

GOKHALE INSTITUTE MIMEOGRAPH SERIES NO. 15

**STUDY OF THE HIGH YIELDING VARIETIES PROGRAMME IN
MAHARASHTRA (1967-58)**

PART I : KHARIF BAJRA IN NASIK DISTRICT

PART II : RABI JOWAR IN POONA DISTRICT

S. W. MURANJAN

GOKHALE INSTITUTE OF POLITICS AND ECONOMICS,
POONA 4 (INDIA)

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FOREWORD

The present study consists of the reports of two investigations, the second and the third in the series, undertaken by the Agro-Economic Research Unit of the Institute into the problems of planning, organization and implementation of the high-yielding varieties programme in Maharashtra State in its initial stages namely in 1967-68. Since then, the programme has made considerable progress. Nevertheless, it is hoped that these studies would be ^{of} interest to students of planning and implementation of development programmes especially in agriculture.

V.M. Dandekar,
Director.

Gokhale Institute of
Politics & Economics,
Poona-4

January, 1972.

PREFACE

A series of studies on the high yielding varieties programme were undertaken by the Agro Economic Unit at the Gokhale Institute of Politics and Economics, Poona, at the instance of the Ministry of Food and Agriculture, Government of India. The two reports included in this mimeograph are the second and the third in the series of studies conducted by the Unit in Maharashtra. The first study carried out in 1966-67 dealt with the high yielding variety of paddy. It was therefore, decided that the subsequent studies should deal with the high yielding varieties of the other food crops. Accordingly, the studies in 1967-68 were centred on the high yielding varieties of jowar and bajra which are the other two important food crops in the State. Part I of this mimeograph deals with bajra which is grown in the Kharif season and Part II deals with jowar which is largely grown as a rabi crop.

The objectives of this study were the examination in depth of the planning and implementation of the programme at the district, block and village levels, the role of agricultural credit in the implementation of the programme, the profitability of the varieties and the response these varieties were likely to get in the future implementation of the programme. It was observed that hybrid bajra was quite successful and within the limitations imposed by the characteristics of the variety and the physical features of the area, it had a good chance of success in future. This was, however, not so with hybrid jowar. The programme for hybrid jowar in the selected district also proved to be too ambitious. As a result, it turned out to be an utter failure in spite of the well organised effort made to implement it.

The two parts of this mimeograph are the revised forms of the original notes submitted to the Ministry from time to time during the year of investigation. Part II is especially very much concised to avoid repetitions of the various aspects of the programme described already in details in Part I and the earlier publication on paddy. Part II is, therefore, merely a summary of the notes along with the necessary tables.

The author expresses his gratitude to all the concerned officials in the selected blocks and districts and the state who spared no pains to make available to him all the material that was needed for these investigations.

S. W. Muranjan.

CONTENTS

	<u>Page</u>
FOREWARD	v
PREFACE	vii
LIST OF TABLES	xii

PART I

Kharif Bajra in Nasik District

CHAPTER 1 : INTRODUCTION	1
--------------------------	---

Introduction - Outline of the high yielding varieties programme - Selection of the crop and the district - Selection of the blocks and villages for the survey - Selection of the cultivators - Executive functions assigned to the different officials for the implementation of the programme - Instructions issued for the organization of the programme.

CHAPTER 2 : ORGANIZATION AND IMPLEMENTATION OF THE PROGRAMME IN THE SELECTED DISTRICT AND BLOCKS	5
--	---

Nasik district - High yielding varieties programme in the preceding year in Nasik district - Seed production programme - Schemes preceding the high yielding varieties programme - The staffing pattern for the programme - The formulation of the target - The blockwise breakup of the target - The official agencies connected with the implementation of the programme - The unofficial agency - The administrative arrangements made for the programme - Recommended cultural practices for hybrid bajra - Merits and demerits of the variety - Estimation of the inputs and organization for the programme - Additional executive functions assigned to the staff in the district - The role of the Panchayat Raj bodies - Disbursement of the inputs in the district and the selected blocks - The achievement of the target.

