cross-checked with the bank officials, VLWs, Veterinary doctors and the Secretaries of Milk Producers Cooperative Societies (MPCS). All the milk animals supplied to the beneficiaries were buffaloes; majority of them were of local-breed purchased within the district. Majority of the beneficiaries, especially all the agricultural labourers, did not prefer to purchase cross-bred animals owing to the following reasons.

a. The price of the cross-bred animal is very high i.e. the loan amount is not sufficient enough to purchase one such animal.

b. Even if it is purchased, there is a high rate of risk associated with it. That is, the maintenance becomes difficult since majority of them are not having proper cattle shed and the fodder supply is also not assured.

c. The cross-bred animals require more medical attention than the local breeds. For this the service of veterinary centers and dispensaries is a must. But the veterinary services are not evenly distributed to all the areas.

d. Though the animals are insured against the risk at the time of supplying it to the beneficiaries, majority of the agricultural labourers, small and marginal farmers are not aware. The enquiry with
the VLWs and other officials shows that they themselves are not familiar with the cattle insurance and the insurance company officials are also not canvassing in the rural areas.

All the above factors kept away the agriculture labourers from purchasing of cross-bred animals.

The Buffaloes in the study area are capable of giving seven to eight lactations. Therefore, buffaloes supplied in the study area, on an average, were still left with a productive period of about six more lactations, (with having completed two lactations at the time of purchase by the beneficiaries). The number of milk days (Milk period/lactation) varies between 245 days and 270 days depending upon the nourishment and breed.

Costs

The costs associated with maintaining the milk cattle can be classified into four broad categories, namely:

i) Out-of-pocket expenses incurred on purchased items like concentrates, fodder (both green and dry), and hired labourers;
loan with the income from milk production the period of loan has been tied at 4-5 years (2-3 lactations). This instruction is given by NABARD to the cooperative banks and commercial banks, and it also advised the commercial banks to sanction loans only to those who are becoming members of the MPCSs to facilitate the recovery of loans. And the secretaries of MPCSs are in turn asked by the banks to deduct the loan amount from the income the beneficiaries earned by the sale of milk in the following way:

To be repaid in two lactation as per schedule with a dry period of 4 months together with interest commencing from:

1. I to IV months Rs. 120 per month
2. V to VII months Rs., 100 per month
3. VIII to IX months Rs. 80 per month
4. X month Rs. 60.

Thus, it comes to Rs. 1000, i.e. per lactation the amount to be repaid is Rs. 1000. After deducting Rs. 2000 during two lactation periods the remaining amount, if any, will be deducted during the third lactation. However, in practice, this was not followed. In fact there was a complaint that in some cases the secretaries of the MPCSs, on the advice of the
commercial banks, were deducting higher amount per month, recovering the whole amount within a period of one year, thus taking away the entire income from sale of milk of the beneficiary or forcing him to repay the loan from his other sources of income or from other borrowings. Leaving aside the above cited cases for the convenience of the analysis, the following loan repayment pattern has been assumed.

In the present analysis, the interest rate has been taken as the cost of capital. The loan instalments can be taken as a part of the cost of capital if the initial investment is taken as zero. But in the present analysis, considering the convenience in calculating the measures of investment worth, instead of allowing for depreciation on the animal every year, the initial purchase price has been considered as the investment, and the resale value at the end of the eighth lactation (scrap value) has been taken as an income.

The cost incurred by the beneficiaries in maintaining the buffaloes during different lactations has been calculated using the above assumptions. Since the loan amount varies between the small farmers, marginal farmers and the agricultural labourers, the viability analysis has been carried out separately for these three categories.
Benefits

The returns to the beneficiaries can include the following:

i) Value of milk produced

ii) Cow-dung

iii) Sale of calf/heifers at the end of each lactation, and

iv) Scrap value of the animal at the end of the productive life period.

The value of milk per lactation has been calculated using the total milk yield in a lactation and the market price realised by the beneficiaries. However, those who are supplying the milk to the milk societies realised the price according to the level of fat content of milk. In these cases the statements made by the beneficiaries regarding milk yield and the income they received have been cross-checked from their milk society cards and also from milk society records. The length of lactation period varied from 245 days to 265 days in block I and 254 days to 270 days in block II.

