0 | 56.0 | 21.0 | 69.0 | 53.0 | 60.0 | 349.0 | 303.0 | 74.6 |
| Crop Intensity (%) | 100% | 96% | 96% | 102% | 114% | 103% | 124% | 109% | 101% | 98% | 100% | 100% | 116% | 99% |

Note: Wheat=Wheat-Barley, Apple=Apple-Apricot-Grape-Cherry-Almond, Onion=Onion-Cumin-Tobacco, Vegetable=Vegetable+Potato+Melon

Source: JICA Study Team

Table L.2.6.1 Economic Project Cost of Each DAD (1/4)

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | Economic Cost | Financial Cost | | | | Economic Cost | | |
|-------------|--|----------------|---------------|-----------------|------------|---------------|----------------|---------------|-----------------|------------|---------------|-------|--------|
| | | Total Cost | Local Cost | | | | Total Cost | Local Cost | | | | | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | Transfer Cost | Unskilled Labor | Other Cost | | | |
| | | 0.00 | 0.75 | 0.87 | 1.00 | | | 0.00 | 0.75 | 0.87 | 1.00 | | |
| Name of DAD | | Brewary | | | | | Ghulal Shela | | | | | | |
| I | Construction Cost of DAD* | 46,159 | 2,642 | 1,476 | 22,302 | 19,740 | 40,249 | 13,854 | 538 | 1,037 | 3,803 | 8,475 | 12,562 |
| A | Direct Cost | 36,490 | 2,089 | 1,278 | 17,519 | 15,604 | 31,804 | 10,951 | 425 | 898 | 2,928 | 6,700 | 9,921 |
| 1 | Dam | 26,401 | 1,573 | 886 | 13,274 | 10,658 | 22,881 | 6,609 | 230 | 530 | 1,536 | 4,313 | 6,047 |
| 2 | Spillway | 3,361 | 190 | 119 | 1,589 | 1,463 | 2,935 | 1,651 | 100 | 213 | 685 | 653 | 1,409 |
| 3 | Intake Facility | 180 | 5 | 3 | 46 | 126 | 168 | 1,048 | 34 | 21 | 281 | 712 | 973 |
| 4 | Infiltration Facility | 1,788 | 48 | 103 | 325 | 1,312 | 1,672 | 215 | 7 | 17 | 43 | 148 | 198 |
| 6 | Rehabilitation of Karez | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Temporary Works | 4,760 | 272 | 167 | 2,285 | 2,035 | 4,148 | 1,428 | 55 | 117 | 382 | 874 | 1,294 |
| B | Indirect Cost | 5,473 | 313 | 64 | 2,756 | 2,341 | 4,786 | 1,643 | 64 | 45 | 529 | 1,005 | 1,499 |
| 1 | Administration Cost | 1,824 | 104 | 64 | 876 | 780 | 1,590 | 548 | 21 | 45 | 146 | 335 | 496 |
| 2 | Engineering Cost | 3,649 | 209 | 0 | 1,880 | 1,560 | 3,196 | 1,095 | 43 | 0 | 383 | 670 | 1,003 |
| C | Physical Contingency | 4,196 | 240 | 134 | 2,027 | 1,795 | 3,659 | 1,259 | 49 | 94 | 346 | 770 | 1,142 |
| I | Cost on Sedimentation (less) | 24,054 | 1,377 | 769 | 11,622 | 10,266 | 20,974 | 7,963 | 309 | 598 | 2,186 | 4,872 | 6,774 |
| III | Economic Project Cost on DAD (III = I - II) | | | | | | 19,275 | | | | | | 5,788 |
| IV | Annual O&M Cost | 81 | 5 | 3 | 38 | 36 | 69 | 119 | 5 | 9 | 52 | 53 | 92 |

Note: Excl. Erosion Control Facility

Source: JICA Study Team

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | Economic Cost | Financial Cost | | | | Economic Cost | | |
|---|-------------------|----------------|---------------|-----------------|------------|---------------|----------------|------------|---------------|-----------------|---------------|--------------|------------|
| | | Total Cost | Local Cost | | | | Foreign Cost | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | | | Other Cost |
| | | 0.00 | 0.75 | 0.87 | 1.00 | | 0.00 | 0.75 | 0.87 | 1.00 | | | |
| Name of DAD | | Well Dad | | | | | Dara | | | | | | |
| I Construction Cost of DAD* | | 43,606 | 2,050 | 658 | 17,782 | 23,106 | 39,077 | 74,458 | 2,002 | 4,422 | 13,593 | 54,443 | 69,585 |
| A Direct Cost | | 34,471 | 1,621 | 578 | 14,007 | 18,265 | 30,886 | 58,860 | 1,582 | 3,828 | 10,412 | 43,038 | 54,968 |
| 1 Dam | | 10,153 | 607 | 340 | 5,121 | 4,085 | 8,795 | 34,690 | 1,008 | 2,494 | 6,580 | 24,608 | 32,203 |
| 2 Spillway | | 1,926 | 111 | 65 | 937 | 813 | 1,677 | 12,747 | 253 | 722 | 1,558 | 10,214 | 12,111 |
| 3 Intake Facility | | 16,830 | 671 | 40 | 6,000 | 10,169 | 15,419 | 2,033 | 94 | 58 | 788 | 2,043 | 2,772 |
| 4 Infiltration Facility | | 1,016 | 20 | 58 | 122 | 816 | 966 | 763 | 20 | 55 | 129 | 559 | 712 |
| 6 Rehabilitation of Karez | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 Temporary Works | | 4,436 | 211 | 75 | 1,827 | 2,382 | 4,029 | 7,677 | 206 | 499 | 1,358 | 5,614 | 7,170 |
| B Indirect Cost | | 5,171 | 243 | 29 | 2,159 | 2,740 | 4,639 | 8,829 | 237 | 191 | 1,945 | 6,456 | 8,291 |
| 1 Administration Cost | | 1,724 | 81 | 29 | 700 | 913 | 1,544 | 2,943 | 79 | 191 | 521 | 2,152 | 2,743 |
| 2 Engineering Cost | | 3,447 | 162 | 0 | 1,459 | 1,827 | 3,095 | 5,886 | 158 | 0 | 1,424 | 4,304 | 5,543 |
| C Physical Contingency | | 3,964 | 186 | 61 | 1,517 | 2,101 | 3,552 | 6,769 | 182 | 402 | 1,236 | 4,949 | 6,326 |
| I Cost on Sedimentation (less) | | 10,778 | 507 | 165 | 4,395 | 5,711 | 9,535 | 40,283 | 1,093 | 2,392 | 7,354 | 29,454 | 35,852 |
| II Economic Project Cost on DAD (III = I - II) | | | | | | | 29,542 | | | | | | 33,733 |
| IV Annual O&M Cost | | 138 | 6 | 2 | 48 | 81 | 123 | 313 | 8 | 19 | 155 | 131 | 268 |

Note: Excl. Erosion Control Facility

Source: JICA Study Team

Table 1.2.6.1 Economic Project Cost of Each DAD (2/4)

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | | Economic Cost | Financial Cost | | | | | Economic Cost |
|-------------|--|----------------|---------------|-----------------|------------|--------------|---------------|----------------|---------------|-----------------|------------|--------------|---------------|
| | | Total Cost | Local Cost | | | Foreign Cost | | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | Other Cost | | |
| | | 0.00 | 0.75 | 0.87 | 1.00 | | 0.00 | 0.75 | 0.87 | 1.00 | | | |
| Name of DAD | | Murgh Kotal | | | | | Kach | | | | | | |
| I | Construction Cost of DAD* | 65,479 | 1,729 | 3,605 | 11,955 | 49,191 | 62,295 | 140,391 | 4,919 | 7,935 | 36,332 | 91,206 | 128,765 |
| A | Direct Cost | 52,553 | 1,367 | 3,121 | 9,179 | 39,886 | 49,212 | 110,981 | 3,858 | 6,870 | 28,123 | 72,099 | 101,719 |
| 1 | Dam | 34,277 | 874 | 2,263 | 5,606 | 25,534 | 32,108 | 87,378 | 1,902 | 4,754 | 12,368 | 48,354 | 62,679 |
| 2 | Spillway | 5,406 | 115 | 307 | 725 | 4,259 | 5,120 | 26,862 | 1,401 | 1,128 | 11,484 | 12,849 | 23,686 |
| 3 | Intake Facility | 5,432 | 187 | 109 | 1,574 | 3,562 | 5,013 | 1,781 | 54 | 37 | 452 | 1,218 | 1,639 |
| 4 | Infiltration Facility | 593 | 12 | 35 | 77 | 459 | 552 | 504 | 23 | 55 | 152 | 274 | 447 |
| 5 | Rehabilitation of Karez | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Temporary Works | 8,855 | 178 | 407 | 1,197 | 5,072 | 6,419 | 14,476 | 507 | 896 | 3,668 | 9,404 | 13,268 |
| B | Indirect Cost | 7,883 | 205 | 156 | 1,689 | 5,833 | 7,420 | 18,647 | 583 | 344 | 4,908 | 10,815 | 15,340 |
| 1 | Administration Cost | 2,628 | 68 | 156 | 459 | 1,944 | 2,461 | 5,549 | 194 | 344 | 1,406 | 3,605 | 5,085 |
| 2 | Engineering Cost | 5,255 | 137 | 0 | 1,230 | 3,889 | 4,959 | 11,098 | 389 | 0 | 3,499 | 7,210 | 10,254 |
| C | Physical Contingency | 6,044 | 157 | 328 | 1,087 | 4,472 | 5,663 | 12,763 | 447 | 721 | 3,303 | 8,291 | 11,706 |
| II | Cost on Sedimentation (less) | 18,322 | 424 | 885 | 2,935 | 12,077 | 14,630 | 51,271 | 1,795 | 2,898 | 13,268 | 33,308 | 44,851 |
| III | Economic Project Cost on DAD (III = I - II) | | | | | | 47,655 | | | | | | 83,914 |
| IV | Annual O&M Cost | 238 | 6 | 13 | 114 | 105 | 204 | 341 | 12 | 19 | 194 | 116 | 285 |

Note*: Excl. Erosion Control Facility

Source: JICA Study Team

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | | Economic Cost | Financial Cost | | | | | Economic Cost |
|-------------|--|----------------|---------------|-----------------|------------|--------------|---------------|----------------|---------------|-----------------|------------|--------------|---------------|
| | | Total Cost | Local Cost | | | Foreign Cost | | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | Other Cost | | |
| | | | 0.00 | 0.75 | 0.87 | 1.00 | | | 0.00 | 0.75 | 0.87 | 1.00 | |
| Name of DAD | | Jigda | | | | | Sanzail | | | | | | |
| I | Construction Cost of DAD* | 41,856 | 1,484 | 2,121 | 11,233 | 27,018 | 38,381 | 49,216 | 2,273 | 4,544 | 15,912 | 26,487 | 43,740 |
| A | Direct Cost | 33,088 | 1,173 | 1,837 | 8,720 | 21,358 | 30,322 | 38,806 | 1,797 | 3,934 | 12,237 | 20,938 | 34,536 |
| 1 | Dam | 16,015 | 474 | 1,149 | 3,115 | 11,277 | 14,849 | 17,319 | 553 | 1,316 | 3,661 | 11,789 | 15,961 |
| 2 | Spillway | 5,269 | 275 | 333 | 2,142 | 2,519 | 4,632 | 13,385 | 848 | 2,029 | 5,599 | 4,909 | 11,302 |
| 3 | Intake Facility | 3,594 | 114 | 71 | 951 | 2,458 | 3,339 | 770 | 27 | 16 | 223 | 505 | 711 |
| 4 | Infiltration Facility | 2,273 | 60 | 17 | 527 | 1,669 | 2,140 | 273 | 10 | 25 | 69 | 170 | 248 |
| 6 | Rehabilitation of Karez | 1,621 | 97 | 27 | 848 | 649 | 1,407 | 2,084 | 125 | 35 | 1,090 | 834 | 1,809 |
| 7 | Temporary Works | 4,316 | 153 | 240 | 1,137 | 2,768 | 3,955 | 5,075 | 234 | 513 | 1,598 | 2,731 | 4,505 |
| B | Indirect Cost | 4,963 | 176 | 92 | 1,492 | 3,204 | 4,570 | 5,836 | 270 | 197 | 2,229 | 3,141 | 5,228 |
| 1 | Administration Cost | 1,654 | 59 | 92 | 436 | 1,068 | 1,516 | 1,945 | 90 | 197 | 812 | 1,047 | 1,727 |
| 2 | Engineering Cost | 3,309 | 117 | 0 | 1,056 | 2,136 | 3,054 | 3,891 | 180 | 0 | 1,617 | 2,094 | 3,501 |
| C | Physical Contingency | 3,805 | 135 | 193 | 1,021 | 2,456 | 3,489 | 4,474 | 207 | 413 | 1,447 | 2,408 | 3,976 |
| II | Cost on Sedimentation (less) | 15,124 | 536 | 766 | 4,059 | 9,762 | 13,293 | 22,818 | 1,054 | 2,107 | 7,377 | 12,280 | 18,698 |
| III | Economic Project Cost on DAD (III = I - II) | | | | | | 25,088 | | | | | | 25,042 |
| IV | Annual O&M Cost | 295 | 10 | 15 | 115 | 155 | 235 | 198 | 9 | 18 | 102 | 69 | 152 |

Note*: Excl. Erosion Control Facility

Source: JICA Study Team

Table I.2.6.1 Economic Project Cost of Each DAD (3/4)

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | | Economic Cost | Financial Cost | | | | | Economic Cost |
|-------------|--|-------------------|---------------|-----------------|------------|--------------|---------------|-----------------|---------------|-----------------|------------|--------------|---------------|
| | | Total Cost | Local Cost | | | Foreign Cost | | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | Other Cost | | |
| | | | 0.00 | 0.75 | 0.87 | 1.00 | | | 0.00 | 0.75 | 0.87 | 1.00 | |
| Name of DAD | | Arambl (Ghazlona) | | | | | | Arambl (Samaki) | | | | | |
| I | Construction Cost of DAD* | 24,078 | 937 | 1,492 | 8,939 | 14,710 | 21,867 | 15,615 | 673 | 938 | 5,120 | 8,884 | 14,044 |
| A | Direct Cost | 19,034 | 740 | 1,291 | 5,373 | 11,629 | 17,272 | 12,344 | 532 | 812 | 3,977 | 7,023 | 11,693 |
| 1 | Dam | 10,651 | 324 | 778 | 2,139 | 7,412 | 9,855 | 5,084 | 154 | 370 | 1,014 | 3,548 | 4,706 |
| 2 | Spillway | 4,913 | 285 | 316 | 2,252 | 2,060 | 4,256 | 4,913 | 285 | 316 | 2,252 | 2,060 | 4,256 |
| 3 | Intake Facility | 874 | 23 | 18 | 247 | 580 | 808 | 640 | 22 | 14 | 180 | 425 | 592 |
| 4 | Infiltration Facility | 113 | 5 | 13 | 35 | 60 | 100 | 97 | 2 | 6 | 13 | 76 | 92 |
| 6 | Rehabilitation of Karez | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Temporary Works | 2,483 | 97 | 158 | 701 | 1,517 | 2,253 | 1,610 | 69 | 106 | 519 | 916 | 1,447 |
| B | Indirect Cost | 2,855 | 111 | 65 | 935 | 1,744 | 2,607 | 1,852 | 80 | 41 | 678 | 1,053 | 1,674 |
| 1 | Administration Cost | 952 | 37 | 65 | 269 | 581 | 864 | 617 | 27 | 41 | 199 | 351 | 555 |
| 2 | Engineering Cost | 1,903 | 74 | 0 | 666 | 1,163 | 1,743 | 1,234 | 53 | 0 | 479 | 702 | 1,119 |
| C | Physical Contingency | 2,189 | 85 | 136 | 631 | 1,337 | 1,988 | 1,420 | 61 | 85 | 465 | 808 | 1,277 |
| II | Cost on Sedimentation (less) | 11,213 | 436 | 695 | 3,231 | 8,851 | 9,662 | 4,398 | 169 | 284 | 1,439 | 2,497 | 3,749 |
| III | Economic Project Cost on DAD (III = I - II) | | | | | | 12,205 | | | | | | 10,235 |
| IV | Annual O&M Cost | 143 | 6 | 9 | 74 | 55 | 119 | 119 | 5 | 7 | 54 | 53 | 100 |

Note*: Excl. Erosion Control Facility

Source: JICA Study Team

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | Economic Cost | Financial Cost | | | | Economic Cost | | |
|-------------|--|----------------|---------------|-----------------|------------|---------------|----------------|------------|---------------|-----------------|---------------|--------------|------------|
| | | Total Cost | Local Cost | | | | Foreign Cost | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | | | Other Cost |
| | | | 0.00 | 0.75 | 0.87 | 1.00 | | | 0.00 | 0.75 | 0.87 | 1.00 | |
| Name of DAD | | Sakhol | | | | | Wangl | | | | | | |
| I | Construction Cost of DAD* | 65,170 | 2,578 | 4,747 | 18,453 | 39,392 | 59,008 | 73,820 | 3,140 | 3,937 | 24,322 | 42,421 | 68,535 |
| A | Direct Cost | 51,518 | 2,038 | 4,110 | 14,230 | 31,140 | 46,604 | 58,358 | 2,482 | 3,409 | 18,931 | 33,534 | 52,561 |
| 1 | Dam | 36,443 | 1,248 | 2,935 | 8,273 | 23,983 | 33,387 | 28,469 | 967 | 2,245 | 6,456 | 18,801 | 26,102 |
| 2 | Spillway | 5,441 | 381 | 583 | 2,844 | 1,633 | 4,545 | 12,621 | 760 | 526 | 6,317 | 5,018 | 10,908 |
| 3 | Intake Facility | 881 | 27 | 17 | 230 | 607 | 820 | 4,620 | 146 | 91 | 1,219 | 3,164 | 4,293 |
| 4 | Infiltration Facility | 102 | 2 | 6 | 12 | 82 | 97 | 402 | 8 | 23 | 48 | 323 | 382 |
| 6 | Rehabilitation of Karez | 1,931 | 116 | 33 | 1,009 | 773 | 1,676 | 4,632 | 278 | 79 | 2,421 | 1,854 | 4,020 |
| 7 | Temporary Works | 6,720 | 268 | 538 | 1,858 | 4,062 | 6,079 | 7,612 | 324 | 445 | 2,469 | 4,374 | 6,856 |
| B | Indirect Cost | 7,728 | 306 | 206 | 2,546 | 4,671 | 7,040 | 8,753 | 372 | 170 | 3,180 | 5,030 | 7,925 |
| 1 | Administration Cost | 2,576 | 102 | 206 | 712 | 1,557 | 2,330 | 2,918 | 124 | 170 | 947 | 1,677 | 2,628 |
| 2 | Engineering Cost | 5,152 | 204 | 0 | 1,834 | 3,114 | 4,710 | 5,835 | 248 | 0 | 2,234 | 3,353 | 5,297 |
| C | Physical Contingency | 5,925 | 234 | 432 | 1,678 | 3,581 | 5,384 | 6,711 | 285 | 358 | 2,211 | 3,856 | 6,049 |
| II | Cost on Sedimentation (less) | 39,691 | 1,570 | 2,891 | 11,239 | 23,991 | 33,769 | 28,822 | 1,226 | 1,537 | 9,496 | 16,563 | 24,825 |
| III | Economic Project Cost on DAD (III = I - II) | | | | | | 25,239 | | | | | | 41,710 |
| IV | Annual O&M Cost | 328 | 13 | 24 | 207 | 84 | 264 | 382 | 16 | 20 | 178 | 167 | 322 |

Note*: Excl. Erosion Control Facility

Source: JICA Study Team

Table L.2.6.1 Economic Project Cost of Each DAD (4/4)

Economic Project Cost

| Component | Conversion Factor | Financial Cost | | | | Economic Cost | Financial Cost | | | | Economic Cost | | |
|-------------|--|----------------|---------------|-----------------|------------|---------------|----------------|------------|---------------|-----------------|---------------|--------------|------------|
| | | Total Cost | Local Cost | | | | Foreign Cost | Total Cost | Local Cost | | | Foreign Cost | |
| | | | Transfer Cost | Unskilled Labor | Other Cost | | | | Transfer Cost | Unskilled Labor | | | Other Cost |
| | | 0.00 | 0.75 | 0.87 | 1.00 | | 0.00 | 0.75 | 0.87 | 1.00 | | | |
| Name of DAD | | Kad Kocha II | | | | | Iskafko | | | | | | |
| I | Construction Cost of DAD* | 60,259 | 2,382 | 4,311 | 17,123 | 35,443 | 54,573 | 22,370 | 1,053 | 1,768 | 7,709 | 11,840 | 19,874 |
| A | Direct Cost | 47,635 | 1,883 | 3,733 | 13,211 | 28,809 | 43,102 | 17,684 | 832 | 1,531 | 5,961 | 9,350 | 15,694 |
| 1 | Dam | 30,779 | 1,036 | 2,397 | 8,929 | 20,417 | 28,243 | 6,432 | 196 | 474 | 1,288 | 4,474 | 5,950 |
| 2 | Spillway | 7,773 | 515 | 769 | 3,863 | 2,628 | 6,564 | 8,098 | 502 | 835 | 3,679 | 3,083 | 6,910 |
| 3 | Intake Facility | 2,375 | 74 | 45 | 617 | 1,639 | 2,210 | 715 | 24 | 15 | 200 | 476 | 661 |
| 4 | Infiltration Facility | 495 | 13 | 35 | 78 | 369 | 463 | 132 | 3 | 7 | 16 | 106 | 126 |
| 6 | Rehabilitation of Karez | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Temporary Works | 6,213 | 246 | 497 | 1,723 | 3,759 | 5,622 | 2,307 | 109 | 200 | 777 | 1,221 | 2,047 |
| B | Indirect Cost | 7,145 | 282 | 187 | 2,355 | 4,321 | 6,510 | 2,653 | 125 | 77 | 1,047 | 1,404 | 2,373 |
| 1 | Administration Cost | 2,382 | 94 | 187 | 661 | 1,440 | 2,155 | 884 | 42 | 77 | 298 | 468 | 785 |
| 2 | Engineering Cost | 4,764 | 188 | 0 | 1,694 | 2,881 | 4,355 | 1,768 | 83 | 0 | 749 | 936 | 1,588 |
| C | Physical Contingency | 5,478 | 217 | 392 | 1,557 | 3,313 | 4,961 | 2,034 | 96 | 161 | 701 | 1,076 | 1,607 |
| II | Cost on Sedimentation (less) | 35,938 | 1,420 | 2,571 | 10,212 | 21,734 | 30,618 | 6,856 | 323 | 542 | 2,363 | 3,629 | 5,685 |
| III | Economic Project Cost on DAD (III = I + II) | | | | | | 23,955 | | | | | | 14,189 |
| IV | Annual O&M Cost | 387 | 15 | 28 | 179 | 165 | 321 | 131 | 6 | 10 | 56 | 58 | 107 |

