
**EVALUATION STUDY OF GRAPE CULTIVATION
SCHEME IN NASIK DISTRICT (MAHARASHTRA)**

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FOREWORD

The present study to evaluate a scheme of grape cultivation in seven talukas in Nasik district of Maharashtra, sanctioned by the National Bank for Agriculture and Rural Development (NABARD), was undertaken by the Institute at the instance of the NABARD.

The scheme was meant for long term finance to 202 farmers spread over 97 villages for cultivation of grapes over an area of 200 acres. The amount of loan was Rs.40 lakhs at the rate of Rs.20,000 per acre as unit cost of investment. The present study covered a sample of 67 farmers spread over 18 villages, who had borrowed the money under this scheme. Detailed data on investment costs during the first two years and costs of cultivation during the subsequent three years were collected and analysed. The year 1985-86 was the first full development year. The study was initiated in the last quarter of 1986 and completed in Sept.1988 and the report was finalised in August 1989.

The study revealed that the average yield realised by the sample farmers was quite close to the expected yield. The average incremental income was Rs.27,132 per acre during the full development year. Internal Rate of Return worked out to be 27.99 per cent which was much lower than the expected rate of 37 per cent in the scheme. The scheme generated additional employment of about 185 mandays per acre during the full development year. The repayment performance was

good. By the end of January 1987, 85 per cent of the interest was paid and 62 per cent of the expected principal amount also was paid. Production Function Analysis was carried out by fitting Cobb-Douglas production function. There was an indication of slightly increasing returns to scale.

The study came out with the suggestion, in addition to other suggestions, that Maharashtra State Co-operative Land Development Bank and the Department of Co-operation should put in motivational efforts and encourage the grape growers to form co-operative marketing societies and develop marketing infrastructure.

The author proposes further research work on (a) determination of economically viable minimum size and also optimum size of grape garden based on empirical data and (b) comparative marketing aspects of Nasik grapes and Tasgaon chaman grapes of Sangli district.

It is hoped that the present empirical study will be quite useful for the planners and other researchers, besides being useful to WABARD and other financial institutions.

January 1992

D.C. Wadhwa
Director.

PREFACE

The State of Maharashtra ranks first in the country as far as the area under grapes is concerned. About 36 per cent of the total area under grapes in the country is in Maharashtra. The empirical studies on grapes in Maharashtra are thus quite important. The present study covered a scheme of finance in seven talukas of Nasik district by carrying out a sample survey of beneficiary farmers. The study covered various aspects, such as cost and economics of investment including internal rate of return analysis, repayment performance, macro impact of the scheme, etc. In addition, the production function analysis was also carried out using Cobb-Douglas function.

I am grateful to the National Bank for Agriculture and Rural Development for providing me an opportunity to carry out this study. I am also thankful to them for their comments on the earlier draft of the report.

I would like to express my sincere gratitude to Dr. D.C. Wadhwa, Director, Gokhale Institute of Politics and Economics, for encouraging me to bring out this mimeograph.

Over a period of this study, I was assisted continuously by one research assistant. However, during the period there were three incumbents, Shri D.K. Shinde, Shri Sabale and Shri H.P. Rajguru. All of them helped me enthusiastically and carried out meticulous work. I am thankful to all of them. I was assisted by Shri R.D. Khodaskar and Shri V.B. Kasabe in carrying out the field work. I am thankful to them. I am

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Sudhakar N. Gadam

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SUMMARY AND CONCLUSIONS

- 0.1 The present study was taken up by the Institute at the instance of National Bank for Agriculture and Rural Development to evaluate a scheme for grape cultivation in seven talukas in Nasik district of Maharashtra State sanctioned by ARDC under the Third ARDC Credit Project. The scheme was meant for long term finance for cultivation of grapes over an area of 200 acres. The amount of loan to be financed was Rs. 40 lakhs at the rate of Rs.20000 per acre as unit cost of investment. For this purpose the Maharashtra State Cooperative Land Development Bank (MSCLDB) was to raise special Development Debentures of Rs. 30 lakhs with the contribution from the ARDC and of Rs. 10 lakhs to be subscribed by the State Government and the Government of India.
- 0.2 The scheme was sanctioned to be completed during the two years 1980-81 and 1981-82. Since Nasik is an important grape growing district, the farmers came forward enthusiastically for the scheme and therefore the scheme was completed in the first year itself. By the 31st May 1981 all the disbursement was done and the Land Development was looking forward for the new scheme.
- 0.3 The total area covered by the scheme was 81.45 hectares or 201 acres by financing 202 farmers spread

over 97 villages. Total disbursement was Rs.32,58,630 which is 81.47 per cent of the planned target of Rs. 40 lakhs. The area target was fully achieved. Of these 202 farmers, 118 or 58 per cent were small farmers and as such the stipulated coverage of small farmers was achieved. The scheme was to cover 7 talukas but there was no response from Sinnar taluka since the climatic and other conditions are not very favourable to grape cultivation. Of the remaining 6 talukas, Niphad is the most important grape growing taluka and for this scheme also there was very good response from this taluka. About 52 per cent of the scheme disbursement was done through two sub-branches of the LDB, namely, Niphad and Pimpalgaon in this taluka.

0.4 The study covered a sample of 67 farmers who borrowed the finance under this scheme. For the sample farmers, detailed data on investment costs during the first two years and costs of cultivation during the subsequent three years was collected. Their output and income during this period was also recorded. No yield is expected during the first year but in the second year, the farmers were expected to get some yield. However, the sample farmers did not get any

yield in the second year. They obtained yield from third year onwards. The third and the fourth years are preoptimal years and the fifth year is optimal or full development year for the grape garden. For the scheme under study 1985-86 happens to be fifth and full development year considering the actual dates of plantation. Since the scheme was completed in one year and the plantation was concentrated in few months, the gardens under the scheme were of uniform age and therefore there was no scope to take gardens of different ages. Therefore, information for all the five years was collected for the sample gardens.

0.5 The year 1985-86 was the full development year. For this year, the data on the costs of cultivation and income, etc. from other crops and other sources was collected at the family level for the sample farmers. This was useful for other analysis and also for computations of income forgone which were based on the incomes from irrigated crops obtained by these farmers. Since all these farmers had irrigation before they took to grape cultivation and since they currently have other crops on their remaining irrigated land, it was possible to obtain the estimates of income forgone by this method. The data so obtained was

analysed for finding out yield levels, incremental incomes, internal rates of returns, etc.

0.6 As for the repayment performance, since the total number of farmers is only 202, we decided to have full coverage. Therefore detailed data was collected from the sub-branches of the LD Bank for all the 202 farmers.

0.7 The finance provided under the scheme was quite inadequate since the average investment of the sample farmers was Rs. 29691 per acre whereas the scheme provided only for Rs. 20000. It was reported that the unit cost was revised for the later schemes. The major cost was that of iron angles and wires which constituted 63 per cent of the total cost. The next two important items were fertilizers and pesticides.

0.8 The average yield realised by the sample farmers was about 7600 kg. per acre which was quite close to the expected yield of 3000 kg. per acre in the scheme. Majority of the farmers had gardens of one acre size. There was a wide variation in the yield per acre and cost of cultivation per acre. It was observed that the farmers who obtained better yields also spent more on cultivation.

0.9 There was also a wide variation in the incremental

income per acre from grape garden obtained by the farmers. The average incremental income was Rs.27132 per acre during the full development year with Rs.914 as the lowest and Rs. 1,05,862 as the highest.

- 0.10 Internal rate of return worked out to be 27.99 per cent excluding the family labour and 26.93 including the family labour. This was much lower than the expected rate of 37 per cent.
- 0.11 The grape cultivation carried out under the scheme generated additional employment of about 185 mandays per acre during the full development year which would continue till the life of the garden.
- 0.12 The repayment performance was good. By the end of January 1987, 85 per cent of the interest was paid and 62 per cent of the expected principal was repaid, since the introduction of scheme. The payment of instalment was not timely. There were only 14 farmers who paid all the instalments in time whereas 103 farmers did not pay a single instalment in time.
- 0.13 Production function analysis was also carried out by fitting Cobb-Douglas production function using five explanatory variables. There was an indication of slightly increasing returns to scale. Expenditure

on fertilizers has come out as significant variable for explaining the variability in the production of grapes.

- 0.14 It was observed that most of the procedures were followed as stipulated in the scheme. Some were not adhered to strictly in this scheme but reportedly they are followed in the later schemes. The keeping of records was poor causing difficulties to us initially. This is also reportedly streamlined for later schemes. Most of the farmers availed of the crop loan facilities from the DCC Bank. Technical guidance was adequately available. It was observed that the marketing structure for grapes in this district was traditional without regulated market coverage or cooperative efforts towards grape marketing.
- 0.15 Since the district is endowed with favourable agro-climatic conditions grape cultivation may be vigorously promoted in the district. In doing so, the following points having policy implications may be considered.
- (i) Unit costs of investment need to be revised periodically and made more realistic.
 - (ii) Proper monitoring is required to improve repayment performance.