The value of the cow-dung has been obtained by taking into consideration its prevailing price (on per bullock cart load basis) in the study area. The value of the calf at the termination of the lactation period has been estimated using the actual sales price realised
by the beneficiaries disposing of the calf. Almost all the agricultural labourers and most of the small and marginal farmers in both the blocks sold their calves at the termination of the lactation and only a very few of them retained the female calves for getting the second generation. Considering the above facts, the sale value at the end of the lactation has been considered for all calves instead of working out the multiplier effect in the case of a few beneficiaries who retain calves. The scrap value of the animal has been taken as the value realised at the end of eighth lactation, and the survey data on actual sales have been utilised to determine this.

**Viability of the Loan**

The viability of the loan has been determined on the basis of private costs and returns accruing to the beneficiaries and their ability to repay the loans as stipulated by the provisions of the loan agreement. Using the data on costs and returns the investment worth of the scheme has been calculated, using four different criteria, namely, i) payback period, ii) net present value, iii) internal rate of return and iv) benefit-cost ratio.
To determine the financial viability of the dairy loans from the beneficiaries’ point of view, all the above four measures have been calculated on the basis of the data collected from the sample beneficiaries. The inter-calving period-wise cost and returns are converted into yearly costs and returns data. The inter-calving period included nine months of lactation and six months of dry period. Thus, the costs and returns for the entire period were realigned so that they are expressed on an annual basis. These annual costs and returns are used to calculate the measures of investment worth (Table 7.1).

In calculating the measures two sets of cost data were assumed: (1) all costs including the out-of-pocket expenditures, imputed value of farm grown items and family labour and cost of capital (Situation A) and (2) cost excluding value of imputed items (Situation B). The point is that costs including the imputed items may be an over estimate and, therefore the measures based on this are likely to be under-estimated. At the same time exclusion of imputed cost assumes zero opportunity cost and, this tends to be an under-estimate of cost, which implies that the measures based on this will be an over-estimate. For this, two sets of measures including and excluding imputed cost was presented in Table 7.1. This is to indicate the probable range in
which the two measures vary — the measure including imputed costs serving as a lower boundary. The interpretations of these measures are provided here with a view to drawing conclusions on the financial viability of the scheme to the three category of small borrowers in the two blocks.

The pay-back period worked out to seven years for the small farmers in both the blocks; six years in the case of marginal farmers in both the blocks; seven years for agricultural labourers in block I; and six years to their counterparts in block II when all cost items were taken into account. If the imputed costs are not included in the analysis the pay-back period becomes much smaller — three years in the case of all the three categories of small borrowers in block II and marginal farmers in block I; for the rest of two categories in block I the period is little higher (four years). The emerging point is that, it takes six to seven years to recover the cost of purchase and maintenance of milch cattle from its returns to the beneficiaries and if the imputed costs are excluded it takes 3 to 4 years.
### Table 7.1
Measures of Investment Worth Per Buffalo in the Selected Blocks

<table>
<thead>
<tr>
<th>Measures</th>
<th>Block I</th>
<th>Block II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Situation A</td>
<td>Situation B</td>
</tr>
<tr>
<td></td>
<td>SF</td>
<td>MF</td>
</tr>
<tr>
<td>1. Pay back period</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>2. Net present value at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Discount rate 10%</td>
<td>2705</td>
<td>3340</td>
</tr>
<tr>
<td>b) Discount rate 12%</td>
<td>2493</td>
<td>3078</td>
</tr>
<tr>
<td>c) Discount rate 20%</td>
<td>1850</td>
<td>2294</td>
</tr>
<tr>
<td>3. Internal rate of return</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>(20)</td>
<td>(20)</td>
</tr>
<tr>
<td>4. Benefit cost ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Discount rate 10%</td>
<td>1.22</td>
<td>1.31</td>
</tr>
<tr>
<td>b) Discount rate 12%</td>
<td>1.21</td>
<td>1.23</td>
</tr>
<tr>
<td>c) Discount rate 20%</td>
<td>1.20</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Note: Situation A = Calculated values when imputed costs included.  
Situation B = Calculated values when imputed costs excluded.  
SF: Small Farmers  
MF: Marginal Farmers  
AL: Agricultural Labourers  
Figures in parentheses are internal rate of return when the subsidy amount is taken as loan.
The net present value, as pointed out earlier, is a function of the discount rate. For the purpose of the analysis, three discount rates (10 %, 12 % and 20 %) are used. (The interest rate charged on the dairy loans is 10 per cent, the opportunity cost of capital, usually taken as 12 per cent in India and to indicate a higher rate of return 20 per cent has been taken into account). When the imputed cost items are included in the calculations, the present values worked out to Rs.2705, Rs.2493 and Rs.1850 respectively for three interest rates in the case of small farmers in block I. The average initial investment is Rs.2037 and this investment has been justified when the discount rate is at a little over the interest rate i.e., 12 per cent.