Note*: Excl. Erosion Control Facility

Source: JICA Study Team

Table L.2.7.1 Annual Benefit of Each DAD

| | Brewary | Ghudai Shela | Wali Dad | Dara | Murgi Kotel | Kach | Jigda | Sanzali | Arambi (Chaziona) | Arambi (Samaki) | Sekhol | Mangi | Kad Kooa II | Iskaikoo |
|---|-----------|--------------|-----------|-----------|-------------|-----------|-----------|-----------|-------------------|-----------------|-----------|-----------|-------------|----------|
| Recharge/Exploitation (%) | 80.7% | 80.7% | 80.7% | 80.7% | 80.7% | 82.7% | 80.7% | 86.1% | 86.1% | 86.1% | 50.6% | 68.4% | 50.6% | 81.6% |
| Recharge-Specified Area (m3) | 308,100 | 15,000 | 82,700 | 233,700 | 188,600 | 407,400 | 84,100 | 34,000 | 41,400 | 17,000 | 98,400 | 654,800 | 305,300 | 32,100 |
| Recharge-Unspecified Area (m3) | 204,100 | 16,400 | 55,200 | 155,800 | 206,300 | 739,600 | 444,000 | 179,300 | 99,300 | 40,800 | 107,700 | 436,500 | 305,600 | 77,200 |
| Available for Domestic Use (m3) | 306,100 | 15,000 | 82,700 | 233,700 | 188,600 | 407,400 | 84,100 | 34,000 | 41,400 | 17,000 | 98,400 | 654,800 | 305,300 | 32,100 |
| Domestic Use (m3) | 10,144 | 15,000 | 12,680 | 7,185 | 17,428 | 12,680 | 4,566 | 1,522 | 9,741 | 7,306 | 21,637 | 33,218 | 27,047 | 6,044 |
| Available for Irrigation Use (m3) | 295,956 | 0 | 70,020 | 225,936 | 171,172 | 394,720 | 79,534 | 32,478 | 31,659 | 9,694 | 76,763 | 621,582 | 278,254 | 26,056 |
| Irrigation Use (m3) | 295,956 | 0 | 70,020 | 183,113 | 171,172 | 204,142 | 65,000 | 20,083 | 31,659 | 9,694 | 76,763 | 621,582 | 278,254 | 26,056 |
| Unspecific Use (m3) | 204,100 | 16,400 | 55,200 | 199,202 | 206,300 | 930,178 | 458,534 | 191,695 | 99,300 | 40,800 | 107,700 | 436,500 | 203,600 | 77,200 |
| No. of Beneficiary | 2,400 | 4,000 | 3,000 | 1,700 | 4,600 | 3,000 | 1,500 | 500 | 3,200 | 2,400 | 2,000 | 4,800 | 2,500 | 1,500 |
| Population in Water Shortage | 463 | 772 | 579 | 328 | 798 | 579 | 209 | 70 | 445 | 334 | 988 | 1,517 | 1,235 | 276 |
| Unit Water Value (Rs/m3) | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 | 8.80 |
| Unit Water Requirement (m3/m2) | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Water Requirement (m3) | 10,144 | 16,907 | 12,680 | 7,185 | 17,428 | 12,680 | 4,566 | 1,522 | 9,741 | 7,306 | 21,637 | 33,218 | 27,047 | 6,044 |
| Water Capacity (m3) | 306,100 | 15,000 | 82,700 | 233,700 | 188,600 | 407,400 | 84,100 | 34,000 | 41,400 | 17,000 | 98,400 | 654,800 | 305,300 | 32,100 |
| Water Use (m3) | 10,144 | 15,000 | 12,680 | 7,185 | 17,428 | 12,680 | 4,566 | 1,522 | 9,741 | 7,306 | 21,637 | 33,218 | 27,047 | 6,044 |
| Benefit on Domestic Water (Rs/year) | 89,268 | 132,000 | 111,535 | 63,231 | 153,367 | 111,585 | 40,182 | 13,394 | 85,722 | 64,291 | 190,407 | 292,318 | 238,009 | 53,191 |
| Net Irrigated Area (ha) | 188.0 | 40.5 | 70.9 | 133.0 | 113.0 | 136.0 | 56.0 | 21.0 | 69.0 | 53.0 | 60.0 | 349.0 | 303.0 | 74.6 |
| Max Beneficial Area (ha) | 36.3 | 7.8 | 13.7 | 23.7 | 19.5 | 26.2 | 7.8 | 2.9 | 9.6 | 7.4 | 29.6 | 110.3 | 149.7 | 13.7 |
| Base Unit Water Requirement (m3/ha) | 12,570 | 8,500 | 8,500 | 8,500 | 13,560 | 9,350 | 10,000 | 8,310 | 13,350 | 7,620 | 8,000 | 8,620 | 11,940 | 7,800 |
| Unit Water Requirement (m3/ha) | 10,475 | 8,500 | 8,500 | 7,125 | 11,292 | 7,792 | 8,333 | 6,925 | 11,125 | 7,620 | 7,167 | 7,183 | 9,950 | 7,800 |
| Max Water Requirement (m3) | 380,243 | 66,300 | 116,450 | 183,113 | 220,188 | 204,142 | 65,000 | 20,083 | 106,800 | 56,388 | 212,133 | 792,322 | 1,489,515 | 106,860 |
| Available Water (m3) | 295,956 | 0 | 70,020 | 225,936 | 171,172 | 394,720 | 79,534 | 32,478 | 31,659 | 9,694 | 76,763 | 621,582 | 278,254 | 26,056 |
| Water Use (m3) | 295,956 | 0 | 70,020 | 183,113 | 171,172 | 204,142 | 65,000 | 20,083 | 31,659 | 9,694 | 76,763 | 621,582 | 278,254 | 26,056 |
| Unit Benefit (Rs/ha) | 99,426 | 63,420 | 63,601 | 73,251 | 94,361 | 81,037 | 82,005 | 38,770 | 96,416 | 50,364 | 36,074 | 35,817 | 91,653 | 40,986 |
| Benefit on Crop Production (Rs/year) | 2,809,132 | 0 | 523,922 | 1,892,546 | 1,430,432 | 2,123,179 | 483,641 | 112,433 | 274,376 | 64,073 | 386,390 | 3,099,318 | 2,553,082 | 136,945 |
| Catchment Area (km2) | 25.9 | 1.8 | 5.4 | 16.6 | 19.7 | 59.3 | 20.8 | 10.4 | 9.1 | 2.5 | 22.3 | 74.2 | 36.2 | 5.8 |
| Unit Benefit (Rs/km2) | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 | 18,800 |
| Apportionment Ratio (%) | 100% | 100% | 100% | 100% | 100% | 100% | 60% | 60% | 60% | 60% | 100% | 100% | 100% | 80% |
| Benefit on Flood Mitigation (Rs/year) | 486,920 | 33,840 | 101,520 | 312,080 | 370,360 | 891,872 | 234,624 | 117,312 | 102,648 | 37,800 | 419,240 | 1,394,960 | 680,560 | 87,292 |
| Water-Unspecified Area (m3) | 204,100 | 16,400 | 55,200 | 199,202 | 206,300 | 930,178 | 458,534 | 191,695 | 99,300 | 40,800 | 107,700 | 436,500 | 203,600 | 77,200 |
| Unit Water Value (Rs/m3) | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 | 4.98 |
| Benefit on Unspecified Recharge (Rs/year) | 1,016,418 | 81,672 | 274,696 | 992,027 | 1,027,374 | 4,632,288 | 2,283,499 | 954,643 | 494,514 | 203,184 | 536,346 | 2,173,770 | 1,013,928 | 384,456 |
| Total Benefit (Rs/year) | 4,401,738 | 247,512 | 1,011,923 | 3,249,884 | 2,981,503 | 7,758,924 | 3,041,945 | 1,197,782 | 957,260 | 369,149 | 1,532,883 | 6,960,366 | 4,485,579 | 861,824 |

Source: JICA Study Team

Table L.2.7.2 Cash Flow of Each DAD and DAD Group (1/3)

| Banyar | | | | Ghul Shale | | | | Wadi Oad | | | | Dara | | | |
|-----------------------------|------------|-----------|-------------|-----------------------------|-----------|------------|---------|-----------------------------|------------|-------------|---------|-----------------------------|------------|-------------|-----------|
| Project Life (year) | | | | Project Life (year) | | | | Project Life (year) | | | | Project Life (year) | | | |
| Construction Cost (Rs) | | | | Construction Cost (Rs) | | | | Construction Cost (Rs) | | | | Construction Cost (Rs) | | | |
| Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | |
| IRR (%) | | | | IRR (%) | | | | IRR (%) | | | | IRR (%) | | | |
| NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | |
| B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 18,275,000 | | -18,275,000 | 1 | 5,788,000 | -5,788,000 | | 1 | 29,542,000 | -29,542,000 | | 1 | 33,733,000 | -33,733,000 | |
| 2 | 69,000 | 4,431,738 | 4,332,738 | 2 | 69,000 | 247,512 | 148,512 | 2 | 123,000 | 1,011,923 | 888,923 | 2 | 266,000 | 3,249,884 | 2,983,884 |
| 3 | 69,000 | 4,431,738 | 4,332,738 | 3 | 69,000 | 247,512 | 148,512 | 3 | 123,000 | 1,011,923 | 888,923 | 3 | 266,000 | 3,249,884 | 2,983,884 |
| 4 | 69,000 | 4,431,738 | 4,332,738 | 4 | 69,000 | 247,512 | 148,512 | 4 | 123,000 | 1,011,923 | 888,923 | 4 | 266,000 | 3,249,884 | 2,983,884 |
| 5 | 69,000 | 4,431,738 | 4,332,738 | 5 | 69,000 | 247,512 | 148,512 | 5 | 123,000 | 1,011,923 | 888,923 | 5 | 266,000 | 3,249,884 | 2,983,884 |
| 6 | 69,000 | 4,431,738 | 4,332,738 | 6 | 69,000 | 247,512 | 148,512 | 6 | 123,000 | 1,011,923 | 888,923 | 6 | 266,000 | 3,249,884 | 2,983,884 |
| 7 | 69,000 | 4,431,738 | 4,332,738 | 7 | 69,000 | 247,512 | 148,512 | 7 | 123,000 | 1,011,923 | 888,923 | 7 | 266,000 | 3,249,884 | 2,983,884 |
| 8 | 69,000 | 4,431,738 | 4,332,738 | 8 | 69,000 | 247,512 | 148,512 | 8 | 123,000 | 1,011,923 | 888,923 | 8 | 266,000 | 3,249,884 | 2,983,884 |
| 9 | 69,000 | 4,431,738 | 4,332,738 | 9 | 69,000 | 247,512 | 148,512 | 9 | 123,000 | 1,011,923 | 888,923 | 9 | 266,000 | 3,249,884 | 2,983,884 |
| 10 | 69,000 | 4,431,738 | 4,332,738 | 10 | 69,000 | 247,512 | 148,512 | 10 | 123,000 | 1,011,923 | 888,923 | 10 | 266,000 | 3,249,884 | 2,983,884 |
| 11 | 69,000 | 4,431,738 | 4,332,738 | 11 | 69,000 | 247,512 | 148,512 | 11 | 123,000 | 1,011,923 | 888,923 | 11 | 266,000 | 3,249,884 | 2,983,884 |
| 12 | 69,000 | 4,431,738 | 4,332,738 | 12 | 69,000 | 247,512 | 148,512 | 12 | 123,000 | 1,011,923 | 888,923 | 12 | 266,000 | 3,249,884 | 2,983,884 |
| 13 | 69,000 | 4,431,738 | 4,332,738 | 13 | 69,000 | 247,512 | 148,512 | 13 | 123,000 | 1,011,923 | 888,923 | 13 | 266,000 | 3,249,884 | 2,983,884 |
| 14 | 69,000 | 4,431,738 | 4,332,738 | 14 | 69,000 | 247,512 | 148,512 | 14 | 123,000 | 1,011,923 | 888,923 | 14 | 266,000 | 3,249,884 | 2,983,884 |
| 15 | 69,000 | 4,431,738 | 4,332,738 | 15 | 69,000 | 247,512 | 148,512 | 15 | 123,000 | 1,011,923 | 888,923 | 15 | 266,000 | 3,249,884 | 2,983,884 |
| 16 | 69,000 | 4,431,738 | 4,332,738 | 16 | 69,000 | 247,512 | 148,512 | 16 | 123,000 | 1,011,923 | 888,923 | 16 | 266,000 | 3,249,884 | 2,983,884 |
| 17 | 69,000 | 4,431,738 | 4,332,738 | 17 | 69,000 | 247,512 | 148,512 | 17 | 123,000 | 1,011,923 | 888,923 | 17 | 266,000 | 3,249,884 | 2,983,884 |
| 18 | 69,000 | 4,431,738 | 4,332,738 | 18 | 69,000 | 247,512 | 148,512 | 18 | 123,000 | 1,011,923 | 888,923 | 18 | 266,000 | 3,249,884 | 2,983,884 |
| 19 | 69,000 | 4,431,738 | 4,332,738 | 19 | 69,000 | 247,512 | 148,512 | 19 | 123,000 | 1,011,923 | 888,923 | 19 | 266,000 | 3,249,884 | 2,983,884 |
| 20 | 69,000 | 4,431,738 | 4,332,738 | 20 | 69,000 | 247,512 | 148,512 | 20 | 123,000 | 1,011,923 | 888,923 | 20 | 266,000 | 3,249,884 | 2,983,884 |
| 21 | 69,000 | 4,431,738 | 4,332,738 | 21 | 69,000 | 247,512 | 148,512 | 21 | 123,000 | 1,011,923 | 888,923 | 21 | 266,000 | 3,249,884 | 2,983,884 |
| 22 | 69,000 | 4,431,738 | 4,332,738 | 22 | 69,000 | 247,512 | 148,512 | 22 | 123,000 | 1,011,923 | 888,923 | 22 | 266,000 | 3,249,884 | 2,983,884 |
| 23 | 69,000 | 4,431,738 | 4,332,738 | 23 | 69,000 | 247,512 | 148,512 | 23 | 123,000 | 1,011,923 | 888,923 | 23 | 266,000 | 3,249,884 | 2,983,884 |
| 24 | 69,000 | 4,431,738 | 4,332,738 | 24 | 69,000 | 247,512 | 148,512 | 24 | 123,000 | 1,011,923 | 888,923 | 24 | 266,000 | 3,249,884 | 2,983,884 |
| 25 | 69,000 | 4,431,738 | 4,332,738 | 25 | 69,000 | 247,512 | 148,512 | 25 | 123,000 | 1,011,923 | 888,923 | 25 | 266,000 | 3,249,884 | 2,983,884 |
| 26 | 69,000 | 4,431,738 | 4,332,738 | 26 | 69,000 | 247,512 | 148,512 | 26 | 123,000 | 1,011,923 | 888,923 | 26 | 266,000 | 3,249,884 | 2,983,884 |
| 27 | 69,000 | 4,431,738 | 4,332,738 | 27 | 69,000 | 247,512 | 148,512 | 27 | 123,000 | 1,011,923 | 888,923 | 27 | 266,000 | 3,249,884 | 2,983,884 |
| 28 | 69,000 | 4,431,738 | 4,332,738 | 28 | 69,000 | 247,512 | 148,512 | 28 | 123,000 | 1,011,923 | 888,923 | 28 | 266,000 | 3,249,884 | 2,983,884 |
| 29 | 69,000 | 4,431,738 | 4,332,738 | 29 | 69,000 | 247,512 | 148,512 | 29 | 123,000 | 1,011,923 | 888,923 | 29 | 266,000 | 3,249,884 | 2,983,884 |
| 30 | 69,000 | 4,431,738 | 4,332,738 | 30 | 69,000 | 247,512 | 148,512 | 30 | 123,000 | 1,011,923 | 888,923 | 30 | 266,000 | 3,249,884 | 2,983,884 |
| 31 | 69,000 | 4,431,738 | 4,332,738 | 31 | 69,000 | 247,512 | 148,512 | 31 | 123,000 | 1,011,923 | 888,923 | 31 | 266,000 | 3,249,884 | 2,983,884 |
| 32 | 69,000 | 4,431,738 | 4,332,738 | 32 | 69,000 | 247,512 | 148,512 | 32 | 123,000 | 1,011,923 | 888,923 | 32 | 266,000 | 3,249,884 | 2,983,884 |
| 33 | 69,000 | 4,431,738 | 4,332,738 | 33 | 69,000 | 247,512 | 148,512 | 33 | 123,000 | 1,011,923 | 888,923 | 33 | 266,000 | 3,249,884 | 2,983,884 |
| 34 | 69,000 | 4,431,738 | 4,332,738 | 34 | 69,000 | 247,512 | 148,512 | 34 | 123,000 | 1,011,923 | 888,923 | 34 | 266,000 | 3,249,884 | 2,983,884 |
| 35 | 69,000 | 4,431,738 | 4,332,738 | 35 | 69,000 | 247,512 | 148,512 | 35 | 123,000 | 1,011,923 | 888,923 | 35 | 266,000 | 3,249,884 | 2,983,884 |
| 36 | 69,000 | 4,431,738 | 4,332,738 | 36 | 69,000 | 247,512 | 148,512 | 36 | 123,000 | 1,011,923 | 888,923 | 36 | 266,000 | 3,249,884 | 2,983,884 |
| 37 | 69,000 | 4,431,738 | 4,332,738 | 37 | 69,000 | 247,512 | 148,512 | 37 | 123,000 | 1,011,923 | 888,923 | 37 | 266,000 | 3,249,884 | 2,983,884 |
| 38 | 69,000 | 4,431,738 | 4,332,738 | 38 | 69,000 | 247,512 | 148,512 | 38 | 123,000 | 1,011,923 | 888,923 | 38 | 266,000 | 3,249,884 | 2,983,884 |
| 39 | 69,000 | 4,431,738 | 4,332,738 | 39 | 69,000 | 247,512 | 148,512 | 39 | 123,000 | 1,011,923 | 888,923 | 39 | 266,000 | 3,249,884 | 2,983,884 |
| 40 | 69,000 | 4,431,738 | 4,332,738 | 40 | 69,000 | 247,512 | 148,512 | 40 | 123,000 | 1,011,923 | 888,923 | 40 | 266,000 | 3,249,884 | 2,983,884 |
| 41 | 69,000 | 4,431,738 | 4,332,738 | 41 | 69,000 | 247,512 | 148,512 | 41 | 123,000 | 1,011,923 | 888,923 | 41 | 266,000 | 3,249,884 | 2,983,884 |

| Murghl Kotail | | | | Kach | | | | Jigda | | | | Sanzail | | | |
|-----------------------------|------------|-----------|-------------|-----------------------------|------------|-------------|-----------|-----------------------------|------------|-------------|-----------|-----------------------------|------------|-------------|-----------|
| Project Life (year) | | | | Project Life (year) | | | | Project Life (year) | | | | Project Life (year) | | | |
| Construction Cost (Rs) | | | | Construction Cost (Rs) | | | | Construction Cost (Rs) | | | | Construction Cost (Rs) | | | |
| Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | | Annual Benefit (Rs) | | | |
| IRR (%) | | | | IRR (%) | | | | IRR (%) | | | | IRR (%) | | | |
| NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | | NPV (Rs, discount rate=10%) | | | |
| B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | | B/C (Rs, discount rate=10%) | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 47,665,000 | | -47,665,000 | 1 | 83,914,000 | -83,914,000 | | 1 | 25,088,000 | -25,088,000 | | 1 | 25,042,000 | -25,042,000 | |
| 2 | 204,000 | 2,981,533 | 2,777,533 | 2 | 285,000 | 7,758,924 | 7,473,924 | 2 | 255,000 | 3,041,945 | 2,786,945 | 2 | 157,000 | 1,197,782 | 1,040,782 |
| 3 | 204,000 | 2,981,533 | 2,777,533 | 3 | 285,000 | 7,758,924 | 7,473,924 | 3 | 255,000 | 3,041,945 | 2,786,945 | 3 | 157,000 | 1,197,782 | 1,040,782 |
| 4 | 204,000 | 2,981,533 | 2,777,533 | 4 | 285,000 | 7,758,924 | 7,473,924 | 4 | 255,000 | 3,041,945 | 2,786,945 | 4 | 157,000 | 1,197,782 | 1,040,782 |
| 5 | 204,000 | 2,981,533 | 2,777,533 | 5 | 285,000 | 7,758,924 | 7,473,924 | 5 | 255,000 | 3,041,945 | 2,786,945 | 5 | 157,000 | 1,197,782 | 1,040,782 |
| 6 | 204,000 | 2,981,533 | 2,777,533 | 6 | 285,000 | 7,758,924 | 7,473,924 | 6 | 255,000 | 3,041,945 | 2,786,945 | 6 | 157,000 | 1,197,782 | 1,040,782 |
| 7 | 204,000 | 2,981,533 | 2,777,533 | 7 | 285,000 | 7,758,924 | 7,473,924 | 7 | 255,000 | 3,041,945 | 2,786,945 | 7 | 157,000 | 1,197,782 | 1,040,782 |
| 8 | 204,000 | 2,981,533 | 2,777,533 | 8 | 285,000 | 7,758,924 | 7,473,924 | 8 | 255,000 | 3,041,945 | 2,786,945 | 8 | 157,000 | 1,197,782 | 1,040,782 |
| 9 | 204,000 | 2,981,533 | 2,777,533 | 9 | 285,000 | 7,758,924 | 7,473,924 | 9 | 255,000 | 3,041,945 | 2,786,945 | 9 | 157,000 | 1,197,782 | 1,040,782 |
| 10 | 204,000 | 2,981,533 | 2,777,533 | 10 | 285,000 | 7,758,924 | 7,473,924 | 10 | 255,000 | 3,041,945 | 2,786,945 | 10 | 157,000 | 1,197,782 | 1,040,782 |
| 11 | 204,000 | 2,981,533 | 2,777,533 | 11 | 285,000 | 7,758,924 | 7,473,924 | 11 | 255,000 | 3,041,945 | 2,786,945 | 11 | 157,000 | 1,197,782 | 1,040,782 |
| 12 | 204,000 | 2,981,533 | 2,777,533 | 12 | 285,000 | 7,758,924 | 7,473,924 | 12 | 255,000 | 3,041,945 | 2,786,945 | 12 | 157,000 | 1,197,782 | 1,040,782 |
| 13 | 204,000 | 2,981,533 | 2,777,533 | 13 | 285,000 | 7,758,924 | 7,473,924 | 13 | 255,000 | 3,041,945 | 2,786,945 | 13 | 157,000 | 1,197,782 | 1,040,782 |
| 14 | 204,000 | 2,981,533 | 2,777,533 | 14 | 285,000 | 7,758,924 | 7,473,924 | 14 | 255,000 | 3,041,945 | 2,786,945 | 14 | 157,000 | 1,197,782 | 1,040,782 |
| 15 | 204,000 | 2,981,533 | 2,777,533 | 15 | 285,000 | 7,758,924 | 7,473,924 | 15 | 255,000 | 3,041,945 | 2,786,945 | 15 | 157,000 | 1,197,782 | 1,040,782 |
| 16 | 204,000 | 2,981,533 | 2,777,533 | 16 | 285,000 | 7,758,924 | 7,473,924 | 16 | 255,000 | 3,041,945 | 2,786,945 | 16 | 157,000 | 1,197,782 | 1,040,782 |
| 17 | 204,000 | 2,981,533 | 2,777,533 | 17 | 285,000 | 7,758,924 | 7 | | | | | | | | |