CHAPTER 3 : IMPLEMENTATION OF THE PROGRAMME IN THE SELECTED VILLAGES	15
--	----

Characteristics of the selected villages - The 'phad' system - Previous experience about the variety in the selected villages - Village targets and the arrangements for their achievement - Number of participants - Distribution of seed - Distribution of fertilizers - Disbursement of loan in cash - Actual input of

seed - Characteristics of the participants and the non-participants.

CHAPTER 4 : COSTS OF CULTIVATION, CREDIT REQUIREMENTS AND PRODUCTION FROM THE VARIETY 30

Outlays over the inputs - Financing the outlays - Production from the hybrid and local varieties - Repayment performance of the participants and the non-participants - Profitability of the new variety.

CHAPTER 5 : SUMMARY AND CONCLUSIONS 52

Formulation of the target - Plans for achievement of the target - Revision of the target - Estimation of requirements and the disbursement of the inputs - Village targets and the arrangements made for their achievement - Distribution and use of the seed supplied - The real achievement of the target - Characteristics of the participants and the non-participants - Distribution and use of fertilizers - Distribution and use of pesticides - Disbursement of credit in cash - Cash expenditure over local and hybrid varieties - Sources of financing the cash expenditure - Requirements of credit for the new variety - Productivity of the new variety - Profitability of the new variety - Conclusions and some lessons from the study.

PART II

Rabi Jowar in Poona District

1. Introduction	.....	1
2. Formulation of the target	.....	1
3. Previous experience about the variety	.....	2
4. Staff available for the programme	.....	2
5. Seed production programme	.....	2
6. Administrative arrangements for the programme	.....	3
7. Estimation of the inputs	.....	3
8. Organization of the programme	.....	4
9. Achievement of the targets	.....	5
10. Disbursement of the inputs	.....	5
11. Targets for the selected villages and the arrangements made for their achievement	.....	6
12. Distribution of the seed	.....	7
13. Use of the seed	.....	8

	<u>Page</u>
14. The real achievement of the target	9
15. The participants and the nonparticipants	9
16. Participation in relation to the size of the holding	9
17. Land use pattern of the participants and the non-participants	9
18. Cropping pattern of the participants and the non-participants	10
19. The main factors influencing participation	11
20. Other factors influencing participation	11
21. The problem of irrigation	12
22. Distribution of credit	13
23. Use of the fertilizers and the pesticides	13
24. Outlays over the inputs : the concepts used	14
25. Cash expenditure and the costs	15
26. Expenditure over different items	15
27. Sizewise distribution of the expenditure and the costs	16
28. Variations in the outlays for irrigated and non-irrigated jowar	17
29. Financing the outlays	17
30. The problem of fodder	18
31. Crop conditions	18
32. Production of grains from the hybrid and the local varieties	19
33. Sizewise distribution of production	19
34. Production of fodder from the hybrid and the local varieties	20
35. Disposal of the produce	21
36. Profitability of the new variety	21
37. Prospects for the variety	22
38. Conclusions and some lessons from the study	22

LIST OF TABLES

<u>Table</u>	<u>Page</u>
<u>PART I</u>	
1. Blockwise distribution of the targets fixed at the various stages in the formulation of the final target	8
2. Number of cultivators growing local and hybrid bajra with and without irrigation	18
3. Quantities of seed distributed through the different agencies in the selected villages	19
4. Actual input of seed per acre in case of the selected participants	21
5. Classification of the selected participants and nonparticipants by size of the cultivated holdings	22
6. Size of the cultivated holding and land use pattern of the participants and the non-participants selected from the four villages	23
7. Size of the cultivated holding and land use pattern of the selected participants and the nonparticipants in Khamatane	24
8. Size of the cultivated holding and land use pattern of the selected participants and the nonparticipants in Aundane	25
9. Size of the cultivated holding and land use pattern of the selected participants and the non-participants in Kukane	26
10. Size of the cultivated holding and land use pattern of the participants and the non-participants in Varhane	27
11. Cropping pattern of the participants and the non-participants selected from the four villages ...	29
12. Per acre cash expenditure and per acre costs over hybrid bajra in case of the participants	31-32
13. Per acre cash expenditure and per acre costs over local bajra in case of the participants and the non-participants	34-35
14. Sources of finance for current farm expenditure over hybrid bajra in case of the selected participants	37-38