- (iii) When a farmer does not plant grapes and the bank recovers the amount soon after the disbursement such amount may be reutilised in the same scheme.
- (iv) Development of marketing infrastructure may improve the profitability of the schemes. This may be possible if MSCLDB itself takes initiative with the help of the Department of Cooperation, in enabling the grape growers to form cooperative marketing societies. This departure from the MSCLDB's normal functioning may be justified as a major policy matter towards more effective recovery programme.

0.16 Arising from the experience of the present study, it is felt that there is scope for initiating fresh enquiries into (a) determination of economically viable minimum size and also optimum size of grape garden based on empirical data and (b) comparative marketing aspects of Nasik grapes and Tasgaon Chaman grapes of Sangli district.

CHAPTER I

INTRODUCTION

- 1.1 Grape is grown widely in temperate countries. France, Germany, Italy, United States of America and Soviet Union are the major grape growing countries. The total area under grape in the world is estimated to be more than 10 lakh hectares. Since grape cultivation is very recent in India, the total area under it is only about 0.1 per cent of that in the world.
- 1.2 It is seen that Maharashtra ranks first in the country as far as the area under grape is concerned. About 36 per cent of the total area under grape in the country is in Maharashtra. It is further observed that the area under grape is not spread evenly in the state but is mainly concentrated in the deccan plateau of western Maharashtra. Main reason for this is favourable climatic conditions.
- 1.3 Grapes were first cultivated in Maharashtra in Daulatabad, Aurangabad and Ahmednagar on small scale. It was around 1930 that the grape cultivation was started in Nasik district. Because of the favourable climatic conditions and promising financial results from grape, it was very quickly adopted by the well-off farmers. Previously Phakri, Bhokri and Anab-E-Shahi were the most common and popular varieties in the district. These varieties required relatively

low level of technical knowledge compared to that of seedless varieties. Low yields, poor keeping quality and high investment were the main constraints in the adoption of grape cultivation by common farmers. But with the introduction of seedless varieties, the situation of grape cultivation improved considerably. Though the seedless varieties required an intensive use of modern technology, the farmers willingly adopted them because of better crop yield and attractive financial returns.

Grape Cultivation in Maharashtra

- 1.4 It is worth mentioning here that the great efforts and unparalleled research work by late Dr. Cheema who introduced a new variety called Selection 7 (or Cheema Sahebi) made the revolutionary changes in grape cultivation in Maharashtra and particularly in Nasik district where the grape cultivation flourished in those days. It was later, after the advent of seedless varieties and specially Thomson seedless that the cultivation of grape picked up in Sangli district, which has now surpassed Nasik district in many respects such as area, productivity, marketing infrastructure and even the quality of fruit.
- 1.5 The districtwise area under grapes is given in Table 1.1.

Table 1.1 : Districtwise Area under Grapes (1980-81)

District	Area (ha.)	Percentage
Sangli	1,600	38.10
Nasik	1,300	30.95
Solapur	700	16.67
Pune	400	9.52
Osmanabad	100	2.38
Ahmednagar	50	1.19
Other Districts	50	1.19
Total	4,200	100.00

Source : B.G. Bhujabal, Drakshabag. Continental Publishers, Pune, 1984, p. 3. Latest figures were not available.

Objectives of the Study

1.6 Nasik ranks second with about 31 per cent area next to Sangli which ranks first in the State with about 38 per cent area under grapes.

Among the horticulture development schemes financed by the NABARD, the schemes for grape cultivation form significant proportion. Since NABARD's interest in this field is growing it was decided to take up evaluation study of a completed scheme in Nasik district with a view to assess the success of the scheme. The following objectives were set for the study.

(i) To find out whether the scheme was implemented as per the procedures laid down, whether the coverage of the small farmer was as stipulated to the scheme, whether the finance provided was adequate or not, etc., and whether the Land Development Bank faced some difficulties in operating the scheme.

(ii) To know the position regarding sources and adequacy of technical knowhow for cultural practices, availability of cooperative short term credit and market structure.

(iii) Economic impact on beneficiary families in terms of incremental income, returns to capital, internal rate of return, employment generation, etc.

(iv) To find out the repayment performance of the borrowers.

(v) Any other relevant aspect which might emerge during the study.

CHAPTER II

THE SCHEME AND THE PLAN OF STUDY

The Scheme

- 2.1 In response to the proposal put forward by the Maharashtra State Cooperative Land Development Bank (MSCLDB) for providing financial assistance for grape cultivation in Nasik district, National Bank for Agriculture and Rural Development (NABARD) sanctioned the scheme known as Third ARDC Credit Project - Scheme for Financing Grape Cultivation (Thomson Seedless variety) in Seven Talukas of Nasik District, for the years 1980-81 and 1981-82.
- 2.2 The refinance assistance of Rs. 40 lakhs was sanctioned for the scheme out of which Rs. 30 lakhs were to be given with the help of special debentures floated by the ARDC and Rs. 10 lakhs was Government contribution.
- 2.3 The main aim of the scheme was to motivate and help the farmers to bring more and more area under grape cultivation which is high priced cash crop and gives higher incremental income to the farmers over other crops. The soil and the climatic conditions prevailing in Nasik district are very well suitable for grape cultivation. Since a large initial investment is required for the establishment of a new grape garden, it is difficult for the small and marginal farmer to undertake grape cultivation mainly because of the financial constraints.

Unit Cost

2.4 A high initial investment is required for the establishment of a grape garden. It includes all expenses such as cost of seedlings, iron angles, cement and labour at all stages of establishment. It was estimated that the cost of establishment of one acre of Thomson seedless variety garden is about Rs. 20000.

Area of Garden

2.5 Maximum area of garden to be financed under the scheme was one hectare.

Rate of Interest

2.6 The rate of interest stipulated in the scheme was 9.5 and 10.5 per cent respectively for small and other farmers. However, the rates of interest are subject to changes as per the general rates followed by the MSCLDB and effectively, the following rates of interest were charged to the farmers in this scheme.

		Rate of interest (per cent per annum)	

		Small Farmers	Others
From	2.3.1981	10.25	12.50
Before	2.3.1981	10.25	11.35

Security

2.7 Land was the only item presented for the security against the loan. An unencumbered land of the

beneficiary of about four times the area of proposed garden was the criterion for the security.

Loans to Small Farmers

2.8 Previously it was observed that the benefits of various scheme do not flow to the small farmers because of many reasons and small holding was big constraint for them. In order to reach the benefits of the scheme to them it was stipulated that not less than 60 per cent of the total financial assistance should be given to the small farmers.

Share of Borrowers

2.9 The borrowers had to purchase the shares of LDB @ 10 per cent of the sanctioned amount. The last instalment of the repayment schedule was calculated by deducting this amount from the total balance.

Direct Payment to Suppliers

2.10 The bank was supposed to make direct payment to local suppliers on behalf of the borrowers for purchase of certain items like cement and steel. This procedure is followed mainly to avoid the misutilization of the sanctioned amount by the borrowers.

Repayment Period

2.11 The commercial production of grapes starts from the third year of planting. So during the first two years no repayment of principle was to be done by the farmers and only if possible interest could be repaid. Thus,

there was two years' gestation period. The repayment plan was prepared for the period of 7 years (popularly called as 3+4). During the next four years starting from the third year, the principal and interest were to be repaid in equated annual instalments.

Operational Area

2.12 The scheme was planned to be implemented in seven talukas of Nasik district, namely, Nasik, Dindori, Kalwan, Satana, Chandwad, Niphad and Sinnar.

Physical and Financial Programme

2.13 NABARD expected the scheme to be implemented in two years i.e. 1980-81 and 1981-82. A target of Rs. 20 lakhs for 100 acre area was set for every year. The LDB was expected to put up a fresh proposal after achieving the paid target successfully by furnishing the data to NABARD.

Completion of the Scheme

2.14 Because of the increasing response from the farmers, the LDB achieved the given target in the first year itself. According to LDB's statement submitted to NABARD,* the scheme was successfully completed before 31st March 1981. There were 203 beneficiaries and the total area brought under the grape cultivation was 200 acres. The

* This was obtained from the Regional Office of NABARD, Pune.

total disbursement was Rs. 31,51,400. As per this statement, only 37 were small farmers out of the 203 farmers who were assisted. The total area of these small farmers was 35.10 acres and disbursement of about Rs. 5 lakhs. According to this statement, the per cent of small farmers was only 18 as against stipulated 60 per cent. Subsequently, on the basis of data collected from the sub-branches of LDB, it was found that there were 58 per cent small farmers (para 2.18).