In the case of marginal farmers in block I the present values worked out to Rs.3340, Rs.3078 and Rs.2284 respectively for the three discount rates. The average initial investment is Rs.2150, and this investment has been justified even when the discount rate has been taken at 20 per cent. The net present values in the case of agricultural labourers in the same block are very low (Rs.1204, Rs.1119 and Rs.859 respectively for the three discount rates) against the average initial investment of Rs.2500 and even at the 10 per cent interest rate level also the investment is not justified.
In block II the average initial investment of the small farmers, Rs.2000, has been justified at 10 per cent level but not at 12 and 20 per cent levels since the present values worked out are Rs.2005, Rs.1550 and Rs.1143 respectively for the three discount rates. However, the average initial investment of Rs.2000 in the case of marginal farmers of the same block has been justified at all the three interest rates since the present values are Rs.2963, Rs.2738 and Rs.2062 respectively for the three discount rates. The average initial investment made by agricultural labourers in block II is Rs.2000 and this has been justified at first two interest rates - Rs.2764 at 10 per cent and Rs.2594 at 12 per cent - though it is not justified at 20 per cent since the present value is Rs.1925 at this rate.

The significant point is that the upper limit (when imputed costs were excluded from the calculations) indicates substantially higher present values in the case of all the beneficiaries. However, in the case of agricultural labourers in block I the present values are little lower when compared to others.

The internal rate of return also shows a similar tendency as in the case of net present value. It is (IRR) 22 in the case of agricultural labourers and for all others it is more than this value. For all
the categories, the IRR is fairly reasonable. And when
the imputed costs excluded, the IRR for all the
categories turns to be more than 50. The point to be
noted here is that in the absence of subsidy amount the
IRR was found much lower as shown in Table 7.1. That
is, when the subsidy amount also taken as loan, then the
IRR in the case of dairy schemes of small farmers,
marginal farmers and agricultural labourers in block I
was found as 20, 20 and 5 and in block II it was 10, 15
and 25 respectively.

The benefit-cost ratios are around 1.21 in
the case of small farmers in block I, i.e., for every
rupee worth of cost incurred, the return is 1.21 when
the cost included the imputed values. This ratio is
higher at 1.31 in the case of marginal farmers of both
the blocks. However, the small farmers in block II
realise a lower benefit-cost ratio at 1.18. And the
agricultural labourers in block II have higher ratio of
1.32 (at 12 % d r) comparing to their counterparts in
block I who have a lower ratio of 1.13. Though the
investment in the milch cattle can be justified if the
benefit-cost ratio is more than one, the agricultural
labourers in block I, as seen earlier in the case of
net present value, are not having a comfortable benefit-
cost ratio compared to others. When it is worked out
excluding the imputed costs, the benefit-cost ratios are
doubled to all the category of beneficiaries in both the blocks except the agricultural labourers in block I.

**Repaying Capacity**

The financial viability of the scheme depends also on the beneficiaries' ability to repay the loans without affecting their other activities. In other words, the receipts from milk supply should be sufficient to meet the repayment obligations and the expenses required for maintaining the cattle. Most of the beneficiaries sold their milk through milk co-operative societies, and a portion of the value of milk has been deducted by the societies for loan repayment. Thus, the amount paid by the milk societies to the beneficiaries should be sufficient to meet the out-of-pocket expenses on the cattle.

**Expected Net Return from Dairy Scheme with one Buffalo**

The following are the assumptions on the basis of which the repaying capacity has been worked out on per animal, per lactation and per annum basis.