<u>Table</u>	<u>Page</u>
15. Sources of finance for current farm expenditure over local bajra in case of the selected participants and the non-participants	39-40
16. Amounts borrowed and the number of participants borrowing from the different sources for the cultivation of hybrid bajra	43
17. Amounts borrowed and the number of participants and the non-participants borrowing from the different sources for the cultivation of local bajra	44
18. Production of grains from the hybrid and local varieties on the irrigated and the nonirrigated farms in the different size groups of the selected participants and non-participants in the different villages	45-46
19. Production of fodder from the hybrid and local varieties on the irrigated and nonirrigated farms in the different size groups of the selected participants and nonparticipants in the different villages	47-48
20. Sales and repayment performance of the participants and the non-participants	50

PART II

1. Classification of the selected participants and non-participants by size of the cultivated holding	10
2. Size of the cultivated holding and land use pattern of the participants and the non-participants selected from the four villages	11
3. Size of the cultivated holding and land use pattern of the selected participants and non-participants in Khanote	13
4. Size of the cultivated holdings and land use pattern of the selected participants and non-participants in Bhandgaon	14
5. Size of the cultivated holdings and land use pattern of the selected participants and non-participants in Korhale	15

<u>Table</u>	<u>Page</u>
6. Size of the cultivated holding and land use pattern of the selected participants and non-participants in Pimpali	16
7. Cropping pattern of the participants and the non-participants selected from the four villages.....	17
8. Average per cultivator area devoted to irrigated jowar in the different size groups of the participants and the non-participants	19
9. Per acre cash expenditure and per acre costs over hybrid jowar in the different size groups of the participants	23-24
10. Per acre cash expenditure and per acre costs over local jowar in the different size groups of the participants and the non-participants	26-27
11. Per acre cash expenditure and per acre costs over irrigated and nonirrigated hybrid and local jowar in case of the participants and the non-participants	29-30
12. Sources of finance for current farm expenditure over hybrid jowar in the different size groups of the selected participants	33-34
13. Sources of finance for current farm expenditure over local jowar in the different size groups of the selected participants and non-participants	35-36
14. Production of grains from the hybrid and local varieties on the irrigated and the nonirrigated farms in the different size groups of the selected participants and non-participants in the different villages	39-40
15. Production of fodder from the hybrid and local varieties on the irrigated and nonirrigated farms in the different size groups of the selected participants and non-participants in the different villages	42-43
16. Production and disposal of the produce	44

PART I

KHARIF BAJRA IN NASIK DISTRICT

Chapter 1

INTRODUCTION

The introduction of high-yielding varieties in place of the local and the other improved ones has been one of the main strategies for covering the deficit of foodgrains in Maharashtra State. These varieties have been evolved in respect of all the major foodgrain crops and they have been tested on the experimental farms for their capacity to give larger yields. The programme of introduction of these varieties was launched in the year 1966-67 and hence experience over a year about the response of these varieties on the cultivators fields was available when the programme studied in the present report was planned by the Maharashtra Government. The present report thus pertains to the second year of the High Yielding Varieties Programme in the State.

The main objectives of this study were to examine in depth the planning and implementation of the programme at the district, block and village levels and the role of credit in the implementation of the programme. A deeper examination of the planning and implementation of the programme was thought to be necessary to help in smoothening and hastening these processes and in eliciting greater response of the cultivators in the subsequent years. The other objective of the study emerged in the context of the alterations in the input structure, these varieties are expected to bring in. It is a well-known fact that the high yielding varieties give a greater response to very heavy doses of fertilizers and the other inputs when compared to the local ones. It is, therefore, imperative that a programme of high-yielding varieties must synchronise with a programme of higher credit disbursements to the cultivators to enable them to use the most responsive doses of inputs to derive the optimum benefit from their cultivation. This necessitated an examination of the extent of the resulting demand for credit and inputs, the role of the various institutions such as the cooperatives and the Government in providing the services and in meeting these demands and the coordination among different agencies participating in the programme.