2.15 Of the seven talukas, there was disbursement in 6 talukas only and due to lack of response from the farmers there was no disbursement in Sinnar taluka. This taluka does not have irrigation facilities and in general there is not much cultivation of grapes.

2.16 Having obtained the preliminary information from the Regional Office and since the scheme has covered 203 farmers, it was decided that the detailed information regarding date of sanction, dates of payment of loan instalments, area developed for grapes under the scheme, amount of loan, share amount deducted, rate of interest and also the details of repayment, etc., should be collected for each of the farmer from the bank. For this it was necessary to visit all the concerned sub-branches of Nasik LDB and collect the information from the bank ledgers and from the individual case papers.

This work took considerable time since the identification of the farmers who were financed under this scheme became quite difficult as the procedures of keeping records were not yet streamlined when this scheme was completed. As the statement submitted by the Nasik LDB to NABARD was available with us, we were keen in tallying the data collected from the sub-branches with that statement. In the process, it was found out that in the case of two/three sub-branches entirely different set of farmers was identified wrongly as belonging to this scheme. The work for these sub-branches was therefore, redone. Considerable time was wasted in this process but there was no way out. The final data collected was then tabulated. As per these data, we have 202 farmers in the scheme.

2.17 The data regarding disbursement of loan under this scheme to small farmers and other farmers by each sub-branch is presented in Table 2.1.

2.18 It can be seen from the table that of the 202 beneficiaries 118 (58 per cent) were small farmers. Total disbursement was Rs. 32,58,630 of which the share of small farmers was Rs. 18,62,030 (59 per cent). In Nasik taluka all disbursement was only to big farmers. It may be noted here that the numbers of small and big farmers are different than given in Pars 2.14. Here we have classified them on the basis of rate of interest

Table 2.1 : Categorywise and Sub-branchwise Disbursement of Loan

Taluka	Small farmers			Big farmers			Total		
	No.	Area (ha)	Disbursement	No.	Area (ha)	Disbursement	No.	Area (ha)	Disbursement
Nasik	-	-	-	20	8.80	383700	20	8.80	383700
Dindori	25	11.45	441900	9	2.70	133600	34	14.15	575500
Kalwan	2	1.00	26000	-	-	-	2	1.00	26000
Satana	6	2.00	107600	2	1.00	44200	8	3.00	151800
Chandwad	3	.90	33200	13	4.60	190200	16	5.5	223400
Niphad	66	25.65	983430	22	10.80	359800	88	36.45	1343230
Pimpalgaon	16	6.00	269900	18	6.55	285100	34	12.55	555000
Total	118	47.00	1862030	84	34.45	1396600	202	81.45	3258630

charged. On the basis of this, the coverage of small farmers is satisfactory in terms of their number and quantum of finance.

It is seen from Table 2.1 that Niphad Sub-branch ranked first having 88 farmers with total area of 36.45 hectares and total disbursement over Rs. 13.43 lakhs. It was followed by Dindori and Pimpalgaon. As Pimpalgaon falls in Niphad taluka, the total amount disbursed in Niphad taluka works out to be about 52 per cent. This is most important taluka as far as the cultivation of grapes goes.

The Plan of Study

2.19 It was decided to study disbursement, the repayment performance, etc., on the basis of the data for all the farmers in the scheme and to take a sample of about 70 farmers to study in depth the costs of investment, cultivation yield of fruits, incremental incomes, etc. A small sheet for recording the date from the bank in respect of payment of loan instalments, rate of interest, repayment of loan was prepared and a detailed questionnaire was designed and canvassed for the sample farmers.

The Sample Size

2.20 As mentioned earlier 70 was the size of the sample decided for the study which works out to be around 35 per cent of the total number of farmers covered under this scheme.

It was also mentioned earlier that the scheme was completed in one year though it was planned for two years and therefore the gardens of the farmers covered under the scheme were of uniform age and there was no scope to obtain the cross section data for the gardens of different ages under the scheme which is evaluated.

Sampling Procedure

2.21 The scheme farmers were spread over 97 villages in the seven sub-branches as given in Table 2.2.

Table 2.2 : Distribution of Beneficiary Farmers' Villages According to Sub-branches of LDB Nasik

Name of the sub-branch	No. of villages
Nasik	11
Dindori	17
Kalvan	2
Satana	6
Chandwad	11
Niphad	32
Pimpalgaon	18
Total	97

2.22 For selecting the sample, the number of farmers in each village should also be looked into. In Table 2.3, the distribution of villages according to the number of farmers is given for each sub-branch. It is seen that

Table 2.3 : Sub-branchwise Distribution of Villages According to the Number of Scheme Farmers and the Distribution of Scheme Farmers According to Small or Big

No. of farmers in village	Nasik	Dindori	Kalwan	Satana	Chandwad	Niphad	Pimpalgaon	Total
1	5 (0+5)	9 (5+4)	2 (2+0)	5 (4+1)	7 (1+6)	15 (13+2)	19 (5+5)	53(30+23)
2	4 (0+8)	3 (5+1)	-	-	3 (1+5)	9 (13+5)	6 (6+6)	25(25+25)
3	1 (0+3)	3 (6+3)	-	1 (2+1)	1 (1+2)	2 (4+2)	1 (0+3)	9(13+14)
4	1 (0+4)	-	-	-	-	1 (3+1)	-	2(3+5)
5	-	2 (9+1)	-	-	-	2(10+0)	-	4(19+1)
6	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	1 (8+0)	-	11 (8+0)
9	-	-	-	-	-	1 (2+7)	1 (5+4)	2 (7+11)
10	-	-	-	-	-	-	-	-
Above 10	-	-	-	-	-	1(15+3)	-	1(15+3)
Total	11 (0+20)	17(25+9)	2(2+0)	6(6+2)	11(3+13)	32(68+20)	18(16+18)	97(120+82)

Note : The frequency of small farmers and big farmers is given in the brackets in that order.

of these 97 villages as many as 53 had only one farmer and there were 25 villages with only two farmers each. Considering the limited time, it was decided to limit the field visits to only those villages which have at least 3 farmers. There were 19 such villages. One village with 18 farmers was also excluded to avoid bulk representation and also because there were similar villages nearby with 3 or more farmers which could be covered in the sample. Thus it was decided to cover all the remaining 18 villages with 3 or more scheme farmers.

Data Collected from the Scheme Farmers

2.23 A questionnaire specially designed for this purpose was canvassed to each sample farmer. Data pertaining to general items such as size of holding, cropping pattern, crop and livestock yield and expenses, wage income and income from other sources were collected for the year 1985-86 in the first part of the questionnaire. In the second part, information regarding the expenses during the first two years for the establishment of garden and detailed expenditure account of the grape garden and income data for the year 1985-86 which was the year of full development was taken. The data regarding the expenses on grape cultivation, yield and income during the third and the fourth years (1983-84 and 1984-85) was also collected.

2.24 Some of the farmers also had additional area under grape gardens other than the scheme gardens. For these cases, the information on non-scheme gardens was also collected. So, for these cases we collected separate information for the scheme and non-scheme gardens for the year 1985-86. For the earlier years, information on only scheme gardens was collected. Thus, for the scheme gardens, overall information regarding grape cultivation including expenses and income during five years, namely 1981-82 to 1985-86 was collected.

CHAPTER III

PROFILE OF THE SAMPLE

3.1 As explained in para 2.22, eighteen villages with 81 scheme farmers were chosen in the sample. During the field work some of the farmers could not be contacted even after repeated visits since they were out of station for longer duration. Therefore some farmers in the neighbouring villages were covered to complete the sample size of 70. However, the information in the case of three farmers was very scanty and therefore their data could not be analysed. Thus, the data for 67 scheme farmers was analysed for the study.

Family Size

3.2 The distribution of sample farmers according to family size is presented in Table 3.1. Their family size varied from 3 members to 21 members. There were as many as 11 families with size of more than 10 members.

Land Holding

3.3 The distribution of sample farmers according to land holding as reported by them is given in Table 3.2.

Table 3.1 : Distribution of Sample Farmers According to Family Size

Size class	No. of farmers	Percentage
3	1	1.49
4	10	14.93
5	10	13.93
6	16	23.88
7	9	13.43
8	5	7.46
9	3	4.48
10	2	2.99
11 to 15	7	10.45
16 to 21	4	5.97
Total	67	100.00

Table 3.2 : Distribution of Sample Farmers According to Land Holding

Size of holding (hectares)	No. of farmers
Upto 2 (hectares)	17
Upto 4	32
Upto 6	9
Upto 8	2
Upto 10	4
Above 10	3
Total	67

Seventeen farmers had land holding of 2 hectares or less, 32 had more than 2 hectares and upto 4 hectares, there were three families who had more than 10 hectares.

3.4 As per the definition of NABARD applicable to these talukas there were 56 small farmers, 5 medium farmers and 6 big farmers in the sample of 67 on the basis of the areas reported by the respondents.