Table I.2.7.2 Cash Flow of Each DAD and DAD Group (2/3)

| Arambi (Ghazala) | | | | Arambi (Sarak) | | | | Sakhel | | | | Mangl | | | |
|-----------------------------|------------|------------|-------------|-----------------------------|------------|------------|-------------|-----------------------------|------------|-------------|-------------|-----------------------------|------------|------------|-------------|
| Project Life (year) | | 40 | | Project Life (year) | | 40 | | Project Life (year) | | 40 | | Project Life (year) | | 40 | |
| Construction Cost (Rs) | | 12,205,000 | | Construction Cost (Rs) | | 10,295,000 | | Construction Cost (Rs) | | 25,239,000 | | Construction Cost (Rs) | | 41,710,000 | |
| Annual Benefit (Rs) | | 957,260 | | Annual Benefit (Rs) | | 369,149 | | Annual Benefit (Rs) | | 1,532,383 | | Annual Benefit (Rs) | | 8,960,366 | |
| IRR (%) | | 6.28% | | IRR (%) | | 0.22% | | IRR (%) | | 3.96% | | IRR (%) | | 15.87% | |
| NPV (Rs, discount rate=10%) | | -2,792,277 | | NPV (Rs, discount rate=10%) | | -5,538,172 | | NPV (Rs, discount rate=10%) | | -10,308,265 | | NPV (Rs, discount rate=10%) | | 27,084,094 | |
| B/C (Rs, discount rate=10%) | | 0.770 | | B/C (Rs, discount rate=10%) | | 0.352 | | B/C (Rs, discount rate=10%) | | 0.593 | | B/C (Rs, discount rate=10%) | | 1.659 | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 12,205,000 | | -12,205,000 | 1 | 10,295,000 | | -10,295,000 | 1 | 25,239,000 | | -25,239,000 | 1 | 41,710,000 | | -41,710,000 |
| 2 | 119,000 | 957,260 | 8.04 | 2 | 100,000 | 369,149 | 3.69 | 2 | 264,000 | 1,532,383 | 5.77 | 2 | 322,000 | 8,960,366 | 27.83 |
| 3 | 119,000 | 957,260 | 8.04 | 3 | 100,000 | 369,149 | 3.69 | 3 | 264,000 | 1,532,383 | 5.77 | 3 | 322,000 | 8,960,366 | 27.83 |
| 4 | 119,000 | 957,260 | 8.04 | 4 | 100,000 | 369,149 | 3.69 | 4 | 264,000 | 1,532,383 | 5.77 | 4 | 322,000 | 8,960,366 | 27.83 |
| 5 | 119,000 | 957,260 | 8.04 | 5 | 100,000 | 369,149 | 3.69 | 5 | 264,000 | 1,532,383 | 5.77 | 5 | 322,000 | 8,960,366 | 27.83 |
| 6 | 119,000 | 957,260 | 8.04 | 6 | 100,000 | 369,149 | 3.69 | 6 | 264,000 | 1,532,383 | 5.77 | 6 | 322,000 | 8,960,366 | 27.83 |
| 7 | 119,000 | 957,260 | 8.04 | 7 | 100,000 | 369,149 | 3.69 | 7 | 264,000 | 1,532,383 | 5.77 | 7 | 322,000 | 8,960,366 | 27.83 |
| 8 | 119,000 | 957,260 | 8.04 | 8 | 100,000 | 369,149 | 3.69 | 8 | 264,000 | 1,532,383 | 5.77 | 8 | 322,000 | 8,960,366 | 27.83 |
| 9 | 119,000 | 957,260 | 8.04 | 9 | 100,000 | 369,149 | 3.69 | 9 | 264,000 | 1,532,383 | 5.77 | 9 | 322,000 | 8,960,366 | 27.83 |
| 10 | 119,000 | 957,260 | 8.04 | 10 | 100,000 | 369,149 | 3.69 | 10 | 264,000 | 1,532,383 | 5.77 | 10 | 322,000 | 8,960,366 | 27.83 |
| 11 | 119,000 | 957,260 | 8.04 | 11 | 100,000 | 369,149 | 3.69 | 11 | 264,000 | 1,532,383 | 5.77 | 11 | 322,000 | 8,960,366 | 27.83 |
| 12 | 119,000 | 957,260 | 8.04 | 12 | 100,000 | 369,149 | 3.69 | 12 | 264,000 | 1,532,383 | 5.77 | 12 | 322,000 | 8,960,366 | 27.83 |
| 13 | 119,000 | 957,260 | 8.04 | 13 | 100,000 | 369,149 | 3.69 | 13 | 264,000 | 1,532,383 | 5.77 | 13 | 322,000 | 8,960,366 | 27.83 |
| 14 | 119,000 | 957,260 | 8.04 | 14 | 100,000 | 369,149 | 3.69 | 14 | 264,000 | 1,532,383 | 5.77 | 14 | 322,000 | 8,960,366 | 27.83 |
| 15 | 119,000 | 957,260 | 8.04 | 15 | 100,000 | 369,149 | 3.69 | 15 | 264,000 | 1,532,383 | 5.77 | 15 | 322,000 | 8,960,366 | 27.83 |
| 16 | 119,000 | 957,260 | 8.04 | 16 | 100,000 | 369,149 | 3.69 | 16 | 264,000 | 1,532,383 | 5.77 | 16 | 322,000 | 8,960,366 | 27.83 |
| 17 | 119,000 | 957,260 | 8.04 | 17 | 100,000 | 369,149 | 3.69 | 17 | 264,000 | 1,532,383 | 5.77 | 17 | 322,000 | 8,960,366 | 27.83 |
| 18 | 119,000 | 957,260 | 8.04 | 18 | 100,000 | 369,149 | 3.69 | 18 | 264,000 | 1,532,383 | 5.77 | 18 | 322,000 | 8,960,366 | 27.83 |
| 19 | 119,000 | 957,260 | 8.04 | 19 | 100,000 | 369,149 | 3.69 | 19 | 264,000 | 1,532,383 | 5.77 | 19 | 322,000 | 8,960,366 | 27.83 |
| 20 | 119,000 | 957,260 | 8.04 | 20 | 100,000 | 369,149 | 3.69 | 20 | 264,000 | 1,532,383 | 5.77 | 20 | 322,000 | 8,960,366 | 27.83 |
| 21 | 119,000 | 957,260 | 8.04 | 21 | 100,000 | 369,149 | 3.69 | 21 | 264,000 | 1,532,383 | 5.77 | 21 | 322,000 | 8,960,366 | 27.83 |
| 22 | 119,000 | 957,260 | 8.04 | 22 | 100,000 | 369,149 | 3.69 | 22 | 264,000 | 1,532,383 | 5.77 | 22 | 322,000 | 8,960,366 | 27.83 |
| 23 | 119,000 | 957,260 | 8.04 | 23 | 100,000 | 369,149 | 3.69 | 23 | 264,000 | 1,532,383 | 5.77 | 23 | 322,000 | 8,960,366 | 27.83 |
| 24 | 119,000 | 957,260 | 8.04 | 24 | 100,000 | 369,149 | 3.69 | 24 | 264,000 | 1,532,383 | 5.77 | 24 | 322,000 | 8,960,366 | 27.83 |
| 25 | 119,000 | 957,260 | 8.04 | 25 | 100,000 | 369,149 | 3.69 | 25 | 264,000 | 1,532,383 | 5.77 | 25 | 322,000 | 8,960,366 | 27.83 |
| 26 | 119,000 | 957,260 | 8.04 | 26 | 100,000 | 369,149 | 3.69 | 26 | 264,000 | 1,532,383 | 5.77 | 26 | 322,000 | 8,960,366 | 27.83 |
| 27 | 119,000 | 957,260 | 8.04 | 27 | 100,000 | 369,149 | 3.69 | 27 | 264,000 | 1,532,383 | 5.77 | 27 | 322,000 | 8,960,366 | 27.83 |
| 28 | 119,000 | 957,260 | 8.04 | 28 | 100,000 | 369,149 | 3.69 | 28 | 264,000 | 1,532,383 | 5.77 | 28 | 322,000 | 8,960,366 | 27.83 |
| 29 | 119,000 | 957,260 | 8.04 | 29 | 100,000 | 369,149 | 3.69 | 29 | 264,000 | 1,532,383 | 5.77 | 29 | 322,000 | 8,960,366 | 27.83 |
| 30 | 119,000 | 957,260 | 8.04 | 30 | 100,000 | 369,149 | 3.69 | 30 | 264,000 | 1,532,383 | 5.77 | 30 | 322,000 | 8,960,366 | 27.83 |
| 31 | 119,000 | 957,260 | 8.04 | 31 | 100,000 | 369,149 | 3.69 | 31 | 264,000 | 1,532,383 | 5.77 | 31 | 322,000 | 8,960,366 | 27.83 |
| 32 | 119,000 | 957,260 | 8.04 | 32 | 100,000 | 369,149 | 3.69 | 32 | 264,000 | 1,532,383 | 5.77 | 32 | 322,000 | 8,960,366 | 27.83 |
| 33 | 119,000 | 957,260 | 8.04 | 33 | 100,000 | 369,149 | 3.69 | 33 | 264,000 | 1,532,383 | 5.77 | 33 | 322,000 | 8,960,366 | 27.83 |
| 34 | 119,000 | 957,260 | 8.04 | 34 | 100,000 | 369,149 | 3.69 | 34 | 264,000 | 1,532,383 | 5.77 | 34 | 322,000 | 8,960,366 | 27.83 |
| 35 | 119,000 | 957,260 | 8.04 | 35 | 100,000 | 369,149 | 3.69 | 35 | 264,000 | 1,532,383 | 5.77 | 35 | 322,000 | 8,960,366 | 27.83 |
| 36 | 119,000 | 957,260 | 8.04 | 36 | 100,000 | 369,149 | 3.69 | 36 | 264,000 | 1,532,383 | 5.77 | 36 | 322,000 | 8,960,366 | 27.83 |
| 37 | 119,000 | 957,260 | 8.04 | 37 | 100,000 | 369,149 | 3.69 | 37 | 264,000 | 1,532,383 | 5.77 | 37 | 322,000 | 8,960,366 | 27.83 |
| 38 | 119,000 | 957,260 | 8.04 | 38 | 100,000 | 369,149 | 3.69 | 38 | 264,000 | 1,532,383 | 5.77 | 38 | 322,000 | 8,960,366 | 27.83 |
| 39 | 119,000 | 957,260 | 8.04 | 39 | 100,000 | 369,149 | 3.69 | 39 | 264,000 | 1,532,383 | 5.77 | 39 | 322,000 | 8,960,366 | 27.83 |
| 40 | 119,000 | 957,260 | 8.04 | 40 | 100,000 | 369,149 | 3.69 | 40 | 264,000 | 1,532,383 | 5.77 | 40 | 322,000 | 8,960,366 | 27.83 |
| 41 | 119,000 | 957,260 | 8.04 | 41 | 100,000 | 369,149 | 3.69 | 41 | 264,000 | 1,532,383 | 5.77 | 41 | 322,000 | 8,960,366 | 27.83 |

| Kad Kucha B | | | | Taka'oo | | | | | |
|-----------------------------|------------|-----------|-------------|------------|-----------------------------|------------|---------|-------------|------------|
| Project Life (year) | | | | 40 | Project Life (year) | | | | 40 |
| Construction Cost (Rs) | | | | 23,955,000 | Construction Cost (Rs) | | | | 14,169,000 |
| Annual Benefit (Rs) | | | | 4,495,579 | Annual Benefit (Rs) | | | | 661,824 |
| IRR (%) | | | | 17.40% | IRR (%) | | | | 2.36% |
| NPV (Rs, discount rate=10%) | | | | 10,331,521 | NPV (Rs, discount rate=10%) | | | | -7,378,314 |
| B/C (Rs, discount rate=10%) | | | | 1.783 | B/C (Rs, discount rate=10%) | | | | 0.487 |
| Year | Cost | Benefit | | BC | Year | Cost | Benefit | | BC |
| 1 | 23,955,000 | | -23,955,000 | | 1 | 14,169,000 | | -14,169,000 | |
| 2 | 321,000 | 4,495,579 | 4,174,579 | 2 | 107,000 | 661,824 | 554,824 | | |
| 3 | 321,000 | 4,495,578 | 4,174,578 | 3 | 107,000 | 661,824 | 554,824 | | |
| 4 | 321,000 | 4,495,578 | 4,174,578 | 4 | 107,000 | 661,824 | 554,824 | | |
| 5 | 321,000 | 4,495,578 | 4,174,578 | 5 | 107,000 | 661,824 | 554,824 | | |
| 6 | 321,000 | 4,495,578 | 4,174,578 | 6 | 107,000 | 661,824 | 554,824 | | |
| 7 | 321,000 | 4,495,579 | 4,174,578 | 7 | 107,000 | 661,824 | 554,824 | | |
| 8 | 321,000 | 4,495,578 | 4,174,578 | 8 | 107,000 | 661,824 | 554,824 | | |
| 9 | 321,000 | 4,495,578 | 4,174,578 | 9 | 107,000 | 661,824 | 554,824 | | |
| 10 | 321,000 | 4,495,578 | 4,174,578 | 10 | 107,000 | 661,824 | 554,824 | | |
| 11 | 321,000 | 4,495,578 | 4,174,578 | 11 | 107,000 | 661,824 | 554,824 | | |
| 12 | 321,000 | 4,495,578 | 4,174,578 | 12 | 107,000 | 661,824 | 554,824 | | |
| 13 | 321,000 | 4,495,578 | 4,174,578 | 13 | 107,000 | 661,824 | 554,824 | | |
| 14 | 321,000 | 4,495,579 | 4,174,578 | 14 | 107,000 | 661,824 | 554,824 | | |
| 15 | 321,000 | 4,495,579 | 4,174,578 | 15 | 107,000 | 661,824 | 554,824 | | |
| 16 | 321,000 | 4,495,579 | 4,174,578 | 16 | 107,000 | 661,824 | 554,824 | | |
| 17 | 321,000 | 4,495,579 | 4,174,578 | 17 | 107,000 | 661,824 | 554,824 | | |
| 18 | 321,000 | 4,495,579 | 4,174,578 | 18 | 107,000 | 661,824 | 554,824 | | |
| 19 | 321,000 | 4,495,579 | 4,174,578 | 19 | 107,000 | 661,824 | 554,824 | | |
| 20 | 321,000 | 4,495,579 | 4,174,578 | 20 | 107,000 | 661,824 | 554,824 | | |
| 21 | 321,000 | 4,495,579 | 4,174,578 | 21 | 107,000 | 661,824 | 554,824 | | |
| 22 | 321,000 | 4,495,579 | 4,174,578 | 22 | 107,000 | 661,824 | 554,824 | | |
| 23 | 321,000 | 4,495,579 | 4,174,578 | 23 | 107,000 | 661,824 | 554,824 | | |
| 24 | 321,000 | 4,495,579 | 4,174,578 | 24 | 107,000 | 661,824 | 554,824 | | |
| 25 | 321,000 | 4,495,579 | 4,174,578 | 25 | 107,000 | 661,824 | 554,824 | | |
| 26 | 321,000 | 4,495,579 | 4,174,578 | 26 | 107,000 | 661,824 | 554,824 | | |
| 27 | 321,000 | 4,495,579 | 4,174,578 | 27 | 107,000 | 661,824 | 554,824 | | |
| 28 | 321,000 | 4,495,579 | 4,174,578 | 28 | 107,000 | 661,824 | 554,824 | | |
| 29 | 321,000 | 4,495,579 | 4,174,578 | 29 | 107,000 | 661,824 | 554,824 | | |
| 30 | 321,000 | 4,495,579 | 4,174,578 | 30 | 107,000 | 661,824 | 554,824 | | |
| 31 | 321,000 | 4,495,579 | 4,174,578 | 31 | 107,000 | 661,824 | 554,824 | | |
| 32 | 321,000 | 4,495,579 | 4,174,578 | 32 | 107,000 | 661,824 | 554,824 | | |
| 33 | 321,000 | 4,495,579 | 4,174,578 | 33 | 107,000 | 661,824 | 554,824 | | |
| 34 | 321,000 | 4,495,579 | 4,174,578 | 34 | 107,000 | 661,824 | 554,824 | | |
| 35 | 321,000 | 4,495,579 | 4,174,578 | 35 | 107,000 | 661,824 | 554,824 | | |
| 36 | 321,000 | 4,495,579 | 4,174,578 | 36 | 107,000 | 661,824 | 554,824 | | |
| 37 | 321,000 | 4,495,579 | 4,174,578 | 37 | 107,000 | 661,824 | 554,824 | | |
| 38 | 321,000 | 4,495,579 | 4,174,578 | 38 | 107,000 | 661,824 | 554,824 | | |
| 39 | 321,000 | 4,495,579 | 4,174,578 | 39 | 107,000 | 661,824 | 554,824 | | |
| 40 | 321,000 | 4,495,579 | 4,174,578 | 40 | 107,000 | 661,824 | 554,824 | | |
| 41 | 321,000 | 4,495,579 | 4,174,578 | 41 | 107,000 | 661,824 | 554,824 | | |

Table L.2.7.3 Results of Economic Evaluation of Each DAD

| Group | Brewary | Ghurai Shela | Wali Dad | Dara | Murpi Kotal | Kach | Jigda | Sanzali | Arambi, Ghazfara | Arambi, Samaki | Sakhoi | Mangi | Kad Koocha | Iskalkoo | Stage I | Stage II | Stage III |
|---|---------|-----------------|----------|--------|----------------|---------|--------|---------|---------------------|-------------------|---------|--------|------------|----------|---------|----------|-----------|
| Annual Recharge Volume by DAD ('000cu.m) | 510 | 31 | 138 | 390 | 395 | 1,147 | 528 | 213 | 141 | 58 | 206 | 1,091 | 509 | 109 | 3,028 | 4,924 | 5,466 |
| Rank-Recharge | 4 | 14 | 11 | 7 | 6 | 1 | 3 | 8 | 10 | 13 | 9 | 2 | 5 | 12 | | | |
| Total Population at the Specified | 2,400 | 4,000 | 3,000 | 1,700 | 4,600 | 3,000 | 1,500 | 500 | 3,200 | 2,400 | 2,000 | 4,800 | 2,500 | 1,500 | 12,900 | 24,200 | 37,100 |
| Beneficiary Area | 8 | 3 | 5 | 11 | 2 | 5 | 12 | 14 | 4 | 8 | 10 | 1 | 7 | 12 | | | |
| Rank-Population | | | | | | | | | | | | | | | | | |
| Total Irrigation Area at the Specified Beneficiary Area (ha) | 128 | 41 | 71 | 133 | 113 | 136 | 56 | 21 | 69 | 53 | 60 | 349 | 303 | 75 | 1,029 | 1,368 | 1,667 |
| Rank-Area | 3 | 13 | 8 | 5 | 6 | 4 | 11 | 14 | 9 | 12 | 10 | 1 | 2 | 7 | | | |
| Total Benefit (Rs. '000/year) | 4,402 | 248 | 1,012 | 3,250 | 2,982 | 7,759 | 3,042 | 1,198 | 957 | 369 | 1,532 | 6,960 | 4,496 | 662 | 22,150 | 35,045 | 38,868 |
| Rank-Benefit | 4 | 14 | 10 | 5 | 7 | 1 | 6 | 9 | 11 | 13 | 8 | 2 | 3 | 12 | | | |
| Domestic Water Benefit (Rs. '000/year) | 89 | 132 | 112 | 63 | 153 | 112 | 40 | 13 | 86 | 64 | 190 | 292 | 238 | 53 | 723 | 1,087 | 1,539 |
| Rank-Domestic | 8 | 5 | 6 | 11 | 4 | 6 | 13 | 14 | 9 | 10 | 3 | 1 | 2 | 12 | | | |
| Irrigation Benefit (Rs. '000/year) | 2,809 | 0 | 524 | 1,883 | 1,430 | 2,123 | 484 | 112 | 274 | 64 | 386 | 3,099 | 2,563 | 137 | 10,838 | 14,778 | 15,889 |
| Rank-Irrigation | 2 | 14 | 7 | 5 | 6 | 4 | 8 | 12 | 10 | 13 | 9 | 1 | 3 | 11 | | | |
| Flood Control Benefit (Rs. '000/year) | 487 | 34 | 102 | 312 | 370 | 892 | 235 | 117 | 103 | 38 | 419 | 1,395 | 681 | 87 | 3,109 | 4,591 | 5,271 |
| Rank-Flood | 4 | 14 | 11 | 7 | 6 | 2 | 8 | 9 | 10 | 13 | 5 | 1 | 3 | 12 | | | |
| Unspecified Benefit (Rs. '000/year) | 1,016 | 82 | 275 | 992 | 1,027 | 4,632 | 2,283 | 955 | 495 | 203 | 536 | 2,174 | 1,014 | 384 | 7,480 | 14,588 | 16,069 |
| Rank-Unspecified | 5 | 14 | 12 | 7 | 4 | 1 | 2 | 8 | 10 | 13 | 9 | 3 | 6 | 11 | | | |
| Total Construction Cost, Financial (Rs. '000) | 49,668 | 14,785 | 46,697 | 85,726 | 75,474 | 151,905 | 91,739 | 57,209 | 28,351 | 16,688 | 69,522 | 78,869 | 64,281 | 23,955 | 370,283 | 683,222 | 854,869 |
| Rank-F. Cost | 6 | 1 | 5 | 12 | 10 | 14 | 13 | 7 | 4 | 2 | 3 | 11 | 8 | 3 | | | |
| Project Cost, Economic (Rs. '000) | 19,275 | 5,788 | 29,542 | 33,733 | 47,665 | 83,914 | 25,088 | 25,042 | 12,205 | 10,295 | 25,239 | 41,710 | 23,955 | 14,189 | 143,761 | 312,587 | 397,640 |
| Rank-E. Cost | 5 | 1 | 10 | 11 | 13 | 14 | 8 | 7 | 3 | 2 | 9 | 12 | 6 | 4 | | | |
| Rank-E. Cost | 22.5% | 0.1% | 0.9% | 8.5% | 4.6% | 6.3% | 10.8% | 0.3% | 6.3% | 0.2% | 4.0% | 15.9% | 17.4% | 2.4% | 14.5% | 10.2% | 8.7% |
| Rank-EBRR | 1 | 14 | 11 | 5 | 8 | 6 | 4 | 12 | 7 | 13 | 9 | 3 | 2 | 10 | | | |
| NPV (Rs. '000) | 24,909 | -3,722 | -18,054 | -1,250 | -16,866 | -12,435 | 4,294 | -13,189 | -2,792 | -6,638 | -10,306 | 27,285 | 19,332 | -7,378 | 74,569 | 4,696 | -36,210 |
| Rank-NPV | 2 | 7 | 14 | 5 | 13 | 11 | 4 | 12 | 6 | 8 | 10 | 1 | 3 | 9 | | | |
| B/C | 2.373 | 0.394 | 0.354 | 0.962 | 0.697 | 0.842 | 1.171 | 0.452 | 0.770 | 0.352 | 0.593 | 1.669 | 1.785 | 0 | 1.527 | 1.016 | 0.898 |
| Rank-B/C | 1 | 12 | 13 | 5 | 8 | 6 | 4 | 11 | 7 | 14 | 9 | 3 | 2 | 10 | | | |