Outline of the High Yielding Varieties Programme

The main contents of the high-yielding varieties programme as envisaged by the Central Ministry of Food and Agriculture were noted as below:

- (1) Selection of suitable areas within the district and its phasing over the five year period.
- (2) Completion of preparatory arrangements such as placing full complement of staff in position and their training.
- (3) Production of certified seeds through National Seed Corporation, State Seed Corporations, State Seed Farms and the net work of registered growers.
- (4) Making suitable arrangements for supplying treated seeds to cultivators or ensuring such treatment before they are sown.

- (5) Organization of timely supplies of seeds to cultivators willing to take up this programme either through existing supply points or by way of opening new depots.
- (6) Ensuring the application of recommended quantity of fertilizers in order to achieve the main objective of increasing per acre crop yields.
- (7) Making adequate arrangements for the timely supply of plant protection equipment and pesticides.
- (8) Making suitable arrangements for supplying seed, fertilizers etc. on credit.
- (9) Ensuring systematic follow-up of the programme at the level of the cultivator and the village so as to facilitate assessment of the performance and extending the area under these varieties.
- (10) Provision of adequate marketing facilities and price support.

Selection of the crop and the district

As in the Agro-Economic Unit located at the Gokhale Institute of Politics and Economics, we had already conducted a study of the high-yielding variety of paddy during the year 1966-67, ^{1/} it was decided to study the programmes for bajra and jowar which were the other two staple food-crops in the State, during the current year. Bajra being a crop of the Kharif season, it was decided to study jowar in the rabi season to spread out the programme of investigations over the year.

Among the different districts in the State the target fixed for hybrid bajra was the largest viz. 1.19 lakh acres in Nasik district. Hence Nasik district was selected for a detailed study. The present report deals only with the study of the hybrid bajra programme in Nasik district.

Selection of the blocks and villages for the survey

The Agricultural Department of the Zilla Parishad in Nasik district was approached for suggesting two of the blocks for the survey wherein the cultivators were expected to give the 'best' response for the programme. Baglan and Malegaon blocks, both of which were located in the north eastern part of the district were recommended by the Department for this survey.

The officials in these two blocks were then approached for suggesting the names of two villages in each block, wherein the farmers had given a good response for the programme. The villages Kukane and Varhane were suggested for the survey in Malegaon block and villages Khamatane and Aundane in Baglan Block. The number of participants in all these villages except Khamatane was found to be adequate for the purpose of selection of the participants. In the village Khamatane, however, only eight cultivators had sown hybrid bajra and hence a nearby village namely Tilwan was covered along with Khamatane to get the required number of culti-

^{1/} High-yielding Varieties Programme in a district in Maharashtra State - S.W.Muranjan. Mimeograph Series No. 4, Gokhale Institute of Politics and Economics, Poona-4.

vators for the sample.

Selection of the cultivators

All the households in these selected villages were listed on a listing schedule. The cultivating households were divided into two groups according to whether they had sown hybrid bajra or only the local variety of the crop. In Tilwan, three of the cultivators had purchased hybrid bajra seeds but had not sown the seeds by the time of the investigation until the last week of July. They were, therefore, not considered for inclusion in the sample.

The cultivators who had sown hybrid bajra were arranged in a descending order according to the size of the holding and they were further divided into five equal groups. Three cultivators were selected at random from each of these groups so as to have 15 hybrid bajra growing cultivators (i.e. the participants) from each village.

The selected participants were further divided into two groups according to whether they cultivated hybrid bajra with the help of irrigation or as a rainfed crop. The cultivators who had grown only the local bajra (i.e. the nonparticipants) were also similarly divided into two groups. Fifteen non-participants were selected from among these two groups in such a way that the number of nonparticipants selected from each of these groups was equal to the number actually falling in a corresponding 'irrigated' or 'un-irrigated' group of the participants. The selection of the required number of non-participants was made at random by dividing the non-participants in the 'irrigated' and the 'unirrigated' groups into suitable equal groups as in the case of the participants. Fifteen participants and an equal number of non-participants having similar characteristics as the participants in respect of providing irrigation for their bajra crop were, thus, selected from each village to ensure comparison between the two samples.