Table 3.3 : Distribution of Sample Farmers According to Small, Medium, Big as per NABARD Definition

Category	No. of farmers	Average holding	Percentage of irrigation
Small	56	2.62	91.80
Medium	5	6.30	84.36
Big	6	10.71	80.01
Total	67	3.62	87.81

3.5 The above classification is on the basis of land holding reported by the respondents. It was observed that there are discrepancies in reporting this. If we go by the identification done by the LD bank as judged from the rates of interest charged, it is observed that of these 67 farmers, 40 were small farmers and 27 were big. The proportions in the sample are more or less the same as observed in the total group of 202 farmers of whom 118 were small and 84 were big farmers (Refer Table 2.1).

Table 3.4 : Distribution of Sample Farmers and All Farmers According to Small and Others on the Basis of Bank Data

Category	No. of farmers		Percentage	
	All	Sample	All	Sample
Small	118	40	58.42	59.70
Others	84	27	41.58	40.30
Total	202	67	100.00	100.00

Sources of Irrigation

3.6 Table 3.5 gives the distribution of sample farmers according to sources of irrigation. As many as 32

Table 3.5 : Distribution of Farmers According to Sources of Irrigation

Source	No. of farmers	Percentage
Well	32	47.76
Canal	1	1.49
Well and canal	28	41.79
Well and river	3	4.48
Well, river and canal	3	4.48
Total	67	100.00

farmers depended only on well water for irrigation while 28 depended on well and canal both. One used only canal water, three used well and river water and other three used well, river and canal water. Of the

67 farmers except one, everybody had a well. Thus, well was the most important source of irrigation.

3.7 The sample farmers had high percentage of irrigation. Their distribution according to percentage of irrigation is given in Table 3.6. More than 80 per cent farmers had more than 80 per cent irrigation. It is obvious that the resourceful farmers went for grape cultivation. Every farmer in the sample already had source of irrigation before he opted for the grape scheme.

Table 3.6 : Distribution of Sample Farmers According to Percentage of Irrigation

Percentage of irrigation	No. of farmers
upto 20	-
40	3
60	2
80	8
100	94
Total	67

Area of Grape Gardens

3.8 The average area of the scheme grape gardens was one acre with the smallest garden of 20 gunthas and biggest of 2 acre 20 gunthas. There were 41 farmers who had one acre garden. The distribution of sample farmers and all farmers according to size of the

scheme garden is given in Table 3.7. The percentage distribution of the sample does not exactly tally with that of all farmers since the sample was selected on the basis of category of farmers. However, the percentage distributions are fairly close.

Table 3.7 : Distribution of Sample Farmers and All Farmers of the Scheme According to Size of Grape Garden

Size of garden	No. of farmers		Percentage	
	All	Sample	All	Sample
Less than 1 acre	67	15	33.17	22.39
1 acre	99	41	49.01	61.19
More than 1 acre	36	11	17.82	16.42
Total	202	67	100.00	100.00

Number of Earners

3.9 Table 3.8 gives the sample families distribution according to the number of earners. Thirty-one per cent families had only one earner, 34 per cent had 2 earners and 16 per cent had 3 earners. Thus, more than 80 per cent of the families had 3 or less number of earners. There was one family with as many as 10 earners.

Table 3.8 : Distribution of Sample Farmers According to Number of Earners (Males + Females)

No. of earners	No. of farmers	Percentage
1	21	31.34
2	23	34.33
3	11	16.42
4	4	5.97
5	4	5.97
6	-	-
7	2	2.99
8	-	-
9	1	1.49
10	1	1.49
Total	67	100.00

CHAPTER IV

COST AND ECONOMICS OF INVESTMENT

Cost of Investment

- 4.1 As per the scheme Rs. 20,000 was the per acre investment loan allowed. It was necessary to find out the actual cost of investment in the case of the sample farmers. For this purpose, the development expenditure incurred during the first year such as preparation of land including ploughing, harrowing, levelling, digging of pits, formation of bunds, etc., erection of pendal with iron angles and galvanised wire; application of manures, soil and sand and planting of grapevines, stacking bamboo, application of chemical fertilizers and pesticides was included. During the second year the items of expenditure are of maintenance nature which include weeding, manures, fertilizers, pesticides and watering. The data on these costs were analysed. The results are presented in this chapter.
- 4.2 As it has been already stated that the sample of 67 beneficiaries consisted of 15 farmers with less than one acre garden, 41 farmers with one acre garden and 11 farmers with more than one acre garden. The cost analysis on per acre basis is more meaningful. It was found that the average cost of investment was Rs.29691 per acre whereas the scheme provided only for Rs.20000, per acre. However, the actual average borrowing by the farmers was Rs. 16372 per acre. The

reason for lower per acre borrowing than the unit cost under the scheme seems to be that some cases already sanctioned at lower unit cost were brought under this scheme when it was sanctioned. However, it is clear that even if the average borrowing per acre were to be Rs. 20000, it would still be substantially lower than the investment cost.* Going by † Table 2.1, the average amount disbursed per acre for small farmers and others was more or less the same.

- 4.3 As far the financing of the expenditure over and above the loan received was concerned, it was found that most of the farmers financed the investment through their own resources. Only eight farmers reported that they had borrowed from cooperative society. The average borrowing from the Land Development Bank by this group of 8 farmers was Rs.17129 per acre which was slightly higher than the overall average. Thus, at the average level about 56 per cent of the investment was covered by the loan from the scheme requiring 44 per cent investment to be arranged by the farmers.

Subsidy

- 4.3.1 None of the farmer received any subsidy for capital investment in grape gardens.

Size of Garden and Cost of Investment

- 4.4 In the following Table 4.1 average cost of investment

* The unit costs were revised for subsequent schemes.

per acre is shown for three sub-groups based on the size of garden, namely, gardens of size less than one acre, one acre and larger than one acre. It is seen from this table that the average investment declined with the increase in size showing the advantage of scale.

Table 4.1 : Cost of Investment

Garden size group	No. of farmers	Average Size of garden Acre-Guntha	Cost of investment per acre (Rs.)	
			A	B
Gr.1 less than 1 acre	15	00-27	32185	32371
Gr.2 Equal to 1 acre	41	1-00	31593	31672
Gr.3 Greater than 1 acre	11	1-17	23086	23366
Total	67	66-30	29692	29834

A - Excluding family labour

B - Including family labour

Cost of Investment by Items

4.5 The cost of investment by major items was computed and is presented in Table 4.2. The major cost was that of iron angles and wire which constituted about 63 per cent of the total cost. The next two important items were fertilizers and pesticides. The component of preplanting operations was small since in most of the cases the garden plots were plain and there was no need of land levelling operations.

Table 4.2 : Itemwise Cost of Investment

Item	Average cost per acre(Rs.)	Percentage to total
Preplanting operations	920	3.08
Planting charges	532	1.78
Bambook stacking	1057	3.54
Iron angles and wires	18820	63.08
FYM owned and purchased	2034	6.82
Fertilizers	2943	9.85
Pesticides	2349	7.87
Others (fertilizer & pest. spraying + Saldar)	1037	3.48
Family labour (various operations)	142	.49
Total	29834	100.00

4.6 The garden-size groupwise costs of investments for these items are presented in Table 4.3. There is a marked decline in per capita costs on pesticides and fertilizers with the increase in garden size. The picture in other items is not that sharp and is sometimes mixed.

Table 4.3 : Garden Size Group and Itemwise Cost of Investment

Item	Size groups	Freq.	Acre	Average/acre (RS.)
Preplanting operations	1	15	10.125	971.46
	2	41	41.00	976.95
	3	11	15.625	737.22
Planting charges	1	15	10.125	576.40
	2	41	41.00	551.49
	3	11	15.625	452.80
Bamboo stacking	1	15	10.125	1044.05
	2	41	41.00	1138.37
	3	11	15.625	852.03
Iron angles and wire	1	15	10.125	18544.49
	2	41	41.00	20325.54
	3	11	15.625	15049.28
FYM owned and purchased	1	15	10.125	2108.64
	2	41	41.00	2095.10
	3	11	15.625	1820.80
Fertilizers	1	15	10.125	3572.35
	2	41	41.00	3083.54
	3	11	15.625	2167.36
Pesticides	1	15	10.125	4093.83
	2	41	41.00	2327.07
	3	11	15.625	1274.88
Others (fert. and pest. spraying and Saldar)	1	15	10.125	1275.26
	2	41	41.00	1093.66
	3	11	15.625	731.86
Family labour	1	15	10.125	184.20
	2	41	41.00	79.27
	3	11	15.625	280.00

Cost of Cultivation

4.7 Average costs of cultivation per acre for various operations during the full development year 1985-86 are presented in Table 4.4. Average cost of cultivation

per acre worked out to be Rs.17086 per acre including the family labour. If family labour is excluded this works out to be Rs.16487. The contribution of family labour was worth Rs.599 per acre. The most import cost item is fertilizers which accounted for 24 per cent of the total cost.