1) Beneficiaries feed their milch animals adequately with concentrates and fodder—both green and dry,
ii) The lactation period lasts for 300 days,

iii) The per day milk yield is

For the first 120 days – 8 litres per day

For the second 90 days – 5 litres per day

For the third 60 days – 3 litres per day

For the fourth 30 days – 2 litres per day

iv) The price of per litre milk is Rs.2.25.

v) The income from the sale of cow-dung, and butter milk is Rs.100 per annum

vi) The cost involved per day to maintain the animal is

Lactation period – for the first 120 days Rs.6 per day

for the second 90 days Rs.5 per day

for the third 60 days Rs.2 per day

for the fourth 30 days Rs.1.50 per day

Dry period – for 63 days Rs.2 per day

vii) Other expenses (including veterinary expenses, rope and bucket) per annum is Rs.100.

viii) The capital expenditure on cattle shed is zero

ix) The value of own fodder is not taken into account and the opportunity cost of family labour is taken as zero.
There exists no difference between the two blocks and/or between the three categories of borrowers in the feeding practices, milk yield, cost of inputs and price of milk.

The worked out figures are:

- Total milk yield: 1650 liters
- Income from milk: Rs. 3712.50
- Income from other sources: Rs. 100.00
- Total income: Rs. 3812.50
- Cost of milk production: Rs. 1465.00
- Other expenses: Rs. 100.00
- Total expenditure: Rs. 1565.00
- Net Income: Rs. 2247.50
- Loan amount deducted: Rs. 1000.00
- Surplus income left to the beneficiary: Rs. 1247.50

Thus, if a beneficiary is left with Rs. 1247.50 or more per annum, after meeting the expenses and paying the loan instalment, then the dairy scheme undertaken by the beneficiary can said to be a viable proposition. By assuming that the remaining loan amount will be deducted in the next lactation, it can be inferred that two years after the loan the beneficiary's economic position improves significantly.

At the same time, if the value for own labour is imputed at Rs. 3 per day then the surplus generated by
the scheme becomes insignificant (Rs.1247.50 - Rs.1095 = Rs.152.50).

Now it is intended to compare the above worked out anticipated income and repaying capacity with the field level data. For this purpose the data collected from both the beneficiaries and milk societies are used. The uniform pattern of deducting the loan amount from the beneficiaries by the milk societies is absent in the study villages. However, the averages have been taken into account to indicate the repaying capacity of the beneficiaries. The data are related to one lactation period and given in Table 7.2.

The net addition to income due to dairy enterprise varies from Rs.286 for agricultural labourers in block I to Rs.1200 for marginal farmers of the same block. The deductions towards loan do not add financial strains on the beneficiaries in the sense that they need not raise additional resources for meeting the out-of-pocket expenses incurred on cattle keeping. However, the net addition to income is arrived without deducting the imputed cost for fodder and domestic labour. The above figures indicate that in absolute terms the small and marginal farmers in block I and marginal farmers in block II are realising higher income than others.
Table 7.2
Average Value of Milk Supplied, Loan Repayment and Net Additions to Income of the Selected Dairy Loan Beneficiaries

<table>
<thead>
<tr>
<th>Block/Category of beneficiaries</th>
<th>Average value of milk supplied to the milk society per lactation (M)</th>
<th>Average amount deducted by societies for the milk loan repayment (D)</th>
<th>Out of pocket expenses (M-D) - E</th>
<th>Net addition to income (E)</th>
<th>Difference between the expected income and the actual income (N1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Marginal farmers</td>
<td>3445</td>
<td>1075</td>
<td>2370</td>
<td>1170</td>
<td>1200</td>
</tr>
<tr>
<td>2 Small farmers</td>
<td>3054</td>
<td>1028</td>
<td>2026</td>
<td>1060</td>
<td>966</td>
</tr>
<tr>
<td>3 Agricultural labourers</td>
<td>2021</td>
<td>1000</td>
<td>1021</td>
<td>735</td>
<td>286</td>
</tr>
<tr>
<td>Block II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Marginal farmers</td>
<td>2498</td>
<td>1000</td>
<td>1498</td>
<td>810</td>
<td>688</td>
</tr>
<tr>
<td>2 Small farmers</td>
<td>2123</td>
<td>1000</td>
<td>1123</td>
<td>700</td>
<td>423</td>
</tr>
<tr>
<td>3 Agricultural labourers</td>
<td>2176</td>
<td>1000</td>
<td>1176</td>
<td>635</td>
<td>541</td>
</tr>
</tbody>
</table>