In all the villages except the village group namely Khamatane-Tilwan, the participants cultivated hybrid bajra only with the help of irrigation. Hence all the nonparticipants in these villages had also to be selected from the group of cultivators growing local bajra by irrigation. It was only in the village group Khamatane - Tilwan, that three cultivators in the sample of the participants cultivated hybrid bajra as a rain-fed crop. Three cultivators in this village group were, therefore, selected from among the non-participants growing local bajra as a rain-fed crop and the remaining twelve cultivators were selected from among the nonparticipants growing local bajra by irrigation.

Executive functions assigned to the different officials for the implementation of the programme

The various officers at the state, division, district and taluka levels and the Grampanchayats and the staff at the village level were assigned with special functions in implementing the programme. The Director of Agriculture was to provide finance and the technical advice for the programme. The Superintending

Agricultural Officer for the division was to arrange for the supply of seeds and finance. The Chief Executive Officer for each Zilla Parishad was to hold complete responsibility for the implementation of the programme in his district, prepare estimates of the inputs, arrange for their supplies to the rural areas and secure the finance for the programme from the Superintending Agricultural Officer. The District Agricultural Officer and his staff was to prepare the time schedule for the implementation of the programme and distribute seeds, fertilisers, pesticides and appliances to the farmers in time. The Block Development Officers were also associated with the timely distribution of the inputs. The Gramsevaks were to prepare the lists of the participating cultivators, prepare estimates of the supplies of inputs and hold demonstrations in the villages about the improved practices. They were to get associated in the distribution of inputs and in disseminating knowledge to the cultivators in the matter of cultivation of the variety. They were the final link in the implementation of the programme.

Instructions issued for the organisation of the programme

A circular was issued through the State Agricultural Department to inform the Agricultural Departments in every district about the steps to be followed in organizing and implementing the programme. These instructions pertained to the selection of areas, selection of farmers, preparation of Normal Credit Statements (N.C. Statements) for the Rural Credit Cooperatives, applications for taccavi loans, supply of inputs in kind, supply of inputs in case the supplies were delayed, recovery of loans and supervision over the programme. It was emphasized through the circular that as the programme was likely to be expanded on a very large scale in the subsequent years it was necessary to organize it in the current year with a view to derive the experience for the implementation of the programme in future.

Chapter 2

ORGANIZATION AND IMPLEMENTATION OF THE PROGRAMME IN THE SELECTED DISTRICT AND BLOCKS

Nasik District

The district lies in the north western part of the State along the eastern slopes of the Sahyadries. It has a population of about 18 lakh persons and it occupies an area of about 6000 square miles. The rainfall and the crop pattern show marked variations as one proceeds from its western to the eastern boundary. The western part receives a rainfall of about 190 cms. whereas it goes on declining upto 45 cms. on the eastern side. As a result of these rainfall variations paddy is grown along the western boundary whereas bajra is largely grown in the rest of the district.

Out of a total geographical area of about 38 lakh acres in the district, 60 per cent is under cultivation. The gross cropped area is 23.8 lakh acres out of which more than 9 lakh acres or about one third, is under the cultivation of bajra. No other single crop accounts for more than 10 per cent of the gross cropped area in the district. The area under irrigation is a little more than one lakh acres. Even though the Season and Crop Reports do not mention any area under irrigated bajra for this district, factual observations indicate that large areas under bajra especially in the northern and the eastern parts were having supplementary irrigation facilities.

High Yielding Varieties Programme in the preceding year in Nasik District

Targets for Kharif jowar, bajra and maize were set for the previous kharif season in the year 1966-67 also. The target for hybrid bajra was set at 54,000 acres. Because of the failure of the seed production programme in the state, it was, however, possible to supply seeds only for 3500 acres in Nasik district. Yet this made it possible to gain some experience for undertaking a sizable programme of 1.19 lakh acres in the year 1967-68 as noted earlier.