Table 4.4, Average Cost of Cultivation Per Acre (1985-86)

Item	Cost Rs.	Percentage to total cost
Area		
Manures	2374	14
Fertilizers	4077	24
Pesticides	2708	16
Hired labour	2916	17
Irrigation charges	213	1
Transport and marketing	2688	16
Others	1136	7
Paid out cost	16487	97
Family labour	599	4
Total cost includ- ing family labour	17087	100

Cost of hired labour was 17 per cent, that of pesticides was 16 per cent and transport and marketing accounted for 16 per cent. It may be noted here that the costs on transport were mainly due to those

growers who had sent their produce directly to distant markets. (Ref. Sections 5.25 and 5.27).

4.8 The cost structure for the three size groups presented in Table 4.5. Average cost of cultivation for the

Table 4.5 : Garden Size Groupwise Average Cost of Cultivation Per Acre (1985-86)

	(RS.)		
Item	Group 1	Group 2	Group 3
Area	10.13	41.00	15.63
Manures	2395	2317	2509
Fertilizer	5251	4132	3171
Pesticides	2981	3032	1681
Hired labour	3529	2966	2385
Irrigation charges	179	210	242
Transport and marketing	1400	3331	1833
Others	1332	1251	709
Paid out cost	17510	17647	12772
Family labour	514	724	328
Total cost including family labour	18024	18371	13100

first two groups was more or less the same but for the group with garden of more than one acre size was substantially lower.

yield

4.9 The year of survey 1985-86 was the fifth year of plantation and the year of full development; prior

to that for two years there was grape harvest and during the first two years, naturally, there was no yield. As per the scheme the average yield at full development stage was expected to be 8000 kg. per acre. However, the average yield during the year 1985-86 was observed to be 7595 kg. per acre. It was stated in the methodology section that the data on yield during 3rd and 4th years was also collected from the sample farmers. The average yield was 3819 kg. per acre during the third year and 6148 kg. per acre during the 4th year. In Table 4.6 the average yields for these three years according to gardensize groups are given. In each year average yield of one acre size group is more than the other two groups. Perhaps, on an average one acre is the optimum size of garden in terms of yield. However, this needs further examination by conducting separate study specially designed for this purpose.

Table 4.6 : Average Yields of Grepes During the 3rd, 4th & 5th Year According to Size Groups of Gardens (Kg/acre)

Garden Size-group	Average yield during year		
	3rd	4th	5th
Less than one acre	3,279	5,620	7,012
One acre	4,210	6,822	8,066
Greater than one acre	3,142	4,717	6,733
Total	3,819	6,148	7,595
Assumed in the scheme	3,500	6,500	8,000

4.10 An average yield of 1,000 kg. per acre was assumed in the scheme during the second year but the sample farmers did not get any yield during this year. At the average level the yields of sample farmers was more than assumed in the scheme during the 3rd year and below the assumed level during the 4th year. It is seen from the table that the one acre size group had all these three years better yield than assumed in the scheme.

4.11 There was large variation in the yields of grapes received by the farmers. The lowest yield was 2100 kg/acre and highest 15100 kg/acre. The distribution of farmers according to the yield class is given in Table 4.7. There were 29 farmers who obtained more than the assumed 8,000 kg. per acre; of them as many as 11 had yield of above 10,000 kg.

Table 4.7 : Distribution of Beneficiaries According to Yield (kgs) Per Acre During the 5th Year

Yield levels per acre (kgs)	(Kg/acre)	No. of beneficiaries
2000 - 3000		2
3000 - 4000		1
4000 - 5000		12
5000 - 6000		9
6000 - 7000		8
7000 - 8000		6
8000 - 9000		8
9000 - 10000		10
Above 10000		11
Total		67

Yield Level and Cost of Cultivation

4.12 The sample beneficiaries were grouped in three groups on the basis of their yield per acre as (i) top 20 per cent, (ii) bottom 20 per cent and (iii) remaining cases. The average yield per acre, average cost of cultivation per acre and average input use of important items during the full development year are shown in Table 4.8.

Table 4.8 : Comparison of Input Use by Farmers with Higher and Lower Yield (1985-86)

Items	Bottom 20% cases	Top 20% cases	Remaining cases
No. of cases	13	13	41
Total area	12.5	12.88	41.38
Average yield (kg)	4280	11433	7401
Average cult. cost (Rs.)	9997	22578	15942
Average cost of owned manures (Rs.)	356	334	396
Average cost of purchased manures (Rs.)	1400	3759	2237
Average cost of fertilizer (Rs.)	2927	5320	4037
Average cost of pesticides (Rs.)	2625	2768	2714

4.13 The ranges of average yield for the bottom, middle and top groups were 21 to 50 quintals, 50 to 100 quintals and 100 to 150 quintals respectively. Average cost of cultivation was highest in the top group and lowest in the bottom group. Other averages also behaved

similarly showing that the yield rate is dependent upon the input use.

Prices

4.14 Average price received by the growers during the year 1985-86 was Rs. 669 per quintal. It was Rs. 620 per quintal during the year 1984-85 and Rs. 569 per quintal in 1983-84. The range of prices received by the sample farmers during 1985-86 was from Rs. 600 to Rs. 800 per quintal, though there were only 2-3 cases receiving price of Rs. 500 on the lower side and only one case receiving that of Rs. 900 on the higher side. The prices received by the farmers were more than double the prices assumed in the scheme.

Net Income

4.15 Average net income from grapes during the full development year was Rs. 34170 per acre with family labour included in the cost and Rs. 34769 per acre with family labour not included in the cost of cultivation. The average net income differed considerably for the three groups of the farmers based on the size of the garden. The one acre size group received the highest net income of Rs. 37,454 with Rs. 26,011 for less than one acre group and Rs. 30,839 for more than one acre group when family labour is accounted for on cost side. Average yield, gross income, cost of cultivation and net income for the three groups of farmers and for all farmers

together for the full development year are presented in Table 4.9. Distribution of farmers according to net income per acre is presented in Table 4.10.

Table 4.9 : Average Yield, Gross Income, Cost of Cultivation and Net Income Per Acre (1985-86)

Items	(Rs.)			
	Group 1 area less than 1 acre	Group 2 area equal to 1 acre	Group 3 area greater than 1 acre	All farm- ers
Area (acres)	10.125	41.00	15.625	66.75
Average yield (kg/acre)	7012	8066	6733	7595
Gross income	44035	55825	43939	51254
Cost of cultivation				
a) Including family labour	18024	18371	13100	17087
b) Excluding family labour	17510	17647	12772	16487
Net Income				
a) Including family labour	26011	37454	30839	34170
b) Excluding family labour	26525	38178	31167	34769

Table 4.10 : Distribution of Beneficiaries According to Levels of Net Income Per Acre (1985-86)

Income groups	Frequency
Upto 10,000	4
10,000 - 20,000	14
20,000 - 30,000	14
30,000 - 40,000	12
40,000 - 50,000	13
50,000 - 60,000	6
60,000 - 2,00,000	4
Total	67

Incremental Income

4.16 In order to obtain the incremental income due to grape cultivation, the income forgone need to be estimated. All the scheme farmers had the irrigation facilities before they took the investment loan through this scheme. Earlier they were taking irrigated crops on the land on which they have planted grapes. Therefore, the income forgone by these farmers is income they used to obtain from the irrigated crops. Since all the farmers have even now irrigated crops on their farms over and above the grape garden, their income per acre from these irrigated crops can be taken as the income forgone. The detailed data on cultivation was collected for the year 1985-86 which was used for finding out the

income forgone. Average income forgone per acre was Rs. 7,038. The figure is quite high since the crops they are growing include onion, vegetables, sugarcane over and above irrigated wheat and irrigated gram. While computing the income forgone, the three year average price is considered for onion and vegetables to adjust for price fluctuations. When income forgone is subtracted from the net income from grapes, we get incremental income from grapes. This was Rs. 27,132 per acre at the average level for the 67 farmers taken together. Three farmers received negative incremental income. Leaving these three cases, the lowest incremental income./ income per acre was Rs. 914 and the highest was Rs. 1,05,862. The distribution of farmers according to incremental income is presented in Table 4.11.

Table 4.11 : Distribution of Beneficiaries According to Level of Net Incremental Income Per Acre (1985-86)

Net incremental income	No. of beneficiaries
Upto 10,000	13
10,000 - 20,000	11
20,000 - 30,000	13
30,000 - 40,000	12
40,000 - 50,000	11
50,000 - 60,000	4
Above 60,000	3
Total	67

Internal Rate of Return (Financial Rate of Return)

4.17 For computing the internal rate of return, the data on investment costs during the first two years and the costs of cultivation and income during the subsequent two years were converted to the 1985-86 prices. Taking into account the income forgone of irrigated crops due to grape cultivation, the cash flows of the borrowers over the life cycle of grape gardens have been projected at 1985-86 prices. This exercise was done on the following assumptions:

- i) Life of the grape gardens is 15 years since plantation.
- ii) Full development of optimum yield is achieved in the fifth year and is stabilized at that level afterwards.
- iii) Capital and maintenance expenditure incurred during the first two years is considered as investment.