If the expected net addition to income is taken into account (Rs.1247.50), then it is only the marginal farmers in block I satisfy this norm. And for all others the difference between the two values has been found high. This indicates that though the beneficiaries are left with some surplus, it is grossly inadequate to make them economically viable.
In Section II of Chapter VI, the costs and benefits of each minor irrigation scheme and the net income accrued to the sample farmers have been analysed. In this section the financial benefit cost analysis for each scheme has been attempted in order to assess the viability of the investment made in that scheme. The benefit-cost ratio and Internal Rate of Return (IRR) are computed for all the schemes separately. The method of calculation of both benefits and costs has been elaborated in Section II of Chapter VI. Benefit-cost ratios, (i) without imputed costs and (ii) with imputed costs have been worked out for each scheme. The Internal Rate of Return has been worked out for three situations:

i) When only paid-out costs are included in the cost item, (situation A).

ii) When the imputed costs also are included with the paid-out costs, (situation B), and

iii) When the subsidy component is included in the cost of investment, i.e., subsidy treated as a part of loan to be repaid with interest (situation C).
The third situation, it is hoped, will explain the importance of subsidy in the minor irrigation loans to the small borrowers.

The details of the worked out results have been given in the Appendices C and D. In what follows is the scheme-wise financial viability analysis.

1. New Well Scheme

The parameters of the viability analysis have been computed subject to the following assumptions:

i) The life of the well is 40 years.

ii) The life of the pumpset is 15 years.

iii) The pumpset is replaced during the life of the well and the salvage value of the pump set is taken as 10 percent of the original cost.

iv) The development benefit flow has the following characteristics:

(a) No benefits accrue in the first year of well construction since it continues for over six months.*

In some cases the work will be over in less than six months but they have to wait for electricity connection; sometimes it takes more than a year to get the connection.
(b) Only 50 percent of the additional benefits is realised in the second year.

(c) Total benefits start flowing after third year onwards.

(v) The desilting of well and other repair work for well are carried out every fifth year.**

(vi) The viability analysis assumes water table to be constant over the life of the well.***

The B/C ratio happens to be the same (Table 7.3) for both the categories indicating a positive, if not very high, returns from the scheme. However, the IRR is high in the case of marginal farmers compared to the small farmers. When the imputed cost is included, the IRR becomes very low, and at the same time B/C ratio also equals to one indicating that the contribution of own human and animal labour is making the otherwise non-viable scheme into a viable scheme. It is interesting to note that when the subsidy amount is included in the cost (situation C), the IRR is reduced in the case of

** Based on the observations collected from the sample farmers.

*** The water table situation in Block-I is normally stable over the years with rarely the wells becoming dry.
Table 7.3

Financial Viability Analysis - New Well Scheme

<table>
<thead>
<tr>
<th>Category of farmers</th>
<th>Benefit-cost Ratio at 10% in Brackets</th>
<th>Internal Rate of Return (%)</th>
<th>Situation A</th>
<th>Situation B</th>
<th>Situation C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Marginal Farmers</td>
<td>1.29 (1.05)</td>
<td>20</td>
<td>5</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2 Small Farmers</td>
<td>1.30 (1.04)</td>
<td>12</td>
<td>3</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in brackets are B/C ratios when imputed costs included in the total cost.

marginal farmers indicating the importance of subsidy to the small borrowers to undertake schemes like digging a new well.

2 Deepening of well

The parameters of the financial viability analysis of this scheme have been computed subject to the following assumptions:
i) The period of analysis has been taken as 10 years.*

ii) The desilting of well and other repair works will be carried out in the fifth year.**

iii) The water table is assumed to be constant over the period of analysis.

iv) The additional benefits are realised from the first year onwards.

The details are given in Table 7.4.