Seed production programme

The district had undertaken the seed production programme over 731 acres in the previous year i.e. 1966-67 and 1876.20 quintals of seed was produced to meet the requirements of seed in Nasik district as well as the other districts. This quantity of seed was sufficient for growing hybrid bajra over an area of 1.87 lakh acres at the rate of 1 kg. of seed per acre and over an area of 1.25 lakh acres if the farmers were to adopt a seed rate of 1.5 kgs. per acre as in the case of local bajra. The district had, thus, produced adequate seed for such a large target of 1.19 lakh acres.

Scheme preceding the high yielding varieties programme

The scheme for the intensive cultivation of food crops was first launched in this district since the year 1963-64. This scheme involved intensive efforts in the propagation of improved methods of cultivation for the food crops. Initially the programme was undertaken in Malegaon, Baglan and Nasik talukas and the area under the scheme was gradually increased every year to cover all the 13 talukas in the district. The high yielding varieties programme is being implemented as part of this scheme of intensive cultivation of food crops and at present these 13 talukas have been divided into 15 intensive agricultural area programme (IAAP) blocks.

The staffing pattern for the programme

Because of the implementation of the above scheme, a sizeable technical staff was available for the implementation of the high yielding varieties programme in this district. The staffing pattern for the intensive blocks consisted of one Campaign Officer and one Cooperative Officer at the district level and one Agricultural Officer and ten Agricultural Assistants for each of the intensive agricultural area programme blocks. There were, thus, as many as 15 Agricultural Officers and 150 Agricultural Assistants directly concerned with the implementation of the High Yielding Varieties Programme besides the technical staff at the Block and the District levels and the staff for other special schemes in the district. The total strength of the technical staff in Agricultural Department in this district was 263 but only 7 of the staff members were graduates in agriculture whereas the remaining were matriculates and below and had received training through the agricultural schools.

The formulation of the target

The target of 1.19 lakh acres for hybrid bajra in this district for the kharif season of 1967-68 was evolved through a long process which commenced in December 1966. The State Agricultural Department had informed all the districts about the formulation of the targets for the programme in this month. The tentative target for hybrid bajra suggested for this district through the Department was 75,000 acres. The district officials were asked to consider this suggestion and be prepared for a divisional level meeting at Bombay in the last week of January, where the targets were to be finalized for all the districts in the Bombay division.

The district officials called a meeting of the Extension and the Agricultural officials and it was decided in this meeting that in view of the very small achievement of the programme in 1966-67 and the other limitations, it would be possible for them to bring an area of only 56,000 acres under hybrid bajra during the current year. In the meeting at Bombay, however, the target for this district was raised to 1.19 lakh acres on the ground that the new variety should be introduced at least on 10 per cent of the area under the crop in a district.

The earlier target of 56,000 acres formulated by the District

Agricultural Department was, as we are told, built up from below and the Block Officers were also issued instructions to make arrangements for the implementation of the targets they had formulated. After the meeting at Bombay, however, the increased target had to be distributed again over the blocks and this was done in the second week of April, 1967. In the meanwhile in a meeting of the State Agricultural Department (AGRESCO meeting), the Parishad Agricultural Development Officer had raised the issue about the large size of the target in his district. It was decided in this meeting that the target may be brought down to 75,000 acres which was the target suggested by the State Agricultural Department earlier.

Nasik district had taken a lead in the production of hybrid seed for the bajra crop and was expected to supply it to other districts also. A stock of seed sufficient for 75,000 acres was, therefore, reserved for this district and the remaining stock was sent to the other districts. The blocks were also informed about the quantities of seed that would be made available to them on the basis of this target of 75,000 acres formulated in the AGRESCO meeting.

When the Parishad Agricultural Officer, however, received the communication about the final target, it was observed that the target had remained at 1.19 lakh acres and not at 75,000 acres as was decided in the earlier meeting.

It, therefore, appears from the processes in the formulation of the target that even though the State insisted upon implementing a large target of 1.19 lakh acres for the programme for this district, the Agricultural Department was not prepared to execute such a large target and to avoid the wastage of seed, seed sufficient only for 75,000 acres were kept in the district even though the target on paper had remained to be 1.19 lakh acres.