4.18 While computing the internal rate of return, the three cases with negative incremental income are excluded. The financial rate of return thus computed on the average basis of sample data worked out to 30.02%. In this, the family labour was not taken on the cost side. If this is done then the internal rate at the average level worked out to 29.79%. (Before excluding these cases, these worked out to 28.61 and 28.37 per cent respectively.)

Table 4.12 : Financial Rate of Return (%) (64 Cases)

With assumption	Including family labour	Excluding family labour
As per data	29.79	30.02
10% increase in investment	27.56	27.79
10% increase in income	31.42	31.62
10% decrease in income	27.95	28.05

(Please refer to the Statements 1, 2 and 3 for the flow of funds statement, group level FRR and distribution of individual level FRR, at the end of the report.)

4.19 The low value of FRR for the sample farmers seem to be mainly due to higher rise in the costs of cultivation than the rise in the prices realized for grapes as compared to the costs and prices respectively assumed in the scheme. Another reason is that the cost of investment was also much higher.

4.20 The value of FRR differ substantially among the three garden size groups (Statement 2). As far as the more than 1 acre garden size group is concerned, the income forgone was much smaller than for the 1st and 2nd group resulting into high incremental incomes and high FRR. The question of determination of optimum garden size is crucial. However, the sample size for the present study is too small to allow for generalization in this matter. As a matter of fact, a separate study on this aspect is necessary. The

related discussions also appear in Chapter VI in connection with production function analysis.

- 4.21 The internal rates of return were also computed by considering 10 per cent increase in investment costs, 10 per cent increase in full development year income and 10 per cent decrease in full development year income. This is done again separately for family labour included and excluded. The FRR remained between 27 and 32 per cent in all these cases (Table 4.12). The FRR assumed in the scheme was 37 per cent. Thus the FRR obtained by the sample farmers was below expectation.

Employment Generation

- 4.22 It is necessary to look after the grape gardens very carefully. The operations such as pruning, girdling, application of gibberallic acid, etc., are to be done timely according to the seasons and the conditions of the vines. Pest has to be carefully controlled by using proper doses of appropriate pesticides. The crop harvesting is also delicate operation. This necessitates good amount of labour input in grape gardening. On the basis of the sample data it was observed that on an average 185 mandays additional employment per acre was generated due to grape cultivation during the full development year compared to the labour input required for the irrigated crops taking into consideration full year requirement. This additional employment

would naturally continue for full life of the gardens.
During the first two investment years, yearly additional average employment generated was 85 mandays.

CHAPTER V

REPAYMENT PERFORMANCE AND OTHER ASPECTS

Repayment Performance : All Farmers

- 5.1 The beneficiaries were expected to repay the loan amount with suitable instalments in a period of seven years after receiving the loan. This period was split into two phases, first three years, known as gestation period, during which only the interest was expected to be paid, if possible and the period of the next four years during which the interest and principal were to be paid with suitable annual instalments. As a special provision some beneficiaries in Niphad and Pimpalgaon sub-branches were given concession for one year in repayment because of drought conditions in that particular year.
- 5.2 The expected date and amount of principal as well as interest to be paid and the actual amounts and dates of payments made by the beneficiaries were collected from the account ledgers maintained by the sub-branches. While analysing the repayment performance, the yearwise figures of expected principal and interest were noted down and the figures of the actually paid amounts according to the dates of payment were pooled together, if there were more than one entries for the same year.
- 5.3 For computations of percentage of recovery, the year to year data was cumulated. In cumulative method, the

percentage of recovery at the end of any years means 'upto the end of that year'. The data is presented in Table 5.1. The per cent recovery of the principal during the fourth* year of the scheme i.e. year ending 31st January 1984 or the first year of the recovery of principal, was as high as 98 per cent. Some principal was repaid during the first, second and the third year, though it was not expected. This is how there is high percentage of recovery during the fourth year. The recovery percentages for the subsequent three years were 74, 77 and 82 respectively. The percentages of interest recovery are also presented in this table. The recovery percentage for interest at the end of January 1987 was 85 which is quite good. The 62 per cent recovery of the principal can also be considered as good. However, this is in the first year of full development and the recovery may further improve in subsequent years.

5.4 The above picture of recovery is presented at aggregate level. Now, we shall turn to taluka level and look into the frequencies of farmers in different percentage class of recovery of principal by the end of January 1987.

* Counting of the years for this purpose is done on the basis of the year ending on 31st January as the bank has stipulated the yearly repayment by this date. Since the scheme was completed by March 1981, the scheme farmers fall in two groups namely those who borrowed before 31st January 1981 and who borrowed in February and March 1981. The table being for all farmers together it appears as if it was 3+5 year scheme though it was 3+4 year scheme.

Table 5.1 : Periodwise Cumulative Repayment Performance : All Farmers

Cumulative period	Expected payment(Rs.)		Actual payment (Rs.)		Percent recovery	
	Principal	Interest	Principal	Interest	Principal	Interest
Upto 31-1-81	-	1,33,224	29,404	5,794	-	4.34
31-1-82	-	5,12,815	1,13,762	81,858	-	15.96
31-1-83	-	8,60,043	1,97,008	2,89,814	-	33.70
31-1-84	4,54,485	11,79,077	4,47,483	6,97,403	98	59.15
31-1-85	11,92,468	14,71,581	8,82,886	11,01,682	74	74.86
31-1-86	20,11,288	16,90,497	15,46,445	14,01,102	77	82.88
31-1-87	29,20,059	18,19,536	20,38,363	15,46,139	62	85.02
31-1-88	32,58,113	18,58,071	*	*	*	*

* Data not collected.

Table 5.2 : Distribution Scheme Farmers According to Recovery Percentage of Principal Amount

Taluka	(Percentage)					Total
	0-25	25-50	50-75	75-100	Above 100	
Nasik	1	4	11	4	-	20
Dindori	-	3	13	12	6	36
Kalwan	-	-	1	1	-	2
Satana	2	3	-	2	1	8
Chandwad	2	7	5	2	-	16
Niphad	10	8	46	18	6	88
Pimpalgaon	5	4	12	6	7	34
Total	20	29	88	45	20	202

This is presented in Table 5.2. This is based on cumulative totals of expected payments and actual payments upto 31-1-1987 at the farmer level. There were 20 farmers whose repayment was less than 25 per cent, 29 had this percentage between 25 and 50, 88 had it between 50 and 75, and 45 between 75 and 100. There were as many as 20 farmers whose recovery was more than 100 per cent. Thus the Table 5.2 indicates that upto the end of January 1987 the repayment performance of only 24 per cent (49) of the total 202 beneficiaries was below 50 per cent. For 60 per cent of the beneficiaries it was 50 to 100 per cent and for 10 per cent (20) of the beneficiaries the performance was more than 100 per

cent indicating advance payment. Thus, the overall performance of repayment was good.

- 5.5 The repayment performance was also examined by considering whether the payment was timely or not. For this purpose, the repayment data was examined in detail. It is not possible to identify each payment as a particular expected instalment since only in exceptional cases the exact amounts are paid. The payments made along with the dates of payments need to be juxtaposed with the expected payments and their due dates. In this process, the payments need to be broken into parts to assign properly to the instalments and then only it could be found out whether the payment was timely or not. This is a straight forward but laborious method. This could be achieved again by cumulative method. On one side take cumulative expected payment and on other cumulative actual payment and calculate year to year percentage. Any percentage equal to 100 or more than hundred is a case of timely payment of instalment. In this method advance payment would get counted as timely payment. This method was adopted for finding the number of instalments timely paid by the beneficiaries. Based on this the frequencies are presented in Table 5.3. There were 108 (54 per cent) beneficiaries who did not pay a single instalment in time. There were only 14 farmers who paid all the instalments in time.

Thirty-three of them paid only one instalment in time, 20 paid two and 27 paid three instalments in time.

Table 5.3 : Showing Talukewise Number of Farmers Reporting Timely Repayment of Instalments (Upto 1987)

Taluka	No. of instalments paid in time					Total
	None	One	Two	Three	Four	
Nasik	13	4	1	2	-	20
Dindori	14	5	4	5	6	34
Kalwan	-	-	1	1	-	2
Satana	4	2	-	2	-	8
Chandwad	11	2	2	1	-	16
Niphad	47	16	7	13	5	88
Pimpalgaon	19	4	5	3	3	34
Total	108	33	20	27	14	202

Repayment Performance : Sample Farmers

5.6 Having analysed the repayment performance of all farmers together, we shall now examine the repayment performance of sample farmers since this would help to relate their performance with the other variables such as incremental income.