Source: JICA Study Team

Table L.2.7.2 Cash Flow of Each DAD and DAD Group (3/3)

| Group I | | | | Group II | | | | Group III | | | |
|---|-------------|--------------|------------|------------------------------------|-------------|------------|--------------|---|-------------|------------|--------------|
| Brewery, Dera, Jyda, Mangl, Kadkocha II | | | | Murg Kotai, Kach, Samoil, Chachina | | | | Ghural Shela, Wal Dad, Samaki, Sakhol, Itakoo | | | |
| Project Life (year) | | | | Project Life (year) | | | | Project Life (year) | | | |
| 40 | | | | 41 | | | | 42 | | | |
| Construction Cost (Rs) | | | | 312,587,000 | | | | 357,640,000 | | | |
| 22,149,513 | | | | 35,045,011 | | | | 35,667,802 | | | |
| Annual Benefit (Rs) | | | | 10.21% | | | | 8.69% | | | |
| IRR (%) | | | | NPV (Rs., discount rate=10%) | | | | NPV (Rs., discount rate=10%) | | | |
| 74,568,899 | | | | 4,698,419 | | | | -36,210,128 | | | |
| B/C (Rs., discount rate=10%) | | | | 1.015 | | | | 0.898 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 143,761,000 | -143,761,000 | | 1 | 143,761,000 | 0 | -143,761,000 | 1 | 143,761,000 | 0 | -143,761,000 |
| 2 | 1,233,000 | 22,149,513 | 20,916,513 | 2 | 170,059,000 | 22,149,513 | -147,909,487 | 2 | 170,059,000 | 22,149,513 | -147,909,487 |
| 3 | 1,233,000 | 22,149,513 | 20,916,513 | 3 | 1,998,000 | 35,045,011 | 33,047,011 | 3 | 67,051,000 | 35,045,011 | -32,005,989 |
| 4 | 1,233,000 | 22,149,513 | 20,916,513 | 4 | 1,998,000 | 35,045,011 | 33,047,011 | 4 | 2,691,000 | 38,667,802 | 36,176,802 |
| 5 | 1,233,000 | 22,149,513 | 20,916,513 | 5 | 1,998,000 | 35,045,011 | 33,047,011 | 5 | 2,691,000 | 38,667,802 | 36,176,802 |
| 6 | 1,233,000 | 22,149,513 | 20,916,513 | 6 | 1,998,000 | 35,045,011 | 33,047,011 | 6 | 2,691,000 | 38,667,802 | 36,176,802 |
| 7 | 1,233,000 | 22,149,513 | 20,916,513 | 7 | 1,998,000 | 35,045,011 | 33,047,011 | 7 | 2,691,000 | 38,667,802 | 36,176,802 |
| 8 | 1,233,000 | 22,149,513 | 20,916,513 | 8 | 1,998,000 | 35,045,011 | 33,047,011 | 8 | 2,691,000 | 38,667,802 | 36,176,802 |
| 9 | 1,233,000 | 22,149,513 | 20,916,513 | 9 | 1,998,000 | 35,045,011 | 33,047,011 | 9 | 2,691,000 | 38,667,802 | 36,176,802 |
| 10 | 1,233,000 | 22,149,513 | 20,916,513 | 10 | 1,998,000 | 35,045,011 | 33,047,011 | 10 | 2,691,000 | 38,667,802 | 36,176,802 |
| 11 | 1,233,000 | 22,149,513 | 20,916,513 | 11 | 1,998,000 | 35,045,011 | 33,047,011 | 11 | 2,691,000 | 38,667,802 | 36,176,802 |
| 12 | 1,233,000 | 22,149,513 | 20,916,513 | 12 | 1,998,000 | 35,045,011 | 33,047,011 | 12 | 2,691,000 | 38,667,802 | 36,176,802 |
| 13 | 1,233,000 | 22,149,513 | 20,916,513 | 13 | 1,998,000 | 35,045,011 | 33,047,011 | 13 | 2,691,000 | 38,667,802 | 36,176,802 |
| 14 | 1,233,000 | 22,149,513 | 20,916,513 | 14 | 1,998,000 | 35,045,011 | 33,047,011 | 14 | 2,691,000 | 38,667,802 | 36,176,802 |
| 15 | 1,233,000 | 22,149,513 | 20,916,513 | 15 | 1,998,000 | 35,045,011 | 33,047,011 | 15 | 2,691,000 | 38,667,802 | 36,176,802 |
| 16 | 1,233,000 | 22,149,513 | 20,916,513 | 16 | 1,998,000 | 35,045,011 | 33,047,011 | 16 | 2,691,000 | 38,667,802 | 36,176,802 |
| 17 | 1,233,000 | 22,149,513 | 20,916,513 | 17 | 1,998,000 | 35,045,011 | 33,047,011 | 17 | 2,691,000 | 38,667,802 | 36,176,802 |
| 18 | 1,233,000 | 22,149,513 | 20,916,513 | 18 | 1,998,000 | 35,045,011 | 33,047,011 | 18 | 2,691,000 | 38,667,802 | 36,176,802 |
| 19 | 1,233,000 | 22,149,513 | 20,916,513 | 19 | 1,998,000 | 35,045,011 | 33,047,011 | 19 | 2,691,000 | 38,667,802 | 36,176,802 |
| 20 | 1,233,000 | 22,149,513 | 20,916,513 | 20 | 1,998,000 | 35,045,011 | 33,047,011 | 20 | 2,691,000 | 38,667,802 | 36,176,802 |
| 21 | 1,233,000 | 22,149,513 | 20,916,513 | 21 | 1,998,000 | 35,045,011 | 33,047,011 | 21 | 2,691,000 | 38,667,802 | 36,176,802 |
| 22 | 1,233,000 | 22,149,513 | 20,916,513 | 22 | 1,998,000 | 35,045,011 | 33,047,011 | 22 | 2,691,000 | 38,667,802 | 36,176,802 |
| 23 | 1,233,000 | 22,149,513 | 20,916,513 | 23 | 1,713,000 | 27,266,087 | 25,553,087 | 23 | 2,408,000 | 31,108,878 | 28,702,878 |
| 24 | 1,233,000 | 22,149,513 | 20,916,513 | 24 | 1,713,000 | 27,266,087 | 25,553,087 | 24 | 2,408,000 | 31,108,878 | 28,702,878 |
| 25 | 1,233,000 | 22,149,513 | 20,916,513 | 25 | 1,713,000 | 27,266,087 | 25,553,087 | 25 | 2,408,000 | 31,108,878 | 28,702,878 |
| 26 | 1,233,000 | 22,149,513 | 20,916,513 | 26 | 1,713,000 | 27,266,087 | 25,553,087 | 26 | 2,408,000 | 31,108,878 | 28,702,878 |
| 27 | 1,233,000 | 22,149,513 | 20,916,513 | 27 | 1,713,000 | 27,266,087 | 25,553,087 | 27 | 2,408,000 | 31,108,878 | 28,702,878 |
| 28 | 1,233,000 | 22,149,513 | 20,916,513 | 28 | 1,556,000 | 26,068,305 | 24,532,305 | 28 | 2,249,000 | 29,911,096 | 27,662,096 |
| 29 | 1,233,000 | 22,149,513 | 20,916,513 | 29 | 1,556,000 | 26,068,305 | 24,532,305 | 29 | 2,249,000 | 29,911,096 | 27,662,096 |
| 30 | 1,233,000 | 22,149,513 | 20,916,513 | 30 | 1,556,000 | 26,068,305 | 24,532,305 | 30 | 2,249,000 | 29,911,096 | 27,662,096 |
| 31 | 1,233,000 | 22,149,513 | 20,916,513 | 31 | 1,556,000 | 26,068,305 | 24,532,305 | 31 | 2,249,000 | 29,911,096 | 27,662,096 |
| 32 | 1,233,000 | 22,149,513 | 20,916,513 | 32 | 1,556,000 | 26,068,305 | 24,532,305 | 32 | 2,249,000 | 29,911,096 | 27,662,096 |
| 33 | 1,233,000 | 22,149,513 | 20,916,513 | 33 | 1,556,000 | 26,068,305 | 24,532,305 | 33 | 2,249,000 | 29,911,096 | 27,662,096 |
| 34 | 1,233,000 | 22,149,513 | 20,916,513 | 34 | 1,556,000 | 26,068,305 | 24,532,305 | 34 | 2,249,000 | 29,911,096 | 27,662,096 |
| 35 | 1,233,000 | 22,149,513 | 20,916,513 | 35 | 1,556,000 | 26,068,305 | 24,532,305 | 35 | 2,249,000 | 29,911,096 | 27,662,096 |
| 36 | 1,233,000 | 22,149,513 | 20,916,513 | 36 | 1,556,000 | 26,068,305 | 24,532,305 | 36 | 2,249,000 | 29,911,096 | 27,662,096 |
| 37 | 978,000 | 19,107,567 | 18,129,567 | 37 | 1,301,000 | 23,046,360 | 21,745,360 | 37 | 1,994,000 | 26,869,151 | 24,875,151 |
| 38 | 978,000 | 19,107,567 | 18,129,567 | 38 | 1,097,000 | 20,064,827 | 18,967,827 | 38 | 1,790,000 | 23,867,618 | 22,097,618 |
| 39 | 978,000 | 19,107,567 | 18,129,567 | 39 | 1,097,000 | 20,064,827 | 18,967,827 | 39 | 1,790,000 | 23,867,618 | 22,097,618 |
| 40 | 978,000 | 19,107,567 | 18,129,567 | 40 | 1,097,000 | 20,064,827 | 18,967,827 | 40 | 1,790,000 | 23,867,618 | 22,097,618 |
| 41 | 978,000 | 19,107,567 | 18,129,567 | 41 | 1,097,000 | 20,064,827 | 18,967,827 | 41 | 1,790,000 | 23,867,618 | 22,097,618 |
| | | | | 42 | 119,000 | 957,260 | 838,260 | 42 | 812,000 | 4,780,051 | 3,968,051 |
| | | | | | | | | 43 | 693,000 | 3,822,791 | 3,129,791 |

**Table L.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 1: Cost overrun by 20%, 1/2)**

| Arambi (Ghaztona) | | | | Arambi (Semak) | | | | Sakhol | | | | Mangt | | | |
|-----------------------------|------------|---------|-------------|----------------|------------|---------|-------------|------------|------------|-----------|-------------|-------------|------------|-----------|-------------|
| Project Life (year) | | | | 40 | | | | 40 | | | | 40 | | | |
| Construction Cost (Rs) | | | | 14,646,000 | | | | 12,354,000 | | | | 30,288,000 | | | |
| Annual Benefit (Rs) | | | | 957,260 | | | | 369,149 | | | | 1,532,383 | | | |
| IRR (%) | | | | 4.87% | | | | 0.65% | | | | 2.80% | | | |
| NPV (Rs, discount rate=10%) | | | | -5,011,368 | | | | -8,509,990 | | | | -14,995,174 | | | |
| B/C (Rs, discount rate=10%) | | | | 0.651 | | | | 0.299 | | | | 0.532 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 14,646,000 | | -14,646,000 | 1 | 12,354,000 | | -12,354,000 | 1 | 30,288,000 | | -30,288,000 | 1 | 50,052,000 | | -50,052,000 |
| 2 | 119,000 | 957,260 | 0.802 | 2 | 100,000 | 369,149 | 3.691 | 2 | 264,000 | 1,532,383 | 5.766 | 2 | 322,000 | 8,960,368 | 27.828 |
| 3 | 119,000 | 957,260 | 0.802 | 3 | 100,000 | 369,149 | 3.691 | 3 | 264,000 | 1,532,383 | 5.766 | 3 | 322,000 | 8,960,368 | 27.828 |
| 4 | 119,000 | 957,260 | 0.802 | 4 | 100,000 | 369,149 | 3.691 | 4 | 264,000 | 1,532,383 | 5.766 | 4 | 322,000 | 8,960,368 | 27.828 |
| 5 | 119,000 | 957,260 | 0.802 | 5 | 100,000 | 369,149 | 3.691 | 5 | 264,000 | 1,532,383 | 5.766 | 5 | 322,000 | 8,960,368 | 27.828 |
| 6 | 119,000 | 957,260 | 0.802 | 6 | 100,000 | 369,149 | 3.691 | 6 | 264,000 | 1,532,383 | 5.766 | 6 | 322,000 | 8,960,368 | 27.828 |
| 7 | 119,000 | 957,260 | 0.802 | 7 | 100,000 | 369,149 | 3.691 | 7 | 264,000 | 1,532,383 | 5.766 | 7 | 322,000 | 8,960,368 | 27.828 |
| 8 | 119,000 | 957,260 | 0.802 | 8 | 100,000 | 369,149 | 3.691 | 8 | 264,000 | 1,532,383 | 5.766 | 8 | 322,000 | 8,960,368 | 27.828 |
| 9 | 119,000 | 957,260 | 0.802 | 9 | 100,000 | 369,149 | 3.691 | 9 | 264,000 | 1,532,383 | 5.766 | 9 | 322,000 | 8,960,368 | 27.828 |
| 10 | 119,000 | 957,260 | 0.802 | 10 | 100,000 | 369,149 | 3.691 | 10 | 264,000 | 1,532,383 | 5.766 | 10 | 322,000 | 8,960,368 | 27.828 |
| 11 | 119,000 | 957,260 | 0.802 | 11 | 100,000 | 369,149 | 3.691 | 11 | 264,000 | 1,532,383 | 5.766 | 11 | 322,000 | 8,960,368 | 27.828 |
| 12 | 119,000 | 957,260 | 0.802 | 12 | 100,000 | 369,149 | 3.691 | 12 | 264,000 | 1,532,383 | 5.766 | 12 | 322,000 | 8,960,368 | 27.828 |
| 13 | 119,000 | 957,260 | 0.802 | 13 | 100,000 | 369,149 | 3.691 | 13 | 264,000 | 1,532,383 | 5.766 | 13 | 322,000 | 8,960,368 | 27.828 |
| 14 | 119,000 | 957,260 | 0.802 | 14 | 100,000 | 369,149 | 3.691 | 14 | 264,000 | 1,532,383 | 5.766 | 14 | 322,000 | 8,960,368 | 27.828 |
| 15 | 119,000 | 957,260 | 0.802 | 15 | 100,000 | 369,149 | 3.691 | 15 | 264,000 | 1,532,383 | 5.766 | 15 | 322,000 | 8,960,368 | 27.828 |
| 16 | 119,000 | 957,260 | 0.802 | 16 | 100,000 | 369,149 | 3.691 | 16 | 264,000 | 1,532,383 | 5.766 | 16 | 322,000 | 8,960,368 | 27.828 |
| 17 | 119,000 | 957,260 | 0.802 | 17 | 100,000 | 369,149 | 3.691 | 17 | 264,000 | 1,532,383 | 5.766 | 17 | 322,000 | 8,960,368 | 27.828 |
| 18 | 119,000 | 957,260 | 0.802 | 18 | 100,000 | 369,149 | 3.691 | 18 | 264,000 | 1,532,383 | 5.766 | 18 | 322,000 | 8,960,368 | 27.828 |
| 19 | 119,000 | 957,260 | 0.802 | 19 | 100,000 | 369,149 | 3.691 | 19 | 264,000 | 1,532,383 | 5.766 | 19 | 322,000 | 8,960,368 | 27.828 |
| 20 | 119,000 | 957,260 | 0.802 | 20 | 100,000 | 369,149 | 3.691 | 20 | 264,000 | 1,532,383 | 5.766 | 20 | 322,000 | 8,960,368 | 27.828 |
| 21 | 119,000 | 957,260 | 0.802 | 21 | 100,000 | 369,149 | 3.691 | 21 | 264,000 | 1,532,383 | 5.766 | 21 | 322,000 | 8,960,368 | 27.828 |
| 22 | 119,000 | 957,260 | 0.802 | 22 | 100,000 | 369,149 | 3.691 | 22 | 264,000 | 1,532,383 | 5.766 | 22 | 322,000 | 8,960,368 | 27.828 |
| 23 | 119,000 | 957,260 | 0.802 | 23 | 100,000 | 369,149 | 3.691 | 23 | 264,000 | 1,532,383 | 5.766 | 23 | 322,000 | 8,960,368 | 27.828 |
| 24 | 119,000 | 957,260 | 0.802 | 24 | 100,000 | 369,149 | 3.691 | 24 | 264,000 | 1,532,383 | 5.766 | 24 | 322,000 | 8,960,368 | 27.828 |
| 25 | 119,000 | 957,260 | 0.802 | 25 | 100,000 | 369,149 | 3.691 | 25 | 264,000 | 1,532,383 | 5.766 | 25 | 322,000 | 8,960,368 | 27.828 |
| 26 | 119,000 | 957,260 | 0.802 | 26 | 100,000 | 369,149 | 3.691 | 26 | 264,000 | 1,532,383 | 5.766 | 26 | 322,000 | 8,960,368 | 27.828 |
| 27 | 119,000 | 957,260 | 0.802 | 27 | 100,000 | 369,149 | 3.691 | 27 | 264,000 | 1,532,383 | 5.766 | 27 | 322,000 | 8,960,368 | 27.828 |
| 28 | 119,000 | 957,260 | 0.802 | 28 | 100,000 | 369,149 | 3.691 | 28 | 264,000 | 1,532,383 | 5.766 | 28 | 322,000 | 8,960,368 | 27.828 |
| 29 | 119,000 | 957,260 | 0.802 | 29 | 100,000 | 369,149 | 3.691 | 29 | 264,000 | 1,532,383 | 5.766 | 29 | 322,000 | 8,960,368 | 27.828 |
| 30 | 119,000 | 957,260 | 0.802 | 30 | 100,000 | 369,149 | 3.691 | 30 | 264,000 | 1,532,383 | 5.766 | 30 | 322,000 | 8,960,368 | 27.828 |
| 31 | 119,000 | 957,260 | 0.802 | 31 | 100,000 | 369,149 | 3.691 | 31 | 264,000 | 1,532,383 | 5.766 | 31 | 322,000 | 8,960,368 | 27.828 |
| 32 | 119,000 | 957,260 | 0.802 | 32 | 100,000 | 369,149 | 3.691 | 32 | 264,000 | 1,532,383 | 5.766 | 32 | 322,000 | 8,960,368 | 27.828 |
| 33 | 119,000 | 957,260 | 0.802 | 33 | 100,000 | 369,149 | 3.691 | 33 | 264,000 | 1,532,383 | 5.766 | 33 | 322,000 | 8,960,368 | 27.828 |
| 34 | 119,000 | 957,260 | 0.802 | 34 | 100,000 | 369,149 | 3.691 | 34 | 264,000 | 1,532,383 | 5.766 | 34 | 322,000 | 8,960,368 | 27.828 |
| 35 | 119,000 | 957,260 | 0.802 | 35 | 100,000 | 369,149 | 3.691 | 35 | 264,000 | 1,532,383 | 5.766 | 35 | 322,000 | 8,960,368 | 27.828 |
| 36 | 119,000 | 957,260 | 0.802 | 36 | 100,000 | 369,149 | 3.691 | 36 | 264,000 | 1,532,383 | 5.766 | 36 | 322,000 | 8,960,368 | 27.828 |
| 37 | 119,000 | 957,260 | 0.802 | 37 | 100,000 | 369,149 | 3.691 | 37 | 264,000 | 1,532,383 | 5.766 | 37 | 322,000 | 8,960,368 | 27.828 |
| 38 | 119,000 | 957,260 | 0.802 | 38 | 100,000 | 369,149 | 3.691 | 38 | 264,000 | 1,532,383 | 5.766 | 38 | 322,000 | 8,960,368 | 27.828 |
| 39 | 119,000 | 957,260 | 0.802 | 39 | 100,000 | 369,149 | 3.691 | 39 | 264,000 | 1,532,383 | 5.766 | 39 | 322,000 | 8,960,368 | 27.828 |
| 40 | 119,000 | 957,260 | 0.802 | 40 | 100,000 | 369,149 | 3.691 | 40 | 264,000 | 1,532,383 | 5.766 | 40 | 322,000 | 8,960,368 | 27.828 |
| 41 | 119,000 | 957,260 | 0.802 | 41 | 100,000 | 369,149 | 3.691 | 41 | 264,000 | 1,532,383 | 5.766 | 41 | 322,000 | 8,960,368 | 27.828 |

Kad Kacha II

Telakoo

| Project Life (year) | | | | 40 | | | | 40 | | | |
|-----------------------------|------------|-----------|-------------|------------|------------|---------|-------------|------------|------------|---------|-------------|
| Construction Cost (Rs) | | | | 28,748,000 | | | | 17,028,800 | | | |
| Annual Benefit (Rs) | | | | 4,495,578 | | | | 681,824 | | | |
| IRR (%) | | | | 14.46% | | | | 1.36% | | | |
| NPV (Rs, discount rate=10%) | | | | 14,976,087 | | | | -9,958,132 | | | |
| B/C (Rs, discount rate=10%) | | | | 1.512 | | | | 0.394 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 28,748,000 | | -28,748,000 | 1 | 17,028,800 | | -17,028,800 | 1 | 17,028,800 | | -17,028,800 |
| 2 | 321,000 | 4,495,578 | 14.005 | 2 | 107,000 | 681,824 | 6.372 | 2 | 107,000 | 681,824 | 6.372 |
| 3 | 321,000 | 4,495,578 | 14.005 | 3 | 107,000 | 681,824 | 6.372 | 3 | 107,000 | 681,824 | 6.372 |
| 4 | 321,000 | 4,495,578 | 14.005 | 4 | 107,000 | 681,824 | 6.372 | 4 | 107,000 | 681,824 | 6.372 |
| 5 | 321,000 | 4,495,578 | 14.005 | 5 | 107,000 | 681,824 | 6.372 | 5 | 107,000 | 681,824 | 6.372 |
| 6 | 321,000 | 4,495,578 | 14.005 | 6 | 107,000 | 681,824 | 6.372 | 6 | 107,000 | 681,824 | 6.372 |
| 7 | 321,000 | 4,495,578 | 14.005 | 7 | 107,000 | 681,824 | 6.372 | 7 | 107,000 | 681,824 | 6.372 |
| 8 | 321,000 | 4,495,578 | 14.005 | 8 | 107,000 | 681,824 | 6.372 | 8 | 107,000 | 681,824 | 6.372 |
| 9 | 321,000 | 4,495,578 | 14.005 | 9 | 107,000 | 681,824 | 6.372 | 9 | 107,000 | 681,824 | 6.372 |
| 10 | 321,000 | 4,495,578 | 14.005 | 10 | 107,000 | 681,824 | 6.372 | 10 | 107,000 | 681,824 | 6.372 |
| 11 | 321,000 | 4,495,578 | 14.005 | 11 | 107,000 | 681,824 | 6.372 | 11 | 107,000 | 681,824 | 6.372 |
| 12 | 321,000 | 4,495,578 | 14.005 | 12 | 107,000 | 681,824 | 6.372 | 12 | 107,000 | 681,824 | 6.372 |
| 13 | 321,000 | 4,495,578 | 14.005 | 13 | 107,000 | 681,824 | 6.372 | 13 | 107,000 | 681,824 | 6.372 |
| 14 | 321,000 | 4,495,578 | 14.005 | 14 | 107,000 | 681,824 | 6.372 | 14 | 107,000 | 681,824 | 6.372 |
| 15 | 321,000 | 4,495,578 | 14.005 | 15 | 107,000 | 681,824 | 6.372 | 15 | 107,000 | 681,824 | 6.372 |
| 16 | 321,000 | 4,495,578 | 14.005 | 16 | 107,000 | 681,824 | 6.372 | 16 | 107,000 | 681,824 | 6.372 |
| 17 | 321,000 | 4,495,578 | 14.005 | 17 | 107,000 | 681,824 | 6.372 | 17 | 107,000 | 681,824 | 6.372 |
| 18 | 321,000 | 4,495,578 | 14.005 | 18 | 107,000 | 681,824 | 6.372 | 18 | 107,000 | 681,824 | 6.372 |
| 19 | 321,000 | 4,495,578 | 14.005 | 19 | 107,000 | 681,824 | 6.372 | 19 | 107,000 | 681,824 | 6.372 |
| 20 | 321,000 | 4,495,578 | 14.005 | 20 | 107,000 | 681,824 | 6.372 | 20 | 107,000 | 681,824 | 6.372 |
| 21 | 321,000 | 4,495,578 | 14.005 | 21 | 107,000 | 681,824 | 6.372 | 21 | 107,000 | 681,824 | 6 |