The Blockwise breakup of the target

The blockwise distribution of the earlier target of 56,000 acres built from below, the target of 1.19 lakh acres fixed by the State and the target of 75,000 acres decided by the district have been given in Table 1. The table would indicate that the programme was intended for 10 of the 13 blocks as the remaining three blocks were located in the paddy growing tract. The targets at the three stages fluctuated mainly according to the fluctuations in the total targets for the district. There was a considerable upward revision of the target for Chandvad block whereas the final target was even lower than the one built from below for Sinnar block. The targets which were said to have been built up from below were, as was revealed later, merely the figures quoted by the Agricultural Officers in these blocks, in a meeting called for the formulation of the target for the district as early as in January.

The final targets in these blocks varied from 3000 to 12000 acres per block according to the extent of land under bajra cultivation. The target acreages were the largest viz. 12,000 acres in Baglan and Malegaon blocks which were recommended by the Department for this survey.

Table 1. BLOCKWISE DISTRIBUTION OF THE TARGETS FIXED AT THE VARIOUS STAGES IN THE FORMULATION OF THE FINAL TARGET

Block	The target which was said to have been built up from below	The target given to the district by the State at the meeting at Bombay	The target which was decided in the meeting at the State Agricultural Department and implemented finally
1. Nasik	6,000	13,000	9,000
2. Niphad	5,000	13,000	8,000
3. Baglan	10,000	14,000	12,000
4. Malegaon	10,000	14,000	12,000
5. Nandgaon	10,000	14,000	10,000
6. Dindori	5,000	12,000	8,000
7. Kalvan	3,000	8,000	6,000
8. Sinnar	4,000	8,000	3,000
9. Chandvad	1,000	5,000	3,000
10. Yevla	2,000	4,000	4,000
11. Igatpuri	-	-	-
12. Peth-Marsul	-	-	-
13. Surgana	-	-	-
Total	56,000	1,19,000	75,000

The Official Agencies connected with the implementation of the programme

The Agricultural Department of the Zilla Parishad was the main implementing agency for the programme. Besides the Zilla Parishad, the District Central Cooperative Bank was to supply credit to the village cooperatives through its branches all over the district and the District Cooperative Sale and Purchase Union was to supply seeds and fertilizers through the Taluka Sale and Purchase Unions in each block. The disbursement of these inputs through the village cooperatives was to be supervised by the Cooperative Supervising Unions in each block. The Cooperative Department which was in the State Sector and not under the Zilla Parishad, was to supervise and guide the overall functions of these various agencies for the programme.

The Unofficial Agency

Besides the above mentioned official agencies, one unofficial agency had also participated indirectly in this programme. There was an American Missionary at Manmad, a town about 25 miles from Nasik, which had gained popularity in the area as the institution of the 'Father Baba'. It was learnt that the agency had supplied hybrid bajra seeds to a few cultivators and

fertilizers to a large number of cultivators in some of the blocks. These supplies were made on a credit basis even though transactions appeared as 'gifts' on records. Though it was not obligatory on the part of the cultivators to repay these loans, an organisational set up had been created in the villages in such a way that the agency would be in a position to recover at least a large part of the loan.

The Administrative arrangements made for the programme

The Agricultural Department at the State level had issued a circular about the arrangements to be made for the implementation of the programme to all the Zilla Parishads and the other agencies connected with the programme as noted earlier. It was suggested through this leaflet that the programme should be implemented in blocks of 100 to 300 acres according to the sources of irrigation available. Once such areas were selected, the farmers cultivating in these areas should be persuaded and they should be listed according to whether they were eligible for the cooperative loans or the taccavi loans or they would purchase the inputs in cash. Those who were eligible for the cooperative loans were to be included in the N.C. Statements for the cooperatives/were to be directed to the revenue official for getting the taccavi loan. The circular further dealt with the steps to be followed in getting the loans sanctioned and in disbursing the inputs. Coordination committees were to be formed at the district and the taluka levels. In some of the blocks, however, instructions were issued that such committees may be formed even on the village level.