5.7 The repayment performance of the sample farmers is tabulated by the same method adopted for all farmers and is presented in Table 5.4. The performance of sample farmers is more or less comparable to all farmers taken together. By the end of January 1987,

Table 5.4 : Periodwise Cumulative Repayment Performance : Sample Farmers

Cumulative period	Expected payment (Rs.)		Actual payment (Rs.)		Percent recovery	
	Principal	Interest	Principal	Interest	Principal	Interest
Upto 31-1-81	-	42,758	-	607	-	1
31-1-82	-	1,71,526	2,700	21,230	-	12
31-1-83	-	2,91,641	6,881	83,259	-	29
31-1-84	1,29,996	3,99,110	90,686	2,03,372	70	51
31-1-85	3,75,337	5,05,239	2,27,516	3,68,576	61	73
31-1-86	6,46,058	5,82,979	4,69,876	4,86,626	73	83
31-1-87	9,49,754	6,32,139	6,45,538	5,37,332	68	85
31-1-88	10,91,277	6,49,669	*	*	*	*

* Data not collected.

85 per cent of the interest was recovered and 68 per cent of the principal was recovered. These percentages for all farmers together were 85 and 62 respectively (Table 5.1). Thus, the repayment performance of the sample farmers was good.

Incremental Income and Repayment Performance

5.8 It is generally expected that better results from the garden should reflect into better repayment. The incremental income from the garden should have bearing on the repayment. Thus, it is useful to look into the relationship between the incremental income and repayment performance. For doing this the correlation analysis was carried out. Incremental income in absolute terms is not important but its levels in relation to expected repayment is more important. Therefore, a variable was constructed by taking expected repayment as per cent of incremental income, say x . The values of this percentage for the 3rd, 4th and 5th year of the garden were calculated for each of the farmer. A correlation coefficient was computed between this percentage and percentage of repayment, say y , (defined as actual repayment as per cent of expected repayment) for each of the three years separately. These variables were also constructed for the three-year-total and the coefficient of correlation was computed. If the repayment performance is related to incremental income, higher the value of x , lower should be the value of y .

Thus, x and y should have negative correlation. None of these four correlation coefficients were significant showing that the repayment performance was not related to incremental income. The coefficients are presented in Table 5.5.

Table 5.5 : Correlation Coefficients between x and y

Year	Coefficient	Value of t
3rd year	-0.1173	.7379
4th year	0.0860	.06437
5th year	0.1701	1.47234
Three year total	0.1227	.878849

5.9 In order to look at the relationship between incremental income and repayment performance, the farmers were grouped on the basis of total incremental income per acre received during the 3rd, 4th and 5th year and then for each group the repayment percentage was computed. The results are presented in Table 5.6. It is seen that the group with negative incremental income has made the lowest (63.18%) repayment but among the other groups the lowest incremental income group has the highest percentage of repayment. It declines in the next higher group. It declines for the 4th group also but increases for the fifth group. This signifies absence of relationship between the incremental income and repayment performance.

Table 5.6 : Groupwise Percentage of Repayment: Sample Farmers

Group on basis of incremental income per acre (3 year total 85, 86, 87)	Average incremental income per farmer per year	Average debt burden per farmer (Rs./year)	Percentage recovery
-ve cases	-17112.11	4465.78	68.18
Lowest 25%	4987.84	5242.54	101.14
Next 25%	11983.67	5796.70	87.01
Next 25%	21791.00	5595.59	66.46
Next 25%	33380.60	4807.50	85.60

Debt Burden and Incremental Income

5.10 At the average level the debt burden was comfortably lower than the incremental income. However, individual examination is more important. If we consider the 3rd, 4th and the 5th year together, there were six farmers with negative incremental income and there were 9 farmers who received lower incremental income than the debt burden. The remaining 52 farmers had higher incremental income than the debt burden. Of these, 21 farmers have repaid 100 per cent or more. The remaining 31 farmers have repaid lower amounts than expected. Thus, it is clear that 31 cases were of wilful default among the sample of 67 farmers studied.

Adherence to Procedures

5.11 It was found that the Land Development Bank has followed most of the procedures laid down in the

Scheme. As for the record keeping, there were certain lacunae in the present scheme which were reportedly taken care of in the subsequent schemes. The procedure of direct payment to the suppliers was not adhered to very strictly. However, it was reported that this procedure was followed in the later schemes more carefully. As for the security, the bank has followed strictly the land holding criterion. It was reported that due overwhelming response to the scheme it was completed within a year instead of two years as planned and therefore certain procedures were not streamlined which was done for the later schemes.

- 5.12 There were three farmers who did not plant grapes. The Land Development Bank recovered the first instalment given to them. One farmer sold away his land, shifted from the village and did not plant grapes but repaid the instalment borrowed. One farmer sold his grape garden which is looked after by the purchaser. This farmer also repaid the loan. Two farmers dismantled their gardens since they could not get good income due to either their inability to manage the cultivation properly or due to unsuitable soil.

Crop Loan

- 5.13 Most of the farmers availed of the crop loan facilities for grape cultivation, from the third year onwards, offered by the District Central Cooperative (DCC) Bank. In most of the cases fertilizers and

giberalllic acid were supplied by the DCC bank in kind as crop loan. In some cases pesticides were also supplied but many farmers reported that they could not get specific fertilizers from the DCC bank and therefore had purchased them in the market using their own funds. Since this aspect was not included in the present study, data regarding crop loans was not collected and therefore analysis such as adequacy of crop loan could not be carried out.

Technical Guidance

- 5.14 Officers of Land Development Bank had provided the necessary technical guidance to most of the grape growers at various stages such as selection of site, preparation of land and plantation, erection of pendal, cultural practices, usage of pesticides, girdling, usage of giberalllic acid and so on. Nasik is traditionally grape growing district and therefore there are a number of farmers growing grapes. Some of the scheme farmers also had other grape gardens before they availed of the loan facility under this scheme. Thus, the grape cultivation being common, mutual discussion with friends was also a source of technical help.
- 5.15 There is an organization of grape growers in Maharashtra State known as Maharashtra Rajya Draksha Bagaitdar Sangh. This Sangh organizes courses in grape cultivation at Ozar (Mig) town in Nasik

district. Many scheme farmers had attended these courses. In general the scheme farmers did not have any difficulty in getting technical guidance.

Marketing of Grapes

5.16 The marketing of grapes is done in traditional manner in this district. A number of purchasers arrive in Nasik town and stay about 4 to 5 months during the grape season, say, from January to May. They are employed by the traders or commission agents from places like Ahmedabad, Baroda, Surat, Bhadoch, Rajkot, Indore, Ujjain, Bhopal, Kanpur, Varanasi, Gorakhpur, Calcutta, Patna, Dhanabad, etc. These purchasers deal with the farmers directly. The crop is not contracted in advance, the purchase price is fixed by negotiations on the day of purchase and in most of the cases at the garden since the purchaser will examine the quality and also assess the quantity. The local price is, of course, influenced by the prices around and also by the market price of grapes in the terminal markets where the grapes are being sent by these purchasers. Since there are a number of purchasers and each one has his own quantity requirements, there is an element of competition though not exactly satisfactory.

5.17 It was observed that the farmers would generally continue to sell to the same purchaser year after year unless there are some serious problems in

dealing with him. Therefore, when a new garden is established these purchasers would be after the new growers so that they can procure their grapes. This also brings in slight competition.

5.18 These purchasers lift the grapes from the garden. The farmers do not have to bother for packing or transporting. In most of the cases, the payment is on the spot, in some cases it is after two or three days.

5.19 There are some farmers who send their produce to the terminal markets themselves. They have direct links with either the traders or the commission agents in the terminal markets. In this, the farmers arrange for packing and transport and take the opportunity of obtaining higher prices. Of course, there could be an eventuality of lower price also.

5.20 It was observed that most of the produce is sold in the above two ways and that the share of produce sold for local markets was small.

5.21 It was found that out of 67 sample farmers, 22 had sent some portion of their produce to the terminal markets directly. The quantity so sent was about 36 per cent of the total quantity they produced by all 67 farmers. Of this, about 31 per cent was sent to Ahmedabad, about 15 per cent to Bombay, 11 per cent to Gorakhpur, 9 per cent to Calcutta, 5 per cent to Allahabad and the remaining to other markets. The list of markets

to which these farmers send grapes and the list of markets from where the purchasers come is more or less the same. These are the terminal markets where Nasik grapes are in demand. There were some farmers who had sent their grapes to more than one terminal market but most of them sent to one market only. Even in these cases, the representatives of the traders/commission agents visit the garden once in order to assess the quality and renew the old contacts and establish new contacts. But the farmers take the responsibility of proper packing and transporting the grapes. The prices prevailing at the time the grapes reach the terminal markets would be realized. Sometimes, the commission agents may keep the grapes in the cold storage with a view to obtaining better price.