**Table L.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 1: Cost overrun by 20% 2/2)**

| Banyu | | | | Gruhal Shale | | | | Well Bed | | | | Cera | | | |
|-----------------------------|------------|-----------|-------|--------------|-----------|---------|------|------------|------------|-----------|------|-------------|------------|-----------|-------|
| Project Life (year) | | | | 40 | | | | 40 | | | | 40 | | | |
| Construction Cost (Rs) | | | | 23,130,000 | | | | 8,945,600 | | | | 35,450,400 | | | |
| Annual Benefit (Rs) | | | | 4,401,738 | | | | 247,512 | | | | 3,249,884 | | | |
| IRR (%) | | | | 18.71% | | | | 0.74% | | | | 0.85% | | | |
| NPV (Rs, discount rate=10%) | | | | 21,404,138 | | | | -4,773,884 | | | | -23,425,468 | | | |
| B/C (Rs, discount rate=10%) | | | | 0.983 | | | | 0.338 | | | | 0.811 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 23,130,000 | | | 1 | 8,945,600 | | | 1 | 35,450,400 | | | 1 | 40,472,800 | | |
| 2 | 69,000 | 4,401,738 | 63.50 | 2 | 69,000 | 247,512 | 3.58 | 2 | 123,000 | 1,011,923 | 8.22 | 2 | 268,000 | 3,249,884 | 12.13 |
| 3 | 69,000 | 4,401,738 | 63.50 | 3 | 69,000 | 247,512 | 3.58 | 3 | 123,000 | 1,011,923 | 8.22 | 3 | 268,000 | 3,249,884 | 12.13 |
| 4 | 69,000 | 4,401,738 | 63.50 | 4 | 69,000 | 247,512 | 3.58 | 4 | 123,000 | 1,011,923 | 8.22 | 4 | 268,000 | 3,249,884 | 12.13 |
| 5 | 69,000 | 4,401,738 | 63.50 | 5 | 69,000 | 247,512 | 3.58 | 5 | 123,000 | 1,011,923 | 8.22 | 5 | 268,000 | 3,249,884 | 12.13 |
| 6 | 69,000 | 4,401,738 | 63.50 | 6 | 69,000 | 247,512 | 3.58 | 6 | 123,000 | 1,011,923 | 8.22 | 6 | 268,000 | 3,249,884 | 12.13 |
| 7 | 69,000 | 4,401,738 | 63.50 | 7 | 69,000 | 247,512 | 3.58 | 7 | 123,000 | 1,011,923 | 8.22 | 7 | 268,000 | 3,249,884 | 12.13 |
| 8 | 69,000 | 4,401,738 | 63.50 | 8 | 69,000 | 247,512 | 3.58 | 8 | 123,000 | 1,011,923 | 8.22 | 8 | 268,000 | 3,249,884 | 12.13 |
| 9 | 69,000 | 4,401,738 | 63.50 | 9 | 69,000 | 247,512 | 3.58 | 9 | 123,000 | 1,011,923 | 8.22 | 9 | 268,000 | 3,249,884 | 12.13 |
| 10 | 69,000 | 4,401,738 | 63.50 | 10 | 69,000 | 247,512 | 3.58 | 10 | 123,000 | 1,011,923 | 8.22 | 10 | 268,000 | 3,249,884 | 12.13 |
| 11 | 69,000 | 4,401,738 | 63.50 | 11 | 69,000 | 247,512 | 3.58 | 11 | 123,000 | 1,011,923 | 8.22 | 11 | 268,000 | 3,249,884 | 12.13 |
| 12 | 69,000 | 4,401,738 | 63.50 | 12 | 69,000 | 247,512 | 3.58 | 12 | 123,000 | 1,011,923 | 8.22 | 12 | 268,000 | 3,249,884 | 12.13 |
| 13 | 69,000 | 4,401,738 | 63.50 | 13 | 69,000 | 247,512 | 3.58 | 13 | 123,000 | 1,011,923 | 8.22 | 13 | 268,000 | 3,249,884 | 12.13 |
| 14 | 69,000 | 4,401,738 | 63.50 | 14 | 69,000 | 247,512 | 3.58 | 14 | 123,000 | 1,011,923 | 8.22 | 14 | 268,000 | 3,249,884 | 12.13 |
| 15 | 69,000 | 4,401,738 | 63.50 | 15 | 69,000 | 247,512 | 3.58 | 15 | 123,000 | 1,011,923 | 8.22 | 15 | 268,000 | 3,249,884 | 12.13 |
| 16 | 69,000 | 4,401,738 | 63.50 | 16 | 69,000 | 247,512 | 3.58 | 16 | 123,000 | 1,011,923 | 8.22 | 16 | 268,000 | 3,249,884 | 12.13 |
| 17 | 69,000 | 4,401,738 | 63.50 | 17 | 69,000 | 247,512 | 3.58 | 17 | 123,000 | 1,011,923 | 8.22 | 17 | 268,000 | 3,249,884 | 12.13 |
| 18 | 69,000 | 4,401,738 | 63.50 | 18 | 69,000 | 247,512 | 3.58 | 18 | 123,000 | 1,011,923 | 8.22 | 18 | 268,000 | 3,249,884 | 12.13 |
| 19 | 69,000 | 4,401,738 | 63.50 | 19 | 69,000 | 247,512 | 3.58 | 19 | 123,000 | 1,011,923 | 8.22 | 19 | 268,000 | 3,249,884 | 12.13 |
| 20 | 69,000 | 4,401,738 | 63.50 | 20 | 69,000 | 247,512 | 3.58 | 20 | 123,000 | 1,011,923 | 8.22 | 20 | 268,000 | 3,249,884 | 12.13 |
| 21 | 69,000 | 4,401,738 | 63.50 | 21 | 69,000 | 247,512 | 3.58 | 21 | 123,000 | 1,011,923 | 8.22 | 21 | 268,000 | 3,249,884 | 12.13 |
| 22 | 69,000 | 4,401,738 | 63.50 | 22 | 69,000 | 247,512 | 3.58 | 22 | 123,000 | 1,011,923 | 8.22 | 22 | 268,000 | 3,249,884 | 12.13 |
| 23 | 69,000 | 4,401,738 | 63.50 | 23 | 69,000 | 247,512 | 3.58 | 23 | 123,000 | 1,011,923 | 8.22 | 23 | 268,000 | 3,249,884 | 12.13 |
| 24 | 69,000 | 4,401,738 | 63.50 | 24 | 69,000 | 247,512 | 3.58 | 24 | 123,000 | 1,011,923 | 8.22 | 24 | 268,000 | 3,249,884 | 12.13 |
| 25 | 69,000 | 4,401,738 | 63.50 | 25 | 69,000 | 247,512 | 3.58 | 25 | 123,000 | 1,011,923 | 8.22 | 25 | 268,000 | 3,249,884 | 12.13 |
| 26 | 69,000 | 4,401,738 | 63.50 | 26 | 69,000 | 247,512 | 3.58 | 26 | 123,000 | 1,011,923 | 8.22 | 26 | 268,000 | 3,249,884 | 12.13 |
| 27 | 69,000 | 4,401,738 | 63.50 | 27 | 69,000 | 247,512 | 3.58 | 27 | 123,000 | 1,011,923 | 8.22 | 27 | 268,000 | 3,249,884 | 12.13 |
| 28 | 69,000 | 4,401,738 | 63.50 | 28 | 69,000 | 247,512 | 3.58 | 28 | 123,000 | 1,011,923 | 8.22 | 28 | 268,000 | 3,249,884 | 12.13 |
| 29 | 69,000 | 4,401,738 | 63.50 | 29 | 69,000 | 247,512 | 3.58 | 29 | 123,000 | 1,011,923 | 8.22 | 29 | 268,000 | 3,249,884 | 12.13 |
| 30 | 69,000 | 4,401,738 | 63.50 | 30 | 69,000 | 247,512 | 3.58 | 30 | 123,000 | 1,011,923 | 8.22 | 30 | 268,000 | 3,249,884 | 12.13 |
| 31 | 69,000 | 4,401,738 | 63.50 | 31 | 69,000 | 247,512 | 3.58 | 31 | 123,000 | 1,011,923 | 8.22 | 31 | 268,000 | 3,249,884 | 12.13 |
| 32 | 69,000 | 4,401,738 | 63.50 | 32 | 69,000 | 247,512 | 3.58 | 32 | 123,000 | 1,011,923 | 8.22 | 32 | 268,000 | 3,249,884 | 12.13 |
| 33 | 69,000 | 4,401,738 | 63.50 | 33 | 69,000 | 247,512 | 3.58 | 33 | 123,000 | 1,011,923 | 8.22 | 33 | 268,000 | 3,249,884 | 12.13 |
| 34 | 69,000 | 4,401,738 | 63.50 | 34 | 69,000 | 247,512 | 3.58 | 34 | 123,000 | 1,011,923 | 8.22 | 34 | 268,000 | 3,249,884 | 12.13 |
| 35 | 69,000 | 4,401,738 | 63.50 | 35 | 69,000 | 247,512 | 3.58 | 35 | 123,000 | 1,011,923 | 8.22 | 35 | 268,000 | 3,249,884 | 12.13 |
| 36 | 69,000 | 4,401,738 | 63.50 | 36 | 69,000 | 247,512 | 3.58 | 36 | 123,000 | 1,011,923 | 8.22 | 36 | 268,000 | 3,249,884 | 12.13 |
| 37 | 69,000 | 4,401,738 | 63.50 | 37 | 69,000 | 247,512 | 3.58 | 37 | 123,000 | 1,011,923 | 8.22 | 37 | 268,000 | 3,249,884 | 12.13 |
| 38 | 69,000 | 4,401,738 | 63.50 | 38 | 69,000 | 247,512 | 3.58 | 38 | 123,000 | 1,011,923 | 8.22 | 38 | 268,000 | 3,249,884 | 12.13 |
| 39 | 69,000 | 4,401,738 | 63.50 | 39 | 69,000 | 247,512 | 3.58 | 39 | 123,000 | 1,011,923 | 8.22 | 39 | 268,000 | 3,249,884 | 12.13 |
| 40 | 69,000 | 4,401,738 | 63.50 | 40 | 69,000 | 247,512 | 3.58 | 40 | 123,000 | 1,011,923 | 8.22 | 40 | 268,000 | 3,249,884 | 12.13 |
| 41 | 69,000 | 4,401,738 | 63.50 | 41 | 69,000 | 247,512 | 3.58 | 41 | 123,000 | 1,011,923 | 8.22 | 41 | 268,000 | 3,249,884 | 12.13 |

| Murgh Kotal | | | | Kach | | | | Jigda | | | | Sanzad | | | | | | | |
|-----------------------------|------------|-----------|-------|-------------|-------------|-----------|-------|-------------|------------|-----------|-------|------------|------------|-----------|------|-------------|--|--|--|
| Project Life (year) | | | | 35 | | | | 20 | | | | 35 | | | | 25 | | | |
| Construction Cost (Rs) | | | | 57,188,000 | | | | 100,895,800 | | | | 30,105,600 | | | | 30,050,400 | | | |
| Annual Benefit (Rs) | | | | 2,981,533 | | | | 7,758,924 | | | | 3,041,845 | | | | 1,197,782 | | | |
| IRR (%) | | | | 3.20% | | | | 4.10% | | | | 8.77% | | | | 11.08% | | | |
| NPV (Rs, discount rate=10%) | | | | -25,032,361 | | | | -27,692,241 | | | | -267,415 | | | | -17,741,772 | | | |
| B/C (Rs, discount rate=10%) | | | | 0.535 | | | | 0.708 | | | | 0.931 | | | | 0.580 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | | | | |
| 1 | 57,188,000 | | | 1 | 100,895,800 | | | 1 | 30,105,600 | | | 1 | 30,050,400 | | | | | | |
| 2 | 204,000 | 2,981,533 | 14.61 | 2 | 285,000 | 7,758,924 | 27.23 | 2 | 255,000 | 3,041,845 | 11.93 | 2 | 157,000 | 1,197,782 | 7.63 | | | | |
| 3 | 204,000 | 2,981,533 | 14.61 | 3 | 285,000 | 7,758,924 | 27.23 | 3 | 255,000 | 3,041,845 | 11.93 | 3 | 157,000 | 1,197,782 | 7.63 | | | | |
| 4 | 204,000 | 2,981,533 | 14.61 | 4 | 285,000 | 7,758,924 | 27.23 | 4 | 255,000 | 3,041,845 | 11.93 | 4 | 157,000 | 1,197,782 | 7.63 | | | | |
| 5 | 204,000 | 2,981,533 | 14.61 | 5 | 285,000 | 7,758,924 | 27.23 | 5 | 255,000 | 3,041,845 | 11.93 | 5 | 157,000 | 1,197,782 | 7.63 | | | | |
| 6 | 204,000 | 2,981,533 | 14.61 | 6 | 285,000 | 7,758,924 | 27.23 | 6 | 255,000 | 3,041,845 | 11.93 | 6 | 157,000 | 1,197,782 | 7.63 | | | | |
| 7 | 204,000 | 2,981,533 | 14.61 | 7 | 285,000 | 7,758,924 | 27.23 | 7 | 255,000 | 3,041,845 | 11.93 | 7 | 157,000 | 1,197,782 | 7.63 | | | | |
| 8 | 204,000 | 2,981,533 | 14.61 | 8 | 285,000 | 7,758,924 | 27.23 | 8 | 255,000 | 3,041,845 | 11.93 | 8 | 157,000 | 1,197,782 | 7.63 | | | | |
| 9 | 204,000 | 2,981,533 | 14.61 | 9 | 285,000 | 7,758,924 | 27.23 | 9 | 255,000 | 3,041,845 | 11.93 | 9 | 157,000 | 1,197,782 | 7.63 | | | | |
| 10 | 204,000 | 2,981,533 | 14.61 | 10 | 285,000 | 7,758,924 | 27.23 | 10 | 255,000 | 3,041,845 | 11.93 | 10 | 157,000 | 1,197,782 | 7.63 | | | | |
| 11 | 204,000 | 2,981,533 | 14.61 | 11 | 285,000 | 7,758,924 | 27.23 | 11 | 255,000 | 3,041,845 | 11.93 | 11 | 157,000 | 1,197,782 | 7.63 | | | | |
| 12 | 204,000 | 2,981,533 | 14.61 | 12 | 285,000 | 7,758,924 | 27.23 | 12 | 255,000 | 3,041,845 | 11.93 | 12 | 157,000 | 1,197,782 | 7.63 | | | | |
| 13 | 204,000 | 2,981,533 | 14.61 | 13 | 285,000 | 7,758,924 | 27.23 | 13 | 255,000 | 3,041,845 | 11.93 | 13 | 157,000 | 1,197,782 | 7.63 | | | | |
| 14 | 204,000 | 2,981,533 | 14.61 | 14 | 285,000 | 7,758,924 | 27.23 | 14 | 255,000 | 3,041,845 | 11.93 | 14 | 157,000 | 1,197,782 | 7.63 | | | | |
| 15 | 204,000 | 2,981,533 | 14.61 | 15 | 285,000 | 7,758,924 | 27.23 | 15 | 255,000 | 3,041,845 | 11.93 | 15 | 157,000 | 1,197,782 | 7.63 | | | | |
| 16 | 204,000 | 2,981,533 | 14.61 | 16 | 285,000 | 7,758,924 | 27.23 | 16 | 255,000 | 3,041,845 | 11.93 | 16 | 157,000 | 1,197,782 | 7.63 | | | | |
| 17 | 204,000 | 2,981,533 | 14.61 | 17 | 285,000 | 7,758,924 | 27.23 | 17 | 255,000 | 3,041,845 | 11.93 | 17 | 157,000 | 1,197,782 | 7.63 | | | | |
| 18 | 204,000 | 2,981,533 | 14.61 | 18 | 285,000 | 7,758,924 | 27.23 | 18 | 255,000 | 3,041,845 | 11.93 | 18 | 157,000 | 1,197,782 | 7.63 | | | | |
| 19 | 204,000 | 2,981,533 | 14.61 | 19 | 285,000 | 7,758,924 | 27.23 | 19 | 255,000 | 3,041,845 | 11.93 | 19 | 157,000 | 1,197,782 | 7.63 | | | | |
| 20 | 204,000 | 2,981,533 | 14.61 | 20 | 285,000 | 7,758,924 | 27.23 | 20 | 255,000 | 3,041,845 | 11.93 | 20 | 157,000 | 1,197,782 | 7.63 | | | | |
| 21 | 204,000 | 2,981,533 | 14.61 | 21 | 285,000 | 7,758,924 | 27.23 | 21 | 255,000 | 3,041,845 | 11.93 | 21 | 157,000 | 1,197,782 | 7.63 | | | | |
| 22 | 204,000 | 2,981,533 | 14.61 | 22 | 285,000 | 7,758,924 | 27.23 | 22 | 255,000 | 3,041,845 | 11.93 | 22 | 157,000 | 1,197,782 | 7.63 | | | | |
| 23 | 204,000 | 2,981,533 | 14.61 | 23 | 285,000 | 7,758,924 | 27.23 | 23 | 255,000 | 3,041,845 | 11.93 | 23 | 157,000 | 1,197,782 | 7.63 | | | | |
| 24 | 204,000 | 2,981,533 | 14.61 | 24 | 285,000 | 7,758,924 | 27.23 | 24 | 255,000 | 3,041,845 | 11.93 | 24 | 157,000 | 1,197,782 | 7.63 | | | | |
| 25 | 204,000 | 2,981,533 | 14.61 | 25 | 285,000 | 7,758,924 | 27.23 | 25 | 255,000 | 3,041,845 | 11.93 | 25 | 157,000 | 1,197,782 | 7.63 | | | | |
| 26 | 204,000 | 2,981,533 | 14.61 | 26 | 285,000 | 7,758,924 | 27.23 | 26 | 255,000 | 3,041,845 | 11.93 | 26 | 157,000 | 1,197,782 | 7.63 | | | | |
| 27 | 204,000 | 2,981,533 | 14.61 | 27 | 285,000 | 7,758,924 | 27.23 | 27 | 255,000 | 3,041,845 | 11.93 | 27 | 157,000 | 1,197,782 | 7.63 | | | | |
| 28 | 204,000 | 2,981,533 | 14.61 | 28 | 285,000 | 7,758,924 | 27.23 | 28 | 255,000 | 3,041,845 | 11.93 | 28 | 157,000 | 1,197,782 | 7.63 | | | | |
| 29 | 204,000 | 2,981,533 | 14.61 | 29 | 285,000 | 7,758,924 | 27.23 | 29 | 255,000 | 3,041,845 | 11.93 | 29 | 157,000 | 1,197,782 | 7.63 | | | | |
| 30 | 204,000 | 2,981,533 | 14.61 | 30 | 285,000 | 7,758,924 | 27.23 | 30 | 255,000 | 3,041,845 | 11.93 | 30 | 157,000 | 1,197,782 | 7.63 | | | | |
| 31 | 204,000 | 2,981,533 | 14.61 | 31 | 285,000 | 7,758,924 | 27.23 | 31 | 255,000 | 3,041,845 | 11.93 | 31 | 157,000 | 1,197,782 | 7.63 | | | | |
| 32 | 204,000 | 2,981,533 | 14.61 | 32 | 285,000 | 7,758,924 | 27.23 | 32 | 255,000 | 3,041,845 | 11.93 | 32 | 157,000 | 1,197,782 | 7.63 | | | | |
| 33 | 204,000 | 2,981,533 | 14.61 | 33 | 285,000 | 7,758,924 | 27.23 | 33 | 255,000 | 3,041,845 | 11.93 | 33 | 157,000 | 1,197,782 | 7.63 | | | | |
| 34 | 204,000 | 2,981,533 | 14.61 | 34 | 285,000 | 7,758,924 | 27.23 | 34 | 255,000 | 3,041,845 | 11.93 | 34 | 157,000 | 1,197,782 | 7.63 | | | | |
| 35 | 204,000 | 2,981,533 | 14.61 | 35 | 285,000 | 7,758,924 | 27.23 | 35 | 255,000 | 3,041,845 | 11.93 | 35 | 157,000 | 1,197,782 | 7.63 | | | | |
| 36 | 204,000 | 2,981,533 | 14.61 | 36 | 285,000 | 7,758,924 | 27.23 | 36 | 255,000 | 3,041,845 | 11.93 | 36 | 157,000 | 1,197,782 | 7.63 | | | | |

**Table 1.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 2: Benefit decrease by 20%, 1/2)**

| Brawely | | | | Ghoru Shale | | | | Well Dred | | | | Dera | | | | | | | |
|-----------------------------|------------|-------------|-----------|-------------|-----------------------------|------------|--------|-----------|------------|-----------------------------|---------|------|------------|-------------|-----------------------------|--|--|--|------------|
| Project Life (year) | | | | 43 | Project Life (year) | | | | 40 | Project Life (year) | | | | 40 | Project Life (year) | | | | 43 |
| Construction Cost (Rs) | | | | 19,275,000 | Construction Cost (Rs) | | | | 5,788,000 | Construction Cost (Rs) | | | | 29,542,000 | Construction Cost (Rs) | | | | 33,733,000 |
| Annual Benefit (Rs) | | | | 3,521,391 | Annual Benefit (Rs) | | | | 198,010 | Annual Benefit (Rs) | | | | 809,538 | Annual Benefit (Rs) | | | | 2,599,907 |
| IRR (%) | | | | 17.82% | IRR (%) | | | | -1.74% | IRR (%) | | | | -0.35% | IRR (%) | | | | 8.32% |
| NPV (Rs, discount rate=10%) | | | | 18,299,717 | NPV (Rs, discount rate=10%) | | | | -4,203,587 | NPV (Rs, discount rate=10%) | | | | -20,033,922 | NPV (Rs, discount rate=10%) | | | | -7,068,493 |
| B/C (Rs, discount rate=10%) | | | | 1.632 | B/C (Rs, discount rate=10%) | | | | 0.315 | B/C (Rs, discount rate=10%) | | | | 0.283 | B/C (Rs, discount rate=10%) | | | | 0.770 |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | | | | |
| 1 | 19,275,000 | -19,275,000 | | 1 | 5,788,000 | -5,788,000 | | 1 | 29,542,000 | -29,542,000 | | 1 | 33,733,000 | -33,733,000 | | | | | |
| 2 | 69,000 | 3,521,391 | 3,452,391 | 2 | 99,000 | 198,010 | 99,010 | 2 | 123,000 | 809,538 | 686,538 | 2 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 3 | 69,000 | 3,521,391 | 3,452,391 | 3 | 99,000 | 198,010 | 99,010 | 3 | 123,000 | 809,538 | 686,538 | 3 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 4 | 69,000 | 3,521,391 | 3,452,391 | 4 | 99,000 | 198,010 | 99,010 | 4 | 123,000 | 809,538 | 686,538 | 4 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 5 | 69,000 | 3,521,391 | 3,452,391 | 5 | 99,000 | 198,010 | 99,010 | 5 | 123,000 | 809,538 | 686,538 | 5 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 6 | 69,000 | 3,521,391 | 3,452,391 | 6 | 99,000 | 198,010 | 99,010 | 6 | 123,000 | 809,538 | 686,538 | 6 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 7 | 69,000 | 3,521,391 | 3,452,391 | 7 | 99,000 | 198,010 | 99,010 | 7 | 123,000 | 809,538 | 686,538 | 7 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 8 | 69,000 | 3,521,391 | 3,452,391 | 8 | 99,000 | 198,010 | 99,010 | 8 | 123,000 | 809,538 | 686,538 | 8 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 9 | 69,000 | 3,521,391 | 3,452,391 | 9 | 99,000 | 198,010 | 99,010 | 9 | 123,000 | 809,538 | 686,538 | 9 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 10 | 69,000 | 3,521,391 | 3,452,391 | 10 | 99,000 | 198,010 | 99,010 | 10 | 123,000 | 809,538 | 686,538 | 10 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 11 | 69,000 | 3,521,391 | 3,452,391 | 11 | 99,000 | 198,010 | 99,010 | 11 | 123,000 | 809,538 | 686,538 | 11 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 12 | 69,000 | 3,521,391 | 3,452,391 | 12 | 99,000 | 198,010 | 99,010 | 12 | 123,000 | 809,538 | 686,538 | 12 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 13 | 69,000 | 3,521,391 | 3,452,391 | 13 | 99,000 | 198,010 | 99,010 | 13 | 123,000 | 809,538 | 686,538 | 13 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 14 | 69,000 | 3,521,391 | 3,452,391 | 14 | 99,000 | 198,010 | 99,010 | 14 | 123,000 | 809,538 | 686,538 | 14 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 15 | 69,000 | 3,521,391 | 3,452,391 | 15 | 99,000 | 198,010 | 99,010 | 15 | 123,000 | 809,538 | 686,538 | 15 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 16 | 69,000 | 3,521,391 | 3,452,391 | 16 | 99,000 | 198,010 | 99,010 | 16 | 123,000 | 809,538 | 686,538 | 16 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 17 | 69,000 | 3,521,391 | 3,452,391 | 17 | 99,000 | 198,010 | 99,010 | 17 | 123,000 | 809,538 | 686,538 | 17 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 18 | 69,000 | 3,521,391 | 3,452,391 | 18 | 99,000 | 198,010 | 99,010 | 18 | 123,000 | 809,538 | 686,538 | 18 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 19 | 69,000 | 3,521,391 | 3,452,391 | 19 | 99,000 | 198,010 | 99,010 | 19 | 123,000 | 809,538 | 686,538 | 19 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 20 | 69,000 | 3,521,391 | 3,452,391 | 20 | 99,000 | 198,010 | 99,010 | 20 | 123,000 | 809,538 | 686,538 | 20 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 21 | 69,000 | 3,521,391 | 3,452,391 | 21 | 99,000 | 198,010 | 99,010 | 21 | 123,000 | 809,538 | 686,538 | 21 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 22 | 69,000 | 3,521,391 | 3,452,391 | 22 | 99,000 | 198,010 | 99,010 | 22 | 123,000 | 809,538 | 686,538 | 22 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 23 | 69,000 | 3,521,391 | 3,452,391 | 23 | 99,000 | 198,010 | 99,010 | 23 | 123,000 | 809,538 | 686,538 | 23 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 24 | 69,000 | 3,521,391 | 3,452,391 | 24 | 99,000 | 198,010 | 99,010 | 24 | 123,000 | 809,538 | 686,538 | 24 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 25 | 69,000 | 3,521,391 | 3,452,391 | 25 | 99,000 | 198,010 | 99,010 | 25 | 123,000 | 809,538 | 686,538 | 25 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 26 | 69,000 | 3,521,391 | 3,452,391 | 26 | 99,000 | 198,010 | 99,010 | 26 | 123,000 | 809,538 | 686,538 | 26 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 27 | 69,000 | 3,521,391 | 3,452,391 | 27 | 99,000 | 198,010 | 99,010 | 27 | 123,000 | 809,538 | 686,538 | 27 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 28 | 69,000 | 3,521,391 | 3,452,391 | 28 | 99,000 | 198,010 | 99,010 | 28 | 123,000 | 809,538 | 686,538 | 28 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 29 | 69,000 | 3,521,391 | 3,452,391 | 29 | 99,000 | 198,010 | 99,010 | 29 | 123,000 | 809,538 | 686,538 | 29 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 30 | 69,000 | 3,521,391 | 3,452,391 | 30 | 99,000 | 198,010 | 99,010 | 30 | 123,000 | 809,538 | 686,538 | 30 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 31 | 69,000 | 3,521,391 | 3,452,391 | 31 | 99,000 | 198,010 | 99,010 | 31 | 123,000 | 809,538 | 686,538 | 31 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 32 | 69,000 | 3,521,391 | 3,452,391 | 32 | 99,000 | 198,010 | 99,010 | 32 | 123,000 | 809,538 | 686,538 | 32 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 33 | 69,000 | 3,521,391 | 3,452,391 | 33 | 99,000 | 198,010 | 99,010 | 33 | 123,000 | 809,538 | 686,538 | 33 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 34 | 69,000 | 3,521,391 | 3,452,391 | 34 | 99,000 | 198,010 | 99,010 | 34 | 123,000 | 809,538 | 686,538 | 34 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 35 | 69,000 | 3,521,391 | 3,452,391 | 35 | 99,000 | 198,010 | 99,010 | 35 | 123,000 | 809,538 | 686,538 | 35 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 36 | 69,000 | 3,521,391 | 3,452,391 | 36 | 99,000 | 198,010 | 99,010 | 36 | 123,000 | 809,538 | 686,538 | 36 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 37 | 69,000 | 3,521,391 | 3,452,391 | 37 | 99,000 | 198,010 | 99,010 | 37 | 123,000 | 809,538 | 686,538 | 37 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 38 | 69,000 | 3,521,391 | 3,452,391 | 38 | 99,000 | 198,010 | 99,010 | 38 | 123,000 | 809,538 | 686,538 | 38 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 39 | 69,000 | 3,521,391 | 3,452,391 | 39 | 99,000 | 198,010 | 99,010 | 39 | 123,000 | 809,538 | 686,538 | 39 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 40 | 69,000 | 3,521,391 | 3,452,391 | 40 | 99,000 | 198,010 | 99,010 | 40 | 123,000 | 809,538 | 686,538 | 40 | 268,000 | 2,599,907 | 2,333,907 | | | | |
| 41 | 69,000 | 3,521,391 | 3,452,391 | 41 | 99,000 | 198,010 | 99,010 | 41 | 123,000 | 809,538 | 686,538 | 41 | 268,000 | 2,599,907 | 2,333,907 | | | | |