As far as this scheme is concerned, it is very difficult to predict the expected life of the additional depth achieved. Moreover, there is no uniformity in our sample regarding the depth at which the well was dug further and the additional depth achieved with the help of the loan, etc., However, the benefits received by sample farmers in terms of increase in area under irrigation and changes in cropping intensity, have already been discussed in Section II of Chapter VI. In view of the above facts, while applying the test of financial viability, the maximum permissible repayment period and not the actual expected life of this scheme, has been taken into account. The repayment period varied between 6 and 10 years; the upper limit of the repayment period allowed by the banks, is 10 years, so this has been taken into account.

** Based on the observations collected from the sample farmers.
Table 7.4

Financial Viability Analysis - Deepening of well Scheme

<table>
<thead>
<tr>
<th>Category of farmers</th>
<th>Benefit/ Internal rate of Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cost ratio at 10%</td>
</tr>
<tr>
<td></td>
<td>Situa- tion A</td>
</tr>
<tr>
<td></td>
<td>Situa- tion B</td>
</tr>
<tr>
<td></td>
<td>Situa- tion C</td>
</tr>
</tbody>
</table>

**Block I**

1 Marginal Farmers
- 1.55
- (1.09)
- 50
- 12
- 35

2 Small Farmers
- 1.75
- (1.32)
- > 50
- 50
- > 50

**Block II**

1 Marginal Farmers
- 1.52
- (1.29)
- 40
- 20
- 30

2 Small Farmers
- 1.55
- (1.10)
- > 50
- 15
- 50

Note: Figures in parentheses are B/C ratios when imputed costs included in the cost.

It is interesting to observe high B/C ratio as well as IRR in all the cases, making the scheme financially viable one. However, in situation B, both the B/C ratio and IRR have been reduced considerably. In situation C, the IRR values indicate that even if the subsidy component is taken as a part of the loan, the scheme will be financially viable to the small borrowers.
3. Oil Engine Scheme

The parameters of the viability analysis under this scheme have been computed subject to the following assumptions:

(i) The life of the oil engine is 10 years.
(ii) The engine is repaired every year; and
(iii) The salvage value at the end of 10 years is 10 percent of the original cost.

Table 7.5

Financial Viability Analysis - Oil Engine

<table>
<thead>
<tr>
<th>Block and Category of farmers</th>
<th>Benefit/cost ratio at 10%</th>
<th>Internal Rate of Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Marginal Farmers</td>
<td>1.30</td>
<td>&gt; 50</td>
</tr>
<tr>
<td></td>
<td>(1.15)</td>
<td></td>
</tr>
<tr>
<td>2 Small Farmers</td>
<td>1.59</td>
<td>&gt; 50</td>
</tr>
<tr>
<td></td>
<td>(1.30)</td>
<td></td>
</tr>
<tr>
<td>Block II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Marginal Farmers</td>
<td>1.62</td>
<td>&gt; 50</td>
</tr>
<tr>
<td></td>
<td>(1.17)</td>
<td></td>
</tr>
<tr>
<td>2 Small Farmers</td>
<td>1.70</td>
<td>&gt; 50</td>
</tr>
<tr>
<td></td>
<td>(1.23)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in the parentheses are B/c ratios when imputed costs included in the cost.
This scheme has been financially viable to all the farmers and it provides a higher B/c ratio combined with a higher rate of IRR. Except in the case of Marginal Farmers in block I whose IRR is very low in situation B, on the whole, in all other situations the IRR is 50 and above 50. It is interesting to note that in situation C all the four calculated values of IRR are above 50.

Further, all the three schemes studied were found as financially viable in terms of their benefit-cost ratio and internal rate of return. However, under two situations: (i) when the imputed costs were included in the cost of the scheme, and (ii) when the subsidy component was also considered as loan - the values of both benefit-cost ratio and internal rate of return got reduced. This particularly happened in the case of new well and deepening of well schemes and was conspicuous in the case of marginal farmers who undertook the above schemes.

The above findings imply that the small and marginal farmers need subsidised loans to undertake the minor irrigation schemes; and their access to the infrastructural facilities has to be improved to enable them to realise the intended benefits.
Notes and References

1. George and Srivatsava analysed the viability of a dairy scheme initiated by a commercial bank in Baroda district (Gujarat) by selecting samples from big, medium and small farmers who were financed to undertake dairy scheme. They took the opportunity cost of family labour as zero. George P S and Srivatsava V K, Institutional Finance for Dairy Development, Op. Cit., 1975, p. 90.