5.22 The growers who send the grapes to terminal markets by taking the trouble of packing and transporting do so for getting higher price. In order to examine whether this has been the case during 1985-86, the average price received by the farmers who sent their grapes to terminal markets was computed and was adjusted for transport and packing costs and it worked out to be Rs.623 per quintal. The price received by the other group was Rs. 650 per quintal. Thus, the data shows that these farmers were losers ultimately. However, this is

only based on one year data and on a sample of only 67 farmers. In order to make more authentic comment on this phenomenon more data would be necessary. This can be examined by taking up market study.

CHAPTER VI

PRODUCTION FUNCTION ANALYSIS

- 6.1 An exercise of fitting a production function for the full development year data was carried out. For this, the Cobb-Douglas production function was chosen which was fitted by Least Squares method. The explanatory variables chosen were cost of cultivation in rupees on manures, fertilizers, pesticides and hired labour and the size of garden. Two functions are fitted, one on total production, expenditure basis and the other on per acre production, expenditure basis with size of garden as explanatory variable in both.
- 6.2 The following Cobb-Douglas production function was used.

$$Q = A x_1^{\alpha_1} \cdot x_2^{\alpha_2} \cdot x_3^{\alpha_3} \cdot x_4^{\alpha_4} \cdot x_5^{\alpha_5} \cdot e^{\alpha}$$

where (for Function I)

Q = Grape production (Quintals)

x_1 = Expenditure on manures (Rs.)

x_2 = Expenditure on Fertilizers (Rs.)

x_3 = Expenditure on Pesticides (Rs.)

x_4 = Expenditure on Hired Labour (Rs.)

x_5 = Size of garden (Acres)

For Function II, the variable Q , x_1 , x_2 , x_3 and x_4 are converted to per acre basis and x_5 is also used as explanatory variable.

6.3 For fitting by the Least Squares method the Cobb-Douglas function is converted to linear form by taking logarithms to the base e as follows:

$$\ln Q = \ln A + \alpha_1 \ln x_1 + \alpha_2 \ln x_2 + \alpha_3 \ln x_3 + \alpha_4 \ln x_4 + \alpha_5 \ln x_5$$

The results of the regression analysis are presented in Tables 6.1 and 6.2.

Table 6.1 : Cobb-Douglas Production Function (I)

Variable	Regression coefficient	(Standard error)
Constant	1.8567	(.7724)*
Manures	.0167	(.0197)
Fertilizers	.2382	(.0763)**
Pesticides	.0406	(.0871)
Hired labour	.0599	(.0317)
Size of garden	.9115	(.01642)**
F Ratio		11.0483**
Multiple R	.6894	
R ²	.4752	
Adjusted \bar{R}	.6574	
\bar{R}^2	.4322	

* Significant at 5 per cent level of significance.

** Significant at 1 per cent level of significance.

Table 6.2 : Cobb-Douglas Production Function (II)

Variable	Regression coefficient	(Standard error)
Constant	1.8715	(.7721)*
Manures	.0177	(.0197)
Fertilizers	.2369	(.0763)**
Pesticides	.0394	(.0871)
Hired labour	.0056	(.0320)
Size of garden	.2103	(.01761)
F Ratio		3.788*
Multiple R	.4867	
R^2	.2369	
Adjusted \bar{R}	.4176	
\bar{R}^2	.1744	

* Significant at 5 per cent level of significance.

** Significant at 1 per cent level of significance.

6.4 In the Function I, the multiple correlation coefficient was 0.6894 showing that about 47 per cent of variation in grape production is explained by the regression. The adjusted coefficient of determination was 0.4322. F-test carried out to test the significance of the regression as a whole and based on analysis of variance was significant at 1 per cent level of significance.

- 6.5 Coming to the individual regression coefficients, the coefficients for size of garden and expenditure on fertilizers were significant both at 1 per cent level. However, none of the remaining three coefficients was significant. Constant term was significant at 5 per cent level of significance. All the coefficients are positive.
- 6.6 Since this function is fitted on the total production and total expenditure basis, the size of the garden has to come out as an important variable and that has come out to be so. Among the others the present analysis shows that the expenditure on fertilizer is important in explaining the variation of the production.
- 6.7 In the Function II, which is based on the per acre data, the multiple correlation coefficient was 0.4868 showing that only 24 per cent variation in per acre productivity of grapes is explained by the relationship fitted. The adjusted coefficient of determination was 0.1744. The F-test carried out by using analysis of variance was significant at 1 per cent level showing overall significance of the regression.
- 6.8 Coming to the individual regression coefficients, the coefficient for per acre expenditure on fertilizers is significant at one per cent level. None of the other coefficients is significant. The size of the garden does not have influence on per acre yield of grapes

as per these results. All the regression coefficients are positive in this case also.

- 6.9 Thus, the expenditure on fertilizers emerges as important explanatory variable taking out consideration both the relationships. It may be noted that these relationships are based on only 67 observations and therefore are to be taken just as indicative and do not have enough potential for generalization.
- 6.10 The Function I also helps in looking into the scale effects. The regression coefficients obtained are also the production elasticities of each factor of production in the Cobb-Douglas production function setting. If they are added in Function I, the sum is 1.213 which indicates slightly increasing returns to scale.
- 6.11 The matrices of correlation coefficients between all the pairs of variables used in the above two functions are presented in Tables 6.3 and 6.4.

Table 6.3 : Correlation Matrix (Function I)

Variable	X ₁	X ₂	X ₃	X ₄	X ₅	Y	
Manures	X ₁	1.00					
Fertilizers	X ₂	.42	1.00				
Pesticides	X ₃	.39	.34	1.00			
Hired labour	X ₄	.34	.19	.23	1.00		
Size of garden	X ₅	-.02	.1	.12	.04	1.00	
Grape production	Y	.25	.43	.26	.14	.55	1.00

Table 6.4 : Correlation Matrix (Function II)

Variable	X ₁	X ₂	X ₃	X ₄	X ₅	Y	
Manures	X ₁	1.00					
Fertilizers	X ₂	.43	1.00				
Pesticides	X ₃	.41	.40	1.00			
Hired labour	X ₄	.34	.22	.26	1.00		
Size of garden	X ₅	-.11	-.31	-.33	-.14	1.00	
Grape production	Y	.31	.45	.23	.15	-.02	1.00

CHAPTER VII

MACRO IMPACT OF THE SCHEME

Crops Replaced

7.1 All the scheme farmers have irrigation facilities before they took the investment loan for grape gardens. Most common crops taken earlier on garden lands were irrigated wheat, irrigated gram, onion, vegetables and in some cases sugarcane. Net yearly income forgone due to discontinuation of these crops works out to be worth Rs. 15,16,319 (in 1985-86 prices) considering 194.25 acres brought under grape gardens due to this scheme.

Grape Production

7.2 The total grape production for all the farmers of the scheme is estimated to be 14,76,273 kg. during the full development year. The same production is normally expected in future years from these gardens.

Incremental Income

7.3 The scheme generated net incremental income of about Rs. 51,25,474/- during the full development year; after accounting for the income forgone from the crops replaced.

Employment Generated

- 7.4 Additional employment generated during the first two years was estimated to be 16511 man-days per year. This is non-recurring. The additional employment generated during the full development year was 35936 man-days per year. This additional employment would naturally continue for the full life of these gardens.

Statement 1 : Cash Flow from Grape Cultivation on Per Acre Basis (67 cases) (Rs.)

Item	Without project	With project years					
		1	2	3	4	5-15	15
I. Net income							
i) Field crops	a	7278					
	b	7038					
ii) Grapes	a	-	-	11387	25330	34769	34769
	b	-	-	10880	24784	34169	34169
iii) Salvage value for iron angles		-	-	-	-	-	7227
II. Incremental income	a	-7278	-7278	3346	17289	27491	34718
	b	-7038	-7038	3079	16983	27132	34359
III. Investment cost	a	35572	5381	-	-	-	-
	b	35702	5392	-	-	-	-
IV. Net cash flow	a	-42850	-12659	3346	17289	27491	34718
	b	-42740	-12430	3079	16983	27132	34359

a - Excluding family labour.

b - Including family labour.

(The sample farmers did not report any water shortage for irrigating grapes though rainfall was below normal during the year 1985.)

Statement 2 : Internal Rate of Return for Three Size Groups
(Including Family Labour) (64 cases)

Size group	IRR (%)
Less than 1 acre	11.19
One acre	19.74
More than 1 acre	35.18
	29.79

Statement 3 : Distribution of Beneficiaries According to
Internal Rate of Return (Including Family
Labour) (64 cases)

IRR % Class	Frequency
Upto 20%	12
20% - 40%	27
40% - 60%	13
60% - 80%	12
Total	64