| Murgh Kotla | | | | Kach | | | | Jigda | | | | Sanzali | | | | | | | |
|-----------------------------|------------|-------------|-----------|-------------|-----------------------------|-------------|-----------|-------|-------------|-----------------------------|-----------|---------|------------|-------------|-----------------------------|--|--|--|-------------|
| Project Life (year) | | | | 35 | Project Life (year) | | | | 20 | Project Life (year) | | | | 35 | Project Life (year) | | | | 25 |
| Construction Cost (Rs) | | | | 47,665,000 | Construction Cost (Rs) | | | | 83,814,000 | Construction Cost (Rs) | | | | 25,042,000 | Construction Cost (Rs) | | | | 25,042,000 |
| Annual Benefit (Rs) | | | | 2,365,226 | Annual Benefit (Rs) | | | | 8,207,139 | Annual Benefit (Rs) | | | | 2,433,556 | Annual Benefit (Rs) | | | | 958,226 |
| IRR (%) | | | | 2.86% | IRR (%) | | | | 3.53% | IRR (%) | | | | 8.12% | IRR (%) | | | | -1.65% |
| NPV (Rs, discount rate=10%) | | | | -22,116,872 | NPV (Rs, discount rate=10%) | | | | -25,846,368 | NPV (Rs, discount rate=10%) | | | | -1,573,361 | NPV (Rs, discount rate=10%) | | | | -15,363,144 |
| B/C (Rs, discount rate=10%) | | | | 0.510 | B/C (Rs, discount rate=10%) | | | | 0.871 | B/C (Rs, discount rate=10%) | | | | 0.937 | B/C (Rs, discount rate=10%) | | | | 0.381 |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | | | | |
| 1 | 47,665,000 | -47,665,000 | | 1 | 83,814,000 | -83,814,000 | | 1 | 25,042,000 | -25,042,000 | | 1 | 25,042,000 | -25,042,000 | | | | | |
| 2 | 204,000 | 2,365,226 | 2,161,226 | 2 | 285,000 | 8,207,139 | 5,922,139 | 2 | 255,000 | 2,433,556 | 2,178,556 | 2 | 157,000 | 958,226 | 801,226 | | | | |
| 3 | 204,000 | 2,365,226 | 2,161,226 | 3 | 285,000 | 8,207,139 | 5,922,139 | 3 | 255,000 | 2,433,556 | 2,178,556 | 3 | 157,000 | 958,226 | 801,226 | | | | |
| 4 | 204,000 | 2,365,226 | 2,161,226 | 4 | 285,000 | 8,207,139 | 5,922,139 | 4 | 255,000 | 2,433,556 | 2,178,556 | 4 | 157,000 | 958,226 | 801,226 | | | | |
| 5 | 204,000 | 2,365,226 | 2,161,226 | 5 | 285,000 | 8,207,139 | 5,922,139 | 5 | 255,000 | 2,433,556 | 2,178,556 | 5 | 157,000 | 958,226 | 801,226 | | | | |
| 6 | 204,000 | 2,365,226 | 2,161,226 | 6 | 285,000 | 8,207,139 | 5,922,139 | 6 | 255,000 | 2,433,556 | 2,178,556 | 6 | 157,000 | 958,226 | 801,226 | | | | |
| 7 | 204,000 | 2,365,226 | 2,161,226 | 7 | 285,000 | 8,207,139 | 5,922,139 | 7 | 255,000 | 2,433,556 | 2,178,556 | 7 | 157,000 | 958,226 | 801,226 | | | | |
| 8 | 204,000 | 2,365,226 | 2,161,226 | 8 | 285,000 | 8,207,139 | 5,922,139 | 8 | 255,000 | 2,433,556 | 2,178,556 | 8 | 157,000 | 958,226 | 801,226 | | | | |
| 9 | 204,000 | 2,365,226 | 2,161,226 | 9 | 285,000 | 8,207,139 | 5,922,139 | 9 | 255,000 | 2,433,556 | 2,178,556 | 9 | 157,000 | 958,226 | 801,226 | | | | |
| 10 | 204,000 | 2,365,226 | 2,161,226 | 10 | 285,000 | 8,207,139 | 5,922,139 | 10 | 255,000 | 2,433,556 | 2,178,556 | 10 | 157,000 | 958,226 | 801,226 | | | | |
| 11 | 204,000 | 2,365,226 | 2,161,226 | 11 | 285,000 | 8,207,139 | 5,922,139 | 11 | 255,000 | 2,433,556 | 2,178,556 | 11 | 157,000 | 958,226 | 801,226 | | | | |
| 12 | 204,000 | 2,365,226 | 2,161,226 | 12 | 285,000 | 8,207,139 | 5,922,139 | 12 | 255,000 | 2,433,556 | 2,178,556 | 12 | 157,000 | 958,226 | 801,226 | | | | |
| 13 | 204,000 | 2,365,226 | 2,161,226 | 13 | 285,000 | 8,207,139 | 5,922,139 | 13 | 255,000 | 2,433,556 | 2,178,556 | 13 | 157,000 | 958,226 | 801,226 | | | | |
| 14 | 204,000 | 2,365,226 | 2,161,226 | 14 | 285,000 | 8,207,139 | 5,922,139 | 14 | 255,000 | 2,433,556 | 2,178,556 | 14 | 157,000 | 958,226 | 801,226 | | | | |
| 15 | 204,000 | 2,365,226 | 2,161,226 | 15 | 285,000 | 8,207,139 | 5,922,139 | 15 | 255,000 | 2,433,556 | 2,178,556 | 15 | 157,000 | 958,226 | 801,226 | | | | |
| 16 | 204,000 | 2,365,226 | 2,161,226 | 16 | 285,000 | 8,207,139 | 5,922,139 | 16 | 255,000 | 2,433,556 | 2,178,556 | 16 | 157,000 | 958,226 | 801,226 | | | | |
| 17 | 204,000 | 2,365,226 | 2,161,226 | 17 | 285,000 | 8,207,139 | 5,922,139 | 17 | 255,000 | 2,433,556 | 2,178,556 | 17 | 157,000 | 958,226 | 801,226 | | | | |
| 18 | 204,000 | 2,365,226 | 2,161,226 | 18 | 285,000 | 8,207,139 | 5,922,139 | 18 | 255,000 | 2,433,556 | 2,178,556 | 18 | 157,000 | 958,226 | 801,226 | | | | |
| 19 | 204,000 | 2,365,226 | 2,161,226 | 19 | 285,000 | 8,207,139 | 5,922,139 | 19 | 255,000 | 2,433,556 | 2,178,556 | 19 | 157,000 | 958,226 | 801,226 | | | | |
| 20 | 204,000 | 2,365,226 | 2,161,226 | 20 | 285,000 | 8,207,139 | 5,922,139 | 20 | 255,000 | 2,433,556 | 2,178,556 | 20 | 157,000 | 958,226 | 801,226 | | | | |
| 21 | 204,000 | 2,365,226 | 2,161,226 | 21 | 285,000 | 8,207,139 | 5,922,139 | 21 | 255,000 | 2,433,556 | 2,178,556 | 21 | 157,000 | 958,226 | 801,226 | | | | |
| 22 | 204,000 | 2,365,226 | 2,161,226 | | | | | 22 | 255,000 | 2,433,556 | 2,178,556 | 22 | 157,000 | 958,226 | 801,226 | | | | |
| 23 | 204,000 | 2,365,226 | 2,161,226 | | | | | 23 | 255,000 | 2,433,556 | 2,178,556 | 23 | 157,000 | 958,226 | 801,226 | | | | |
| 24 | 204,000 | 2,365,226 | 2,161,226 | | | | | 24 | 255,000 | 2,433,556 | 2,178,556 | 24 | 157,000 | 958,226 | 801,226 | | | | |
| 25 | 204,000 | 2,365,226 | 2,161,226 | | | | | 25 | 255,000 | 2,433,556 | 2,178,556 | 25 | 157,000 | 958,226 | 801,226 | | | | |
| 26 | 204,000 | 2,365,226 | 2,161,226 | | | | | 26 | 255,000 | 2,433,556 | 2,178,556 | 26 | 157,000 | 958,226 | 801,226 | | | | |
| 27 | 204,000 | 2,365,226 | 2,161,226 | | | | | 27 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 28 | 204,000 | 2,365,226 | 2,161,226 | | | | | 28 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 29 | 204,000 | 2,365,226 | 2,161,226 | | | | | 29 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 30 | 204,000 | 2,365,226 | 2,161,226 | | | | | 30 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 31 | 204,000 | 2,365,226 | 2,161,226 | | | | | 31 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 32 | 204,000 | 2,365,226 | 2,161,226 | | | | | 32 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 33 | 204,000 | 2,365,226 | 2,161,226 | | | | | 33 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 34 | 204,000 | 2,365,226 | 2,161,226 | | | | | 34 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 35 | 204,000 | 2,365,226 | 2,161,226 | | | | | 35 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |
| 36 | 204,000 | 2,365,226 | 2,161,226 | | | | | 36 | 255,000 | 2,433,556 | 2,178,556 | | | | | | | | |

**Table L.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 2: Benefit decrease by 20%, 2/2)**

| Arambi (Chadrona) | | | | Arambi (Bemak) | | | | Sakhal | | | | Mang | | | |
|-----------------------------|------------|---------|-------------|----------------|------------|---------|-------------|------------|------------|-----------|-------------|-------------|------------|-----------|-------------|
| Project Life (year) | | | | 40 | | | | 40 | | | | 40 | | | |
| Construction Cost (Rs) | | | | 12,205,000 | | | | 10,295,000 | | | | 25,239,000 | | | |
| Annual Benefit (Rs) | | | | 755,808 | | | | 295,319 | | | | 1,225,907 | | | |
| IRR (%) | | | | 4.33% | | | | -1.26% | | | | 2.24% | | | |
| NPV (Rs, discount rate=10%) | | | | -6,664,495 | | | | -7,360,157 | | | | -12,303,313 | | | |
| B/C (Rs, discount rate=10%) | | | | 0.618 | | | | 0.282 | | | | 0.474 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 12,205,000 | | -12,205,000 | 1 | 10,295,000 | | -10,295,000 | 1 | 25,239,000 | | -25,239,000 | 1 | 41,710,000 | | -41,710,000 |
| 2 | 119,000 | 755,808 | 644,808 | 2 | 100,000 | 295,319 | 195,319 | 2 | 264,000 | 1,225,907 | 961,907 | 2 | 322,000 | 5,568,293 | 5,246,293 |
| 3 | 119,000 | 755,808 | 644,808 | 3 | 100,000 | 295,319 | 195,319 | 3 | 264,000 | 1,225,907 | 961,907 | 3 | 322,000 | 5,568,293 | 5,246,293 |
| 4 | 119,000 | 755,808 | 644,808 | 4 | 100,000 | 295,319 | 195,319 | 4 | 264,000 | 1,225,907 | 961,907 | 4 | 322,000 | 5,568,293 | 5,246,293 |
| 5 | 119,000 | 755,808 | 644,808 | 5 | 100,000 | 295,319 | 195,319 | 5 | 264,000 | 1,225,907 | 961,907 | 5 | 322,000 | 5,568,293 | 5,246,293 |
| 6 | 119,000 | 755,808 | 644,808 | 6 | 100,000 | 295,319 | 195,319 | 6 | 264,000 | 1,225,907 | 961,907 | 6 | 322,000 | 5,568,293 | 5,246,293 |
| 7 | 119,000 | 755,808 | 644,808 | 7 | 100,000 | 295,319 | 195,319 | 7 | 264,000 | 1,225,907 | 961,907 | 7 | 322,000 | 5,568,293 | 5,246,293 |
| 8 | 119,000 | 755,808 | 644,808 | 8 | 100,000 | 295,319 | 195,319 | 8 | 264,000 | 1,225,907 | 961,907 | 8 | 322,000 | 5,568,293 | 5,246,293 |
| 9 | 119,000 | 755,808 | 644,808 | 9 | 100,000 | 295,319 | 195,319 | 9 | 264,000 | 1,225,907 | 961,907 | 9 | 322,000 | 5,568,293 | 5,246,293 |
| 10 | 119,000 | 755,808 | 644,808 | 10 | 100,000 | 295,319 | 195,319 | 10 | 264,000 | 1,225,907 | 961,907 | 10 | 322,000 | 5,568,293 | 5,246,293 |
| 11 | 119,000 | 755,808 | 644,808 | 11 | 100,000 | 295,319 | 195,319 | 11 | 264,000 | 1,225,907 | 961,907 | 11 | 322,000 | 5,568,293 | 5,246,293 |
| 12 | 119,000 | 755,808 | 644,808 | 12 | 100,000 | 295,319 | 195,319 | 12 | 264,000 | 1,225,907 | 961,907 | 12 | 322,000 | 5,568,293 | 5,246,293 |
| 13 | 119,000 | 755,808 | 644,808 | 13 | 100,000 | 295,319 | 195,319 | 13 | 264,000 | 1,225,907 | 961,907 | 13 | 322,000 | 5,568,293 | 5,246,293 |
| 14 | 119,000 | 755,808 | 644,808 | 14 | 100,000 | 295,319 | 195,319 | 14 | 264,000 | 1,225,907 | 961,907 | 14 | 322,000 | 5,568,293 | 5,246,293 |
| 15 | 119,000 | 755,808 | 644,808 | 15 | 100,000 | 295,319 | 195,319 | 15 | 264,000 | 1,225,907 | 961,907 | 15 | 322,000 | 5,568,293 | 5,246,293 |
| 16 | 119,000 | 755,808 | 644,808 | 16 | 100,000 | 295,319 | 195,319 | 16 | 264,000 | 1,225,907 | 961,907 | 16 | 322,000 | 5,568,293 | 5,246,293 |
| 17 | 119,000 | 755,808 | 644,808 | 17 | 100,000 | 295,319 | 195,319 | 17 | 264,000 | 1,225,907 | 961,907 | 17 | 322,000 | 5,568,293 | 5,246,293 |
| 18 | 119,000 | 755,808 | 644,808 | 18 | 100,000 | 295,319 | 195,319 | 18 | 264,000 | 1,225,907 | 961,907 | 18 | 322,000 | 5,568,293 | 5,246,293 |
| 19 | 119,000 | 755,808 | 644,808 | 19 | 100,000 | 295,319 | 195,319 | 19 | 264,000 | 1,225,907 | 961,907 | 19 | 322,000 | 5,568,293 | 5,246,293 |
| 20 | 119,000 | 755,808 | 644,808 | 20 | 100,000 | 295,319 | 195,319 | 20 | 264,000 | 1,225,907 | 961,907 | 20 | 322,000 | 5,568,293 | 5,246,293 |
| 21 | 119,000 | 755,808 | 644,808 | 21 | 100,000 | 295,319 | 195,319 | 21 | 264,000 | 1,225,907 | 961,907 | 21 | 322,000 | 5,568,293 | 5,246,293 |
| 22 | 119,000 | 755,808 | 644,808 | 22 | 100,000 | 295,319 | 195,319 | 22 | 264,000 | 1,225,907 | 961,907 | 22 | 322,000 | 5,568,293 | 5,246,293 |
| 23 | 119,000 | 755,808 | 644,808 | 23 | 100,000 | 295,319 | 195,319 | 23 | 264,000 | 1,225,907 | 961,907 | 23 | 322,000 | 5,568,293 | 5,246,293 |
| 24 | 119,000 | 755,808 | 644,808 | 24 | 100,000 | 295,319 | 195,319 | 24 | 264,000 | 1,225,907 | 961,907 | 24 | 322,000 | 5,568,293 | 5,246,293 |
| 25 | 119,000 | 755,808 | 644,808 | 25 | 100,000 | 295,319 | 195,319 | 25 | 264,000 | 1,225,907 | 961,907 | 25 | 322,000 | 5,568,293 | 5,246,293 |
| 26 | 119,000 | 755,808 | 644,808 | 26 | 100,000 | 295,319 | 195,319 | 26 | 264,000 | 1,225,907 | 961,907 | 26 | 322,000 | 5,568,293 | 5,246,293 |
| 27 | 119,000 | 755,808 | 644,808 | 27 | 100,000 | 295,319 | 195,319 | 27 | 264,000 | 1,225,907 | 961,907 | 27 | 322,000 | 5,568,293 | 5,246,293 |
| 28 | 119,000 | 755,808 | 644,808 | 28 | 100,000 | 295,319 | 195,319 | 28 | 264,000 | 1,225,907 | 961,907 | 28 | 322,000 | 5,568,293 | 5,246,293 |
| 29 | 119,000 | 755,808 | 644,808 | 29 | 100,000 | 295,319 | 195,319 | 29 | 264,000 | 1,225,907 | 961,907 | 29 | 322,000 | 5,568,293 | 5,246,293 |
| 30 | 119,000 | 755,808 | 644,808 | 30 | 100,000 | 295,319 | 195,319 | 30 | 264,000 | 1,225,907 | 961,907 | 30 | 322,000 | 5,568,293 | 5,246,293 |
| 31 | 119,000 | 755,808 | 644,808 | 31 | 100,000 | 295,319 | 195,319 | 31 | 264,000 | 1,225,907 | 961,907 | 31 | 322,000 | 5,568,293 | 5,246,293 |
| 32 | 119,000 | 755,808 | 644,808 | 32 | 100,000 | 295,319 | 195,319 | 32 | 264,000 | 1,225,907 | 961,907 | 32 | 322,000 | 5,568,293 | 5,246,293 |
| 33 | 119,000 | 755,808 | 644,808 | 33 | 100,000 | 295,319 | 195,319 | 33 | 264,000 | 1,225,907 | 961,907 | 33 | 322,000 | 5,568,293 | 5,246,293 |
| 34 | 119,000 | 755,808 | 644,808 | 34 | 100,000 | 295,319 | 195,319 | 34 | 264,000 | 1,225,907 | 961,907 | 34 | 322,000 | 5,568,293 | 5,246,293 |
| 35 | 119,000 | 755,808 | 644,808 | 35 | 100,000 | 295,319 | 195,319 | 35 | 264,000 | 1,225,907 | 961,907 | 35 | 322,000 | 5,568,293 | 5,246,293 |
| 36 | 119,000 | 755,808 | 644,808 | 36 | 100,000 | 295,319 | 195,319 | 36 | 264,000 | 1,225,907 | 961,907 | 36 | 322,000 | 5,568,293 | 5,246,293 |
| 37 | 119,000 | 755,808 | 644,808 | 37 | 100,000 | 295,319 | 195,319 | 37 | 264,000 | 1,225,907 | 961,907 | 37 | 322,000 | 5,568,293 | 5,246,293 |
| 38 | 119,000 | 755,808 | 644,808 | 38 | 100,000 | 295,319 | 195,319 | 38 | 264,000 | 1,225,907 | 961,907 | 38 | 322,000 | 5,568,293 | 5,246,293 |
| 39 | 119,000 | 755,808 | 644,808 | 39 | 100,000 | 295,319 | 195,319 | 39 | 264,000 | 1,225,907 | 961,907 | 39 | 322,000 | 5,568,293 | 5,246,293 |
| 40 | 119,000 | 755,808 | 644,808 | 40 | 100,000 | 295,319 | 195,319 | 40 | 264,000 | 1,225,907 | 961,907 | 40 | 322,000 | 5,568,293 | 5,246,293 |
| 41 | 119,000 | 755,808 | 644,808 | 41 | 100,000 | 295,319 | 195,319 | 41 | 264,000 | 1,225,907 | 961,907 | 41 | 322,000 | 5,568,293 | 5,246,293 |

Kad Kacha II

| Project Life (year) | | | | 40 | | | | Project Life (year) | | | | 43 | | | |
|-----------------------------|------------|-----------|-------------|------------|------------|---------|-------------|-----------------------------|------------|---------|-------------|------------|------------|---------|-------------|
| Construction Cost (Rs) | | | | 23,955,000 | | | | Construction Cost (Rs) | | | | 14,189,000 | | | |
| Annual Benefit (Rs) | | | | 3,598,464 | | | | Annual Benefit (Rs) | | | | 529,459 | | | |
| IRR (%) | | | | 13.56% | | | | IRR (%) | | | | 0.88% | | | |
| NPV (Rs, discount rate=10%) | | | | 10,539,022 | | | | NPV (Rs, discount rate=10%) | | | | -9,872,716 | | | |
| B/C (Rs, discount rate=10%) | | | | 1.428 | | | | B/C (Rs, discount rate=10%) | | | | 0.374 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 23,955,000 | | -23,955,000 | 1 | 14,189,000 | | -14,189,000 | 1 | 14,189,000 | | -14,189,000 | 1 | 14,189,000 | | -14,189,000 |
| 2 | 321,000 | 3,598,464 | 3,275,464 | 2 | 107,000 | 529,459 | 422,459 | 2 | 107,000 | 529,459 | 422,459 | 2 | 107,000 | 529,459 | 422,459 |
| 3 | 321,000 | 3,598,464 | 3,275,464 | 3 | 107,000 | 529,459 | 422,459 | 3 | 107,000 | 529,459 | 422,459 | 3 | 107,000 | 529,459 | 422,459 |
| 4 | 321,000 | 3,598,464 | 3,275,464 | 4 | 107,000 | 529,459 | 422,459 | 4 | 107,000 | 529,459 | 422,459 | 4 | 107,000 | 529,459 | 422,459 |
| 5 | 321,000 | 3,598,464 | 3,275,464 | 5 | 107,000 | 529,459 | 422,459 | 5 | 107,000 | 529,459 | 422,459 | 5 | 107,000 | 529,459 | 422,459 |
| 6 | 321,000 | 3,598,464 | 3,275,464 | 6 | 107,000 | 529,459 | 422,459 | 6 | 107,000 | 529,459 | 422,459 | 6 | 107,000 | 529,459 | 422,459 |
| 7 | 321,000 | 3,598,464 | 3,275,464 | 7 | 107,000 | 529,459 | 422,459 | 7 | 107,000 | 529,459 | 422,459 | 7 | 107,000 | 529,459 | 422,459 |
| 8 | 321,000 | 3,598,464 | 3,275,464 | 8 | 107,000 | 529,459 | 422,459 | 8 | 107,000 | 529,459 | 422,459 | 8 | 107,000 | 529,459 | 422,459 |
| 9 | 321,000 | 3,598,464 | 3,275,464 | 9 | 107,000 | 529,459 | 422,459 | 9 | 107,000 | 529,459 | 422,459 | 9 | 107,000 | 529,459 | 422,459 |
| 10 | 321,000 | 3,598,464 | 3,275,464 | 10 | 107,000 | 529,459 | 422,459 | 10 | 107,000 | 529,459 | 422,459 | 10 | 107,000 | 529,459 | 422,459 |
| 11 | 321,000 | 3,598,464 | 3,275,464 | 11 | 107,000 | 529,459 | 422,459 | 11 | 107,000 | 529,459 | 422,459 | 11 | 107,000 | 529,459 | 422,459 |
| 12 | 321,000 | 3,598,464 | 3,275,464 | 12 | 107,000 | 529,459 | 422,459 | 12 | 107,000 | 529,459 | 422,459 | 12 | 107,000 | 529,459 | 422,459 |
| 13 | 321,000 | 3,598,464 | 3,275,464 | 13 | 107,000 | 529,459 | 422,459 | 13 | 107,000 | 529,459 | 422,459 | 13 | 107,000 | 529,459 | 422,459 |
| 14 | 321,000 | 3,598,464 | 3,275,464 | 14 | 107,000 | 529,459 | 422,459 | 14 | 107,000 | 529,459 | 422,459 | 14 | 107,000 | 529,459 | 422,459 |
| 15 | 321,000 | 3,598,464 | 3,275,464 | 15 | 107,000 | 529,459 | 422,459 | 15 | 107,000 | 529,459 | 422,459 | 15 | 107,000 | 529,459 | 422,459 |
| 16 | 321,000 | 3,598,464 | 3,275,464 | 16 | 107,000 | 529,459 | 422,459 | 16 | 107,000 | 529,459 | 422,459 | 16 | 107,000 | 529,459 | 422,459 |
| 17 | 321,000 | 3,598,464 | 3,275,464 | 17 | 107,000 | 529,459 | 422,459 | 17 | 107,000 | 529,459 | 422,459 | 17 | 107,000 | 529,459 | 422,459 |
| 18 | 321,000 | 3,598,464 | 3,275,464 | 18 | 107,000 | 529,459 | 422,459 | 18 | 107,000 | 529,459 | 422,459 | 18 | 107,000 | 529,459 | 422,459 |
| 19 | 321,000 | 3,598,464 | 3,275,464 | 19 | 107,000 | 529,459 | 422,459 | 19 | 107,000 | 529,459 | 422,459 | 19 | 107,000 | 529,459 | 422,459 |
| 20 | 321,000 | 3,598,464 | 3,275,464 | 20 | 107,000 | 529,459 | 422,459 | 20 | 107,000 | 529,459 | 422,459 | 20 | 107,000 | 529,459 | 422,459 |
| 21 | 321,000 | 3,598,464 | 3,275,464 | 21 | 107,000 | 529,459 | 422,459 | 21 | 107,000 | 529,459 | 422,459 | 21 | 107,000 | 529,459 | 422,459 |
| 22 | 321,000 | 3,598,464 | 3,275,464 | 22 | 107,000 | 529,459 | 422,459 | 22 | 107,000 | 529,459 | 422,459 | 22 | 107,000 | 529,459 | 422,459 |
| 23 | 321,000 | 3,598,464 | 3,275,464 | 23 | 107,000 | 529,459 | 422,459 | 23 | 107,000 | 529,459 | 422,459 | 23 | 107,000 | 529,459 | 422,459 |
| 24 | 321,000 | 3,598,464 | 3,275,464 | 24 | 107,000 | 529,459 | 422,459 | 24 | 107,000 | 529,459 | 422,459 | 24 | 107,000 | 529,459 | 422,459 |
| 25 | 321,000 | 3,598,464 | 3,275,464 | 25 | 107,000 | 529,459 | 422,459 | 25 | 107,000 | 529,459 | 422,459 | 25 | 107,000 | 529,459 | 422,459 |
| 26 | 321,000 | 3,598,464 | 3,275,464 | 26 | 107,000 | 529,459 | 422,459 | 26 | 107,000 | 529,459 | 422,459 | 26 | 107,000 | 529,459 | 422,459 |
| 27 | 321,000 | 3,598,464 | 3,275,464 | 27 | 107,000 | 529,459 | 422,459 | 27 | 107,000 | 529,459 | 422,459 | 27 | 107,000 | 529,459 | 422,459 |
| 28 | 321,000 | 3,598,464 | 3,275,464 | 28 | 107,000 | 529,459 | 422,459 | 28 | 107,000 | 529,459 | 422,459 | 28 | 107,000 | 529,459 | 422,459 |
| 29 | 321,000 | 3,598,464 | 3,275,464 | 29 | 107,000 | 529,459 | 422,459 | 29 | 107,000 | 529,459 | 422,459 | 29 | 107,000 | 529,459 | 422,459 |
| 30 | 321,000 | 3,598,464 | 3,275,464 | 30 | 107,000 | 529,459 | 422,459 | 30 | 107,000 | 529,459 | 422,459 | 30 | 107,000 | 529,459 | 422,459 |
| 31 | 321,000 | 3,598,464 | 3,275,464 | 31 | 107,000 | 529,459 | 422,459 | 31 | 107,000 | 529,459 | 422,459 | 31 | 107,000 | 529,459 | 422,459 |
| 32 | 321,000 | 3,598,464 | 3,275,464 | 32 | 107,000 | 529,459 | 422,459 | 32 | 107,000 | 529,459 | 422,459 | 32 | 107,000 | 529,459 | 422,459 |
| 33 | 321,000 | 3,598,464 | 3,275,464 | 33 | 107,000 | 529,459 | 422,459 | 33 | 107,000 | 529,459 | 422,459 | 33 | 107,000 | 529,459 | 422,459 |
| 34 | 321,000 | 3,598,464 | 3,275,464 | 34 | 107,000 | 529,459 | 422,459 | 34 | 107,000 | 529,459 | 422,459 | 34 | 107,000 | 529,459 | 422,459 |
| 35 | 321,000 | 3,598,464 | 3,275,464 | 35 | 107,000 | 529,459 | 422,459 | 35 | 107,000 | 529,459 | 422,459 | 35 | 107,000 | 529,459 | 422,459 |
| 36 | 321,000 | 3,598,464 | 3,275,464 | 36 | 107,000 | 529,459 | 422,459 | 36 | 107,000 | 529,459 | 422,459 | 36 | 107,000 | 529,459 | 422,459 |
| 37 | 321,000 | 3,598,464 | 3,275,464 | 37 | 107,000 | 529,459 | 422,459 | 37 | 107,000 | 529,459 | 422,459 | 37 | 107,000 | 529,459 | 422,459 |
| 38 | 321,000 | 3,598,464 | 3,275,464 | 38 | 107,000 | 529,459 | 422,459 | 38 | 107,000 | 529,459 | 422,459 | 38 | 107,000 | 529,459 | 422,459 |
| 39 | 321,000 | 3,598,464 | 3,275,464 | 39 | 107,000 | 529,459 | 422,459 | 39 | 107,000 | 529,459 | 422,459 | 39 | 107,000 | 529,459 | 422,459 |
| 40 | 321,000 | 3,598,464 | 3,275,464 | 40 | 107,000 | 529,459 | 422,459 | 40 | 107,000 | 529,459 | 422,459 | 40 | 107,000 | 529,459 | 422,459 |
| 41 | 321,000 | 3,598,464 | 3,275,464 | 41 | 107,000 | 529,459 | 422,459 | 41 | 107,000 | 529,459 | 422,459 | 41 | 107,000 | 529,459 | 422,459 |

**Table L.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 3: Construction delay for 1 year, 1/2)**

| Scenario | | | | Global Share | | | | Well Deal | | | | Data | | | |
|---|-----------|-----------|------------|---|-----------|---------|------------|--|------------|-----------|-------------|---|------------|-----------|-------------|
| Project Life (year): 40 | | | | Project Life (year): 40 | | | | Project Life (year): 40 | | | | Project Life (year): 40 | | | |
| Construction Cost (Rs): 18,275,000 | | | | Construction Cost (Rs): 5,788,000 | | | | Construction Cost (Rs): 29,542,000 | | | | Construction Cost (Rs): 33,733,000 | | | |
| Annual Benefit (Rs): 4,401,738 | | | | Annual Benefit (Rs): 247,512 | | | | Annual Benefit (Rs): 1,011,923 | | | | Annual Benefit (Rs): 3,249,884 | | | |
| IRR (%): 20.35% | | | | IRR (%): 0.12% | | | | IRR (%): 0.91% | | | | IRR (%): 8.13% | | | |
| NPV (Rs, discount rate=10%): 18,299,345 | | | | NPV (Rs, discount rate=10%): -3,822,391 | | | | NPV (Rs, discount rate=10%): -18,451,458 | | | | NPV (Rs, discount rate=10%): -5,157,107 | | | |
| B/C (Rs, discount rate=10%): 2.058 | | | | B/C (Rs, discount rate=10%): 0.344 | | | | B/C (Rs, discount rate=10%): 0.332 | | | | B/C (Rs, discount rate=10%): 0.838 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 9,837,500 | 0 | -9,837,500 | 1 | 2,824,000 | 0 | -2,824,000 | 1 | 14,771,000 | 0 | -14,771,000 | 1 | 16,858,500 | 0 | -16,858,500 |
| 2 | 9,837,500 | 0 | -9,837,500 | 2 | 2,824,000 | 0 | -2,824,000 | 2 | 14,771,000 | 0 | -14,771,000 | 2 | 16,858,500 | 0 | -16,858,500 |
| 3 | 99,000 | 4,401,738 | 4,332,738 | 3 | 99,000 | 247,512 | 247,512 | 3 | 123,000 | 1,011,923 | 828,923 | 3 | 268,000 | 3,249,884 | 2,981,884 |
| 4 | 99,000 | 4,401,738 | 4,332,738 | 4 | 99,000 | 247,512 | 247,512 | 4 | 123,000 | 1,011,923 | 828,923 | 4 | 268,000 | 3,249,884 | 2,981,884 |
| 5 | 99,000 | 4,401,738 | 4,332,738 | 5 | 99,000 | 247,512 | 247,512 | 5 | 123,000 | 1,011,923 | 828,923 | 5 | 268,000 | 3,249,884 | 2,981,884 |
| 6 | 99,000 | 4,401,738 | 4,332,738 | 6 | 99,000 | 247,512 | 247,512 | 6 | 123,000 | 1,011,923 | 828,923 | 6 | 268,000 | 3,249,884 | 2,981,884 |
| 7 | 99,000 | 4,401,738 | 4,332,738 | 7 | 99,000 | 247,512 | 247,512 | 7 | 123,000 | 1,011,923 | 828,923 | 7 | 268,000 | 3,249,884 | 2,981,884 |
| 8 | 99,000 | 4,401,738 | 4,332,738 | 8 | 99,000 | 247,512 | 247,512 | 8 | 123,000 | 1,011,923 | 828,923 | 8 | 268,000 | 3,249,884 | 2,981,884 |
| 9 | 99,000 | 4,401,738 | 4,332,738 | 9 | 99,000 | 247,512 | 247,512 | 9 | 123,000 | 1,011,923 | 828,923 | 9 | 268,000 | 3,249,884 | 2,981,884 |
| 10 | 99,000 | 4,401,738 | 4,332,738 | 10 | 99,000 | 247,512 | 247,512 | 10 | 123,000 | 1,011,923 | 828,923 | 10 | 268,000 | 3,249,884 | 2,981,884 |
| 11 | 99,000 | 4,401,738 | 4,332,738 | 11 | 99,000 | 247,512 | 247,512 | 11 | 123,000 | 1,011,923 | 828,923 | 11 | 268,000 | 3,249,884 | 2,981,884 |
| 12 | 99,000 | 4,401,738 | 4,332,738 | 12 | 99,000 | 247,512 | 247,512 | 12 | 123,000 | 1,011,923 | 828,923 | 12 | 268,000 | 3,249,884 | 2,981,884 |
| 13 | 99,000 | 4,401,738 | 4,332,738 | 13 | 99,000 | 247,512 | 247,512 | 13 | 123,000 | 1,011,923 | 828,923 | 13 | 268,000 | 3,249,884 | 2,981,884 |
| 14 | 99,000 | 4,401,738 | 4,332,738 | 14 | 99,000 | 247,512 | 247,512 | 14 | 123,000 | 1,011,923 | 828,923 | 14 | 268,000 | 3,249,884 | 2,981,884 |
| 15 | 99,000 | 4,401,738 | 4,332,738 | 15 | 99,000 | 247,512 | 247,512 | 15 | 123,000 | 1,011,923 | 828,923 | 15 | 268,000 | 3,249,884 | 2,981,884 |
| 16 | 99,000 | 4,401,738 | 4,332,738 | 16 | 99,000 | 247,512 | 247,512 | 16 | 123,000 | 1,011,923 | 828,923 | 16 | 268,000 | 3,249,884 | 2,981,884 |
| 17 | 99,000 | 4,401,738 | 4,332,738 | 17 | 99,000 | 247,512 | 247,512 | 17 | 123,000 | 1,011,923 | 828,923 | 17 | 268,000 | 3,249,884 | 2,981,884 |
| 18 | 99,000 | 4,401,738 | 4,332,738 | 18 | 99,000 | 247,512 | 247,512 | 18 | 123,000 | 1,011,923 | 828,923 | 18 | 268,000 | 3,249,884 | 2,981,884 |
| 19 | 99,000 | 4,401,738 | 4,332,738 | 19 | 99,000 | 247,512 | 247,512 | 19 | 123,000 | 1,011,923 | 828,923 | 19 | 268,000 | 3,249,884 | 2,981,884 |
| 20 | 99,000 | 4,401,738 | 4,332,738 | 20 | 99,000 | 247,512 | 247,512 | 20 | 123,000 | 1,011,923 | 828,923 | 20 | 268,000 | 3,249,884 | 2,981,884 |
| 21 | 99,000 | 4,401,738 | 4,332,738 | 21 | 99,000 | 247,512 | 247,512 | 21 | 123,000 | 1,011,923 | 828,923 | 21 | 268,000 | 3,249,884 | 2,981,884 |
| 22 | 99,000 | 4,401,738 | 4,332,738 | 22 | 99,000 | 247,512 | 247,512 | 22 | 123,000 | 1,011,923 | 828,923 | 22 | 268,000 | 3,249,884 | 2,981,884 |
| 23 | 99,000 | 4,401,738 | 4,332,738 | 23 | 99,000 | 247,512 | 247,512 | 23 | 123,000 | 1,011,923 | 828,923 | 23 | 268,000 | 3,249,884 | 2,981,884 |
| 24 | 99,000 | 4,401,738 | 4,332,738 | 24 | 99,000 | 247,512 | 247,512 | 24 | 123,000 | 1,011,923 | 828,923 | 24 | 268,000 | 3,249,884 | 2,981,884 |
| 25 | 99,000 | 4,401,738 | 4,332,738 | 25 | 99,000 | 247,512 | 247,512 | 25 | 123,000 | 1,011,923 | 828,923 | 25 | 268,000 | 3,249,884 | 2,981,884 |
| 26 | 99,000 | 4,401,738 | 4,332,738 | 26 | 99,000 | 247,512 | 247,512 | 26 | 123,000 | 1,011,923 | 828,923 | 26 | 268,000 | 3,249,884 | 2,981,884 |
| 27 | 99,000 | 4,401,738 | 4,332,738 | 27 | 99,000 | 247,512 | 247,512 | 27 | 123,000 | 1,011,923 | 828,923 | 27 | 268,000 | 3,249,884 | 2,981,884 |
| 28 | 99,000 | 4,401,738 | 4,332,738 | 28 | 99,000 | 247,512 | 247,512 | 28 | 123,000 | 1,011,923 | 828,923 | 28 | 268,000 | 3,249,884 | 2,981,884 |
| 29 | 99,000 | 4,401,738 | 4,332,738 | 29 | 99,000 | 247,512 | 247,512 | 29 | 123,000 | 1,011,923 | 828,923 | 29 | 268,000 | 3,249,884 | 2,981,884 |
| 30 | 99,000 | 4,401,738 | 4,332,738 | 30 | 99,000 | 247,512 | 247,512 | 30 | 123,000 | 1,011,923 | 828,923 | 30 | 268,000 | 3,249,884 | 2,981,884 |
| 31 | 99,000 | 4,401,738 | 4,332,738 | 31 | 99,000 | 247,512 | 247,512 | 31 | 123,000 | 1,011,923 | 828,923 | 31 | 268,000 | 3,249,884 | 2,981,884 |
| 32 | 99,000 | 4,401,738 | 4,332,738 | 32 | 99,000 | 247,512 | 247,512 | 32 | 123,000 | 1,011,923 | 828,923 | 32 | 268,000 | 3,249,884 | 2,981,884 |
| 33 | 99,000 | 4,401,738 | 4,332,738 | 33 | 99,000 | 247,512 | 247,512 | 33 | 123,000 | 1,011,923 | 828,923 | 33 | 268,000 | 3,249,884 | 2,981,884 |
| 34 | 99,000 | 4,401,738 | 4,332,738 | 34 | 99,000 | 247,512 | 247,512 | 34 | 123,000 | 1,011,923 | 828,923 | 34 | 268,000 | 3,249,884 | 2,981,884 |
| 35 | 99,000 | 4,401,738 | 4,332,738 | 35 | 99,000 | 247,512 | 247,512 | 35 | 123,000 | 1,011,923 | 828,923 | 35 | 268,000 | 3,249,884 | 2,981,884 |
| 36 | 99,000 | 4,401,738 | 4,332,738 | 36 | 99,000 | 247,512 | 247,512 | 36 | 123,000 | 1,011,923 | 828,923 | 36 | 268,000 | 3,249,884 | 2,981,884 |
| 37 | 99,000 | 4,401,738 | 4,332,738 | 37 | 99,000 | 247,512 | 247,512 | 37 | 123,000 | 1,011,923 | 828,923 | 37 | 268,000 | 3,249,884 | 2,981,884 |
| 38 | 99,000 | 4,401,738 | 4,332,738 | 38 | 99,000 | 247,512 | 247,512 | 38 | 123,000 | 1,011,923 | 828,923 | 38 | 268,000 | 3,249,884 | 2,981,884 |
| 39 | 99,000 | 4,401,738 | 4,332,738 | 39 | 99,000 | 247,512 | 247,512 | 39 | 123,000 | 1,011,923 | 828,923 | 39 | 268,000 | 3,249,884 | 2,981,884 |
| 40 | 99,000 | 4,401,738 | 4,332,738 | 40 | 99,000 | 247,512 | 247,512 | 40 | 123,000 | 1,011,923 | 828,923 | 40 | 268,000 | 3,249,884 | 2,981,884 |
| 41 | 99,000 | 4,401,738 | 4,332,738 | 41 | 99,000 | 247,512 | 247,512 | 41 | 123,000 | 1,011,923 | 828,923 | 41 | 268,000 | 3,249,884 | 2,981,884 |
| 42 | 99,000 | 4,401,738 | 4,332,738 | 42 | 99,000 | 247,512 | 247,512 | 42 | 123,000 | 1,011,923 | 828,923 | 42 | 268,000 | 3,249,884 | 2,981,884 |

| Murghl Kotat | | | | Kach | | | | Jode | | | | Sanzal | | | |
|---|------------|-----------|-------------|---|------------|-----------|-------------|-------------------------------------|------------|-----------|-------------|---|------------|-----------|-------------|
| Project Life (year) 35 | | | | Project Life (year) 20 | | | | Project Life (year) 35 | | | | Project Life (year) 25 | | | |
| Construction Cost (Rs) 47,648,000 | | | | Construction Cost (Rs) 83,918,000 | | | | Construction Cost (Rs) 25,088,000 | | | | Construction Cost (Rs) 25,042,000 | | | |
| Annual Benefit (Rs) 2,981,533 | | | | Annual Benefit (Rs) 7,755,924 | | | | Annual Benefit (Rs) 3,041,845 | | | | Annual Benefit (Rs) 1,197,782 | | | |
| IRR (%) 4.66% | | | | IRR (%) 5.90% | | | | IRR (%) 10.22% | | | | IRR (%) 0.29% | | | |
| NPV (Rs, discount rate=10%) -18,224,202 | | | | NPV (Rs, discount rate=10%) -20,231,384 | | | | NPV (Rs, discount rate=10%) 442,430 | | | | NPV (Rs, discount rate=10%) -13,923,042 | | | |
| B/C (Rs, discount rate=10%) 0.553 | | | | B/C (Rs, discount rate=10%) 0.730 | | | | B/C (Rs, discount rate=10%) 1.618 | | | | B/C (Rs, discount rate=10%) 0.392 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 23,832,500 | 0 | -23,832,500 | 1 | 41,057,000 | 0 | -41,057,000 | 1 | 12,544,000 | 0 | -12,544,000 | 1 | 12,521,000 | 0 | -12,521,000 |
| 2 | 23,832,500 | 0 | -23,832,500 | 2 | 41,057,000 | 0 | -41,057,000 | 2 | 12,544,000 | 0 | -12,544,000 | 2 | 12,521,000 | 0 | -12,521,000 |
| 3 | 204,000 | 2,981,533 | 2,777,533 | 3 | 285,000 | 7,755,924 | 27,000 | 3 | 255,000 | 3,041,845 | 2,786,845 | 3 | 157,000 | 1,197,782 | 1,040,782 |
| 4 | 204,000 | 2,981,533 | 2,777,533 | 4 | 285,000 | 7,755,924 | 27,000 | 4 | 255,000 | 3,041,845 | 2,786,845 | 4 | 157,000 | 1,197,782 | 1,040,782 |
| 5 | 204,000 | 2,981,533 | 2,777,533 | 5 | 285,000 | 7,755,924 | 27,000 | 5 | 255,000 | 3,041,845 | 2,786,845 | 5 | 157,000 | 1,197,782 | 1,040,782 |
| 6 | 204,000 | 2,981,533 | 2,777,533 | 6 | 285,000 | 7,755,924 | 27,000 | 6 | 255,000 | 3,041,845 | 2,786,845 | 6 | 157,000 | 1,197,782 | 1,040,782 |
| 7 | 204,000 | 2,981,533 | 2,777,533 | 7 | 285,000 | 7,755,924 | 27,000 | 7 | 255,000 | 3,041,845 | 2,786,845 | 7 | 157,000 | 1,197,782 | 1,040,782 |
| 8 | 204,000 | 2,981,533 | 2,777,533 | 8 | 285,000 | 7,755,924 | 27,000 | 8 | 255,000 | 3,041,845 | 2,786,845 | 8 | 157,000 | 1,197,782 | 1,040,782 |
| 9 | 204,000 | 2,981,533 | 2,777,533 | 9 | 285,000 | 7,755,924 | 27,000 | 9 | 255,000 | 3,041,845 | 2,786,845 | 9 | 157,000 | 1,197,782 | 1,040,782 |
| 10 | 204,000 | 2,981,533 | 2,777,533 | 10 | 285,000 | 7,755,924 | 27,000 | 10 | 255,000 | 3,041,845 | 2,786,845 | 10 | 157,000 | 1,197,782 | 1,040,782 |
| 11 | 204,000 | 2,981,533 | 2,777,533 | 11 | 285,000 | 7,755,924 | 27,000 | 11 | 255,000 | 3,041,845 | 2,786,845 | 11 | 157,000 | 1,197,782 | 1,040,782 |
| 12 | 204,000 | 2,981,533 | 2,777,533 | 12 | 285,000 | 7,755,924 | 27,000 | 12 | 255,000 | 3,041,845 | 2,786,845 | 12 | 157,000 | 1,197,782 | 1,040,782 |
| 13 | 204,000 | 2,981,533 | 2,777,533 | 13 | 285,000 | 7,755,924 | 27,000 | 13 | 255,000 | 3,041,845 | 2,786,845 | 13 | 157,000 | 1,197,782 | 1,040,782 |
| 14 | 204,000 | 2,981,533 | 2,777,533 | 14 | 285,000 | 7,755,924 | 27,000 | 14 | 255,000 | 3,041,845 | 2,786,845 | 14 | 157,000 | 1,197,782 | 1,040,782 |
| 15 | 204,000 | 2,981,533 | 2,777,533 | 15 | 285,000 | 7,755,924 | 27,000 | 15 | 255,000 | 3,041,845 | 2,786,845 | 15 | 157,000 | 1,197,782 | 1,040,782 |
| 16 | 204,000 | 2,981,533 | 2,777,533 | 16 | 285,000 | 7,755,924 | 27,000 | 16 | 255,000 | 3,041,845 | 2,786,845 | 16 | 157,000 | 1,197,782 | 1,040,782 |
| 17 | 204,000 | 2,981,533 | 2,777,533 | 17 | 285,000 | 7,755,924 | 27,000 | 17 | 255,000 | 3,041,845 | 2,786,845 | 17 | 157,000 | 1,197,782 | 1,040,782 |
| 18 | 204,000 | 2,981,533 | 2,777,533 | 18 | 285,000 | 7,755,924 | 27,000 | 18 | 255,000 | 3,041,845 | 2,786,845 | 18 | 157,000 | 1,197,782 | 1,040,782 |
| 19 | 204,000 | 2,981,533 | 2,777,533 | 19 | 285,000 | 7,755,924 | 27,000 | 19 | 255,000 | 3,041,845 | 2,786,845 | 19 | 157,000 | 1,197,782 | 1,040,782 |
| 20 | 204,000 | 2,981,533 | 2,777,533 | 20 | 285,000 | 7,755,924 | 27,000 | 20 | 255,000 | 3,041,845 | 2,786,845 | 20 | 157,000 | 1,197,782 | 1,040,782 |
| 21 | 204,000 | 2,981,533 | 2,777,533 | 21 | 285,000 | 7,755,924 | 27,000 | 21 | 255,000 | 3,041,845 | 2,786,845 | 21 | 157,000 | 1,197,782 | 1,040,782 |
| 22 | 204,000 | 2,981,533 | 2,777,533 | 22 | 285,000 | 7,755,924 | 27,000 | 22 | 255,000 | 3,041,845 | 2,786,845 | 22 | 157,000 | 1,197,782 | 1,040,782 |
| 23 | 204,000 | 2,981,533 | 2,777,533 | | | | | 23 | 255,000 | 3,041,845 | 2,786,845 | 23 | 157,000 | 1,197,782 | 1,040,782 |
| 24 | 204,000 | 2,981,533 | 2,777,533 | | | | | 24 | 255,000 | 3,041,845 | 2,786,845 | 24 | 157,000 | 1,197,782 | 1,040,782 |
| 25 | 204,000 | 2,981,533 | 2,777,533 | | | | | 25 | 255,000 | 3,041,845 | 2,786,845 | 25 | 157,000 | 1,197,782 | 1,040,782 |
| 26 | 204,000 | 2,981,533 | 2,777,533 | | | | | 26 | 255,000 | 3,041,845 | 2,786,845 | 26 | 157,000 | 1,197,782 | 1,040,782 |
| 27 | 204,000 | 2,981,533 | 2,777,533 | | | | | 27 | 255,000 | 3,041,845 | 2,786,845 | 27 | 157,000 | 1,197,782 | 1,040,782 |
| 28 | 204,000 | 2,981,533 | 2,777,533 | | | | | 28 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 29 | 204,000 | 2,981,533 | 2,777,533 | | | | | 29 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 30 | 204,000 | 2,981,533 | 2,777,533 | | | | | 30 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 31 | 204,000 | 2,981,533 | 2,777,533 | | | | | 31 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 32 | 204,000 | 2,981,533 | 2,777,533 | | | | | 32 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 33 | 204,000 | 2,981,533 | 2,777,533 | | | | | 33 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 34 | 204,000 | 2,981,533 | 2,777,533 | | | | | 34 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 35 | 204,000 | 2,981,533 | 2,777,533 | | | | | 35 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 36 | 204,000 | 2,981,533 | 2,777,533 | | | | | 36 | 255,000 | 3,041,845 | 2,786,845 | | | | |
| 37 | 204,000 | 2,981,533 | 2,777,533 | | | | | 37 | 255,000 | 3,041,845 | 2,786,845 | | | | |

**Table L.2.8.1 Cash Flow and Economic Evaluation in Sensitivity Analysis
(Case 3: Construction delay for 1 year, 2/2)**

| Arambi (Ghatone) | | | | Arambi (Samak) | | | | Sakhol | | | | Mangl | | | |
|-----------------------------|-----------|---------|------------|----------------|-----------|---------|------------|------------|------------|-----------|-------------|-------------|------------|-----------|-------------|
| Project Life (year) | | | | 40 | | | | 40 | | | | 40 | | | |
| Construction Cost (Rs) | | | | 12,205,000 | | | | 10,295,000 | | | | 25,239,000 | | | |
| Annual Benefit (Rs) | | | | 957,260 | | | | 369,149 | | | | 1,532,383 | | | |
| IRR (%) | | | | 0.03% | | | | 0.21% | | | | 3.84% | | | |
| NPV (Rs, discount rate=10%) | | | | -3,818,418 | | | | -6,758,459 | | | | -11,450,716 | | | |
| B/C (Rs, discount rate=10%) | | | | 0.670 | | | | 0.308 | | | | 0.515 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 8,102,500 | 0 | -0.102,500 | 1 | 5,147,500 | 0 | -0.147,500 | 1 | 12,619,500 | 0 | -12,619,500 | 1 | 20,855,000 | 0 | -20,855,000 |
| 2 | 8,102,500 | 0 | -0.102,500 | 2 | 5,147,500 | 0 | -0.147,500 | 2 | 12,619,500 | 0 | -12,619,500 | 2 | 20,855,000 | 0 | -20,855,000 |
| 3 | 119,000 | 957,260 | 8.048,760 | 3 | 100,000 | 369,149 | 3.691,49 | 3 | 264,000 | 1,532,383 | 5.766,915 | 3 | 322,000 | 6,980,368 | 6,838,368 |
| 4 | 119,000 | 957,260 | 8.048,760 | 4 | 100,000 | 369,149 | 3.691,49 | 4 | 264,000 | 1,532,383 | 5.766,915 | 4 | 322,000 | 6,980,368 | 6,838,368 |
| 5 | 119,000 | 957,260 | 8.048,760 | 5 | 100,000 | 369,149 | 3.691,49 | 5 | 264,000 | 1,532,383 | 5.766,915 | 5 | 322,000 | 6,980,368 | 6,838,368 |
| 6 | 119,000 | 957,260 | 8.048,760 | 6 | 100,000 | 369,149 | 3.691,49 | 6 | 264,000 | 1,532,383 | 5.766,915 | 6 | 322,000 | 6,980,368 | 6,838,368 |
| 7 | 119,000 | 957,260 | 8.048,760 | 7 | 100,000 | 369,149 | 3.691,49 | 7 | 264,000 | 1,532,383 | 5.766,915 | 7 | 322,000 | 6,980,368 | 6,838,368 |
| 8 | 119,000 | 957,260 | 8.048,760 | 8 | 100,000 | 369,149 | 3.691,49 | 8 | 264,000 | 1,532,383 | 5.766,915 | 8 | 322,000 | 6,980,368 | 6,838,368 |
| 9 | 119,000 | 957,260 | 8.048,760 | 9 | 100,000 | 369,149 | 3.691,49 | 9 | 264,000 | 1,532,383 | 5.766,915 | 9 | 322,000 | 6,980,368 | 6,838,368 |
| 10 | 119,000 | 957,260 | 8.048,760 | 10 | 100,000 | 369,149 | 3.691,49 | 10 | 264,000 | 1,532,383 | 5.766,915 | 10 | 322,000 | 6,980,368 | 6,838,368 |
| 11 | 119,000 | 957,260 | 8.048,760 | 11 | 100,000 | 369,149 | 3.691,49 | 11 | 264,000 | 1,532,383 | 5.766,915 | 11 | 322,000 | 6,980,368 | 6,838,368 |
| 12 | 119,000 | 957,260 | 8.048,760 | 12 | 100,000 | 369,149 | 3.691,49 | 12 | 264,000 | 1,532,383 | 5.766,915 | 12 | 322,000 | 6,980,368 | 6,838,368 |
| 13 | 119,000 | 957,260 | 8.048,760 | 13 | 100,000 | 369,149 | 3.691,49 | 13 | 264,000 | 1,532,383 | 5.766,915 | 13 | 322,000 | 6,980,368 | 6,838,368 |
| 14 | 119,000 | 957,260 | 8.048,760 | 14 | 100,000 | 369,149 | 3.691,49 | 14 | 264,000 | 1,532,383 | 5.766,915 | 14 | 322,000 | 6,980,368 | 6,838,368 |
| 15 | 119,000 | 957,260 | 8.048,760 | 15 | 100,000 | 369,149 | 3.691,49 | 15 | 264,000 | 1,532,383 | 5.766,915 | 15 | 322,000 | 6,980,368 | 6,838,368 |
| 16 | 119,000 | 957,260 | 8.048,760 | 16 | 100,000 | 369,149 | 3.691,49 | 16 | 264,000 | 1,532,383 | 5.766,915 | 16 | 322,000 | 6,980,368 | 6,838,368 |
| 17 | 119,000 | 957,260 | 8.048,760 | 17 | 100,000 | 369,149 | 3.691,49 | 17 | 264,000 | 1,532,383 | 5.766,915 | 17 | 322,000 | 6,980,368 | 6,838,368 |
| 18 | 119,000 | 957,260 | 8.048,760 | 18 | 100,000 | 369,149 | 3.691,49 | 18 | 264,000 | 1,532,383 | 5.766,915 | 18 | 322,000 | 6,980,368 | 6,838,368 |
| 19 | 119,000 | 957,260 | 8.048,760 | 19 | 100,000 | 369,149 | 3.691,49 | 19 | 264,000 | 1,532,383 | 5.766,915 | 19 | 322,000 | 6,980,368 | 6,838,368 |
| 20 | 119,000 | 957,260 | 8.048,760 | 20 | 100,000 | 369,149 | 3.691,49 | 20 | 264,000 | 1,532,383 | 5.766,915 | 20 | 322,000 | 6,980,368 | 6,838,368 |
| 21 | 119,000 | 957,260 | 8.048,760 | 21 | 100,000 | 369,149 | 3.691,49 | 21 | 264,000 | 1,532,383 | 5.766,915 | 21 | 322,000 | 6,980,368 | 6,838,368 |
| 22 | 119,000 | 957,260 | 8.048,760 | 22 | 100,000 | 369,149 | 3.691,49 | 22 | 264,000 | 1,532,383 | 5.766,915 | 22 | 322,000 | 6,980,368 | 6,838,368 |
| 23 | 119,000 | 957,260 | 8.048,760 | 23 | 100,000 | 369,149 | 3.691,49 | 23 | 264,000 | 1,532,383 | 5.766,915 | 23 | 322,000 | 6,980,368 | 6,838,368 |
| 24 | 119,000 | 957,260 | 8.048,760 | 24 | 100,000 | 369,149 | 3.691,49 | 24 | 264,000 | 1,532,383 | 5.766,915 | 24 | 322,000 | 6,980,368 | 6,838,368 |
| 25 | 119,000 | 957,260 | 8.048,760 | 25 | 100,000 | 369,149 | 3.691,49 | 25 | 264,000 | 1,532,383 | 5.766,915 | 25 | 322,000 | 6,980,368 | 6,838,368 |
| 26 | 119,000 | 957,260 | 8.048,760 | 26 | 100,000 | 369,149 | 3.691,49 | 26 | 264,000 | 1,532,383 | 5.766,915 | 26 | 322,000 | 6,980,368 | 6,838,368 |
| 27 | 119,000 | 957,260 | 8.048,760 | 27 | 100,000 | 369,149 | 3.691,49 | 27 | 264,000 | 1,532,383 | 5.766,915 | 27 | 322,000 | 6,980,368 | 6,838,368 |
| 28 | 119,000 | 957,260 | 8.048,760 | 28 | 100,000 | 369,149 | 3.691,49 | 28 | 264,000 | 1,532,383 | 5.766,915 | 28 | 322,000 | 6,980,368 | 6,838,368 |
| 29 | 119,000 | 957,260 | 8.048,760 | 29 | 100,000 | 369,149 | 3.691,49 | 29 | 264,000 | 1,532,383 | 5.766,915 | 29 | 322,000 | 6,980,368 | 6,838,368 |
| 30 | 119,000 | 957,260 | 8.048,760 | 30 | 100,000 | 369,149 | 3.691,49 | 30 | 264,000 | 1,532,383 | 5.766,915 | 30 | 322,000 | 6,980,368 | 6,838,368 |
| 31 | 119,000 | 957,260 | 8.048,760 | 31 | 100,000 | 369,149 | 3.691,49 | 31 | 264,000 | 1,532,383 | 5.766,915 | 31 | 322,000 | 6,980,368 | 6,838,368 |
| 32 | 119,000 | 957,260 | 8.048,760 | 32 | 100,000 | 369,149 | 3.691,49 | 32 | 264,000 | 1,532,383 | 5.766,915 | 32 | 322,000 | 6,980,368 | 6,838,368 |
| 33 | 119,000 | 957,260 | 8.048,760 | 33 | 100,000 | 369,149 | 3.691,49 | 33 | 264,000 | 1,532,383 | 5.766,915 | 33 | 322,000 | 6,980,368 | 6,838,368 |
| 34 | 119,000 | 957,260 | 8.048,760 | 34 | 100,000 | 369,149 | 3.691,49 | 34 | 264,000 | 1,532,383 | 5.766,915 | 34 | 322,000 | 6,980,368 | 6,838,368 |
| 35 | 119,000 | 957,260 | 8.048,760 | 35 | 100,000 | 369,149 | 3.691,49 | 35 | 264,000 | 1,532,383 | 5.766,915 | 35 | 322,000 | 6,980,368 | 6,838,368 |
| 36 | 119,000 | 957,260 | 8.048,760 | 36 | 100,000 | 369,149 | 3.691,49 | 36 | 264,000 | 1,532,383 | 5.766,915 | 36 | 322,000 | 6,980,368 | 6,838,368 |
| 37 | 119,000 | 957,260 | 8.048,760 | 37 | 100,000 | 369,149 | 3.691,49 | 37 | 264,000 | 1,532,383 | 5.766,915 | 37 | 322,000 | 6,980,368 | 6,838,368 |
| 38 | 119,000 | 957,260 | 8.048,760 | 38 | 100,000 | 369,149 | 3.691,49 | 38 | 264,000 | 1,532,383 | 5.766,915 | 38 | 322,000 | 6,980,368 | 6,838,368 |
| 39 | 119,000 | 957,260 | 8.048,760 | 39 | 100,000 | 369,149 | 3.691,49 | 39 | 264,000 | 1,532,383 | 5.766,915 | 39 | 322,000 | 6,980,368 | 6,838,368 |
| 40 | 119,000 | 957,260 | 8.048,760 | 40 | 100,000 | 369,149 | 3.691,49 | 40 | 264,000 | 1,532,383 | 5.766,915 | 40 | 322,000 | 6,980,368 | 6,838,368 |
| 41 | 119,000 | 957,260 | 8.048,760 | 41 | 100,000 | 369,149 | 3.691,49 | 41 | 264,000 | 1,532,383 | 5.766,915 | 41 | 322,000 | 6,980,368 | 6,838,368 |
| 42 | 119,000 | 957,260 | 8.048,760 | 42 | 100,000 | 369,149 | 3.691,49 | 42 | 264,000 | 1,532,383 | 5.766,915 | 42 | 322,000 | 6,980,368 | 6,838,368 |

Kad Koche #

Isakoo

| Project Life (year) | | | | 40 | | | | 40 | | | |
|-----------------------------|------------|-----------|-------------|------------|-----------|---------|------------|------------|------------|-----------|-------------|
| Construction Cost (Rs) | | | | 23,855,000 | | | | 14,169,000 | | | |
| Annual Benefit (Rs) | | | | 4,495,579 | | | | 661,824 | | | |
| IRR (%) | | | | 16.69% | | | | 2.32% | | | |
| NPV (Rs, discount rate=10%) | | | | 12,550,970 | | | | -7,028,737 | | | |
| B/C (Rs, discount rate=10%) | | | | 1.554 | | | | 0.406 | | | |
| Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C | Year | Cost | Benefit | B/C |
| 1 | 11,977,500 | 0 | -11,977,500 | 1 | 7,094,500 | 0 | -7,094,500 | 1 | 11,977,500 | 0 | -11,977,500 |
| 2 | 11,977,500 | 0 | -11,977,500 | 2 | 7,094,500 | 0 | -7,094,500 | 2 | 11,977,500 | 0 | -11,977,500 |
| 3 | 321,000 | 4,495,579 | 14.004,079 | 3 | 107,000 | 661,824 | 6.187,824 | 3 | 321,000 | 4,495,579 | 14.004,079 |
| 4 | 321,000 | 4,495,579 | 14.004,079 | 4 | 107,000 | 661,824 | 6.187,824 | 4 | 321,000 | 4,495,579 | 14.004,079 |
| 5 | 321,000 | 4,495,579 | 14.004,079 | 5 | 107,000 | 661,824 | 6.187,824 | 5 | 321,000 | 4,495,579 | 14.004,079 |
| 6 | 321,000 | 4,495,579 | 14.004,079 | 6 | 107,000 | 661,824 | 6.187,824 | 6 | 321,000 | 4,495,579 | 14.004,079 |
| 7 | 321,000 | 4,495,579 | 14.004,079 | 7 | 107,000 | 661,824 | 6.187,824 | 7 | 321,000 | 4,495,579 | 14.004,079 |
| 8 | 321,000 | 4,495,579 | 14.004,079 | 8 | 107,000 | 661,824 | 6.187,824 | 8 | 321,000 | 4,495,579 | 14.004,079 |
| 9 | 321,000 | 4,495,579 | 14.004,079 | 9 | 107,000 | 661,824 | 6.187,824 | 9 | 321,000 | 4,495,579 | 14.004,079 |
| 10 | 321,000 | 4,495,579 | 14.004,079 | 10 | 107,000 | 661,824 | 6.187,824 | 10 | 321,000 | 4,495,579 | 14.004,079 |
| 11 | 321,000 | 4,495,579 | 14.004,079 | 11 | 107,000 | 661,824 | 6.187,824 | 11 | 321,000 | 4,495,579 | 14.004,079 |
| 12 | 321,000 | 4,495,579 | 14.004,079 | 12 | 107,000 | 661,824 | 6.187,824 | 12 | 321,000 | 4,495,579 | 14.004,079 |
| 13 | 321,000 | 4,495,579 | 14.004,079 | 13 | 107,000 | 661,824 | 6.187,824 | 13 | 321,000 | 4,495,579 | 14.004,079 |
| 14 | 321,000 | 4,495,579 | 14.004,079 | 14 | 107,000 | 661,824 | 6.187,824 | 14 | 321,000 | 4,495,579 | 14.004,079 |

Table L.3.1 Financial Analysis on Typical Farmers

| | Unit Value (Rs./ha) | With Project Cropped Area (ha) | Value (Rs) | Without Project Cropped Area (ha) | Value (Rs) |
|---|------------------------|--------------------------------------|----------------|---|----------------|
| Case-1: Fruit Producer in Small Farm | | | | | |
| Income | | | 237,830 | | 186,373 |
| Agricultural Income | | 2.00 | 208,830 | 1.50 | 157,373 |
| Cereals | 4,930 | 0.20 | 986 | 0.15 | 740 |
| Fruits | 131,740 | 1.40 | 184,436 | 1.05 | 138,327 |
| Other Crops | 51,020 | 0.40 | 20,408 | 0.30 | 15,306 |
| Livestock and Forestry | | | 3,000 | | 3,000 |
| Non-Agricultural Income | | | 29,000 | | 29,000 |
| Expenditure | | | 45,000 | | 45,000 |
| Net Income | | | 192,830 | | 141,373 |
| Increment of Net Income | | | 51,458 | | |
| Case-2: Cereal Producer in Medium Farm | | | | | |
| Income | | | 284,320 | | 250,990 |
| Agricultural Income | | 6.00 | 148,320 | 4.50 | 114,990 |
| Cereals | 4,930 | 4.80 | 23,664 | 3.60 | 17,748 |
| Fruits | 131,740 | 0.60 | 79,044 | 0.45 | 59,283 |
| Other Crops | 51,020 | 0.60 | 30,612 | 0.45 | 22,959 |
| Livestock and Forestry | | | 15,000 | | 15,000 |
| Non-Agricultural Income | | | 136,000 | | 136,000 |
| Expenditure | | | 210,000 | | 210,000 |
| Net Income | | | 74,320 | | 40,990 |
| Increment of Net Income | | | 33,330 | | |
| Case-3a: Cereal Producer in Small Farm | | | | | |
| Income | | | 60,296 | | 53,222 |
| Agricultural Income | | 2.00 | 31,296 | 1.50 | 24,222 |
| Cereals | 4,930 | 1.60 | 7,888 | 1.20 | 5,916 |
| Fruits | 131,740 | 0.00 | 0 | 0.00 | 0 |
| Other Crops | 51,020 | 0.40 | 20,408 | 0.30 | 15,306 |
| Livestock and Forestry | | | 3,000 | | 3,000 |
| Non-Agricultural Income | | | 29,000 | | 29,000 |
| Expenditure | | | 45,000 | | 45,000 |
| Net Income | | | 15,296 | | 8,222 |
| Increment of Net Income | | | 7,074 | | |
| Case-3b: Cereal Producer to Vegetable Producer in Small Farm | | | | | |
| Income | | | 106,386 | | 53,222 |
| Agricultural Income | | 2.00 | 77,386 | 1.50 | 24,222 |
| Cereals | 4,930 | 0.60 | 2,958 | 1.20 | 5,916 |
| Fruits | 131,740 | 0.00 | 0 | 0.00 | 0 |
| Other Crops | 51,020 | 1.40 | 71,428 | 0.30 | 15,306 |
| Livestock and Forestry | | | 3,000 | | 3,000 |
| Non-Agricultural Income | | | 29,000 | | 29,000 |
| Expenditure | | | 45,000 | | 45,000 |
| Net Income | | | 61,386 | | 8,222 |
| Increment of Net Income | | | 53,164 | | |
| Case-3c: Cereal Producer to Fruit Producer in Small Farm | | | | | |
| Income | | | 203,250 | | 53,222 |
| Agricultural Income | | 2.00 | 174,250 | 1.50 | 24,222 |
| Cereals | 4,930 | 0.60 | 2,958 | 1.20 | 5,916 |
| Fruits | 131,740 | 1.20 | 158,088 | 0.00 | 0 |
| Other Crops | 51,020 | 0.20 | 10,204 | 0.30 | 15,306 |
| Livestock and Forestry | | | 3,000 | | 3,000 |
| Non-Agricultural Income | | | 29,000 | | 29,000 |
| Expenditure | | | 45,000 | | 45,000 |
| Net Income | | | 158,250 | | 8,222 |
| Increment of Net Income | | | 150,028 | | |