Recommended cultural practices for hybrid bajra

Leaflets describing the cultural practices for hybrid bajra were issued at the State and the district levels and also in one of the selected blocks namely, Baglan Block. No leaflets were issued in Malegaon block. Moreover, there was no need for issuing any special leaflets for the farmers as a leaflet describing the cultural practices for the variety had been inserted in each bag of seed distributed for the programme. It was stated in these leaflets that the land should be prepared well by ploughing and harrowing and 5 to 10 cart-loads of manure should be used per acre. The seeds should be sown in rows 18 to 24 inches apart and the crop thinned out so as to keep a distance of 6" between the plants in a row. One to one and a half kilograms of seed was stated to be sufficient for an acre of the crop. The doses of fertilizers recommended in the state and the district and block leaflets, however, differed. In the leaflet for the state it was recommended that NPK should be used at the rate of 20:15:10 kgms per acre, and half the dose of nitrogen should be used while sowing and the other half should be used 25 to 30 days after sowing. In the district and the block leaflets and the leaflets inserted in the seed bags, the use of NPK was recommended at the rate of 30:20:15 and the dose of nitrogen was divided into two equal parts of 15 kgms. for its use as above. It is, however, not possible to know the reasons for this difference but it might be due to the varying nature of the recommendations for the cultivation of the crop under the dry and the irrigated conditions. It was also recom-

/ whereas those who were not the members of the cooperatives

mended through all these leaflets that 10 per cent and 5 per cent B.H.C. powder should be dusted over the crop in case of the attack of the pests.

Merits and demerits of the variety

The main feature of this variety as stated in the leaflets, was that it tillered very profusely and each tiller was capable of bearing an earhead which attained a length of about 20-25 cms. The variety was capable of giving a yield which was 60 to 100 per cent more than the yield from the local varieties. It was further stated that the variety could yield about 900-1000 kgms. per acre under the rain-fed conditions and about 1400-1500 kgms. per acre when grown by irrigation. The internodes had a reddish colour and the fodder produced being quite leafy, the yield of fodder came to 2500-3000 kgms. per acre. The only demerit with the variety was that the grains produced from its cultivation had no value as a seed for the subsequent crops.

Estimation of the inputs and organization of the programme

Since the targets varied at different stages, different estimates were prepared at different times. A coordination committee consisting of the representatives of the Zilla Parishad, Cooperation Department, District Cooperative Bank, and the Co-operative Sale and Purchase Union was formed for the organization of the programme. The Chief Minister of the State visited the district specially for the programme. The target at the time of his visit stood at 1.19 lakh acres. A detailed note was submitted to him by the Zilla Parishad and the note gives the estimates of inputs and the position of the district in respect of the supplies of these inputs. The requirements of seed for hybrid bajra programme were estimated at 1785 quintals but the district had already on hand a stock of 2005 quintals. The requirements of fertilizers for the total high yielding varieties programme and the other improved varieties programme over 2.68 lakh acres, including jowar, maize, paddy for all the three seasons, was estimated at 26 to 30 thousand M. tons. The total stock of fertilizers at hand was 8371 M. tons whereas indents had been already placed for 11602 M. tons. This was thought to be sufficient for the programme in the kharif season. It was, however, stated in this note that there were certain difficulties in the implementation of such a large programme as three of the talukas in the district were entirely paddy growing areas. Besides this factor, gram, ragi and wheat were the other important food crops which had not been covered under the programme. It was, therefore, argued in this note that it might be difficult to implement a large target for a programme covering only a few crops.

The Secretary for Agriculture had held a meeting at Poona by the end of April. The district was visited thereafter in June by other officials at the divisional level and the state level, including the Director of Agriculture, the Joint Director of Agriculture and the Agricultural Commissioner. A note prepared on the occasion of such a visit in June gives an idea of the implementation of the programme till that month. It was

stated in this note that the district had an adequate stock of seeds. On the contrary the district had supplied seeds sufficient for about 1.25 lakh acres to the other districts. The district had been adequately supplied with fertilizers. Though the district was yet to receive about 13,000 M. tons of fertilizers, the existing stock was sufficient for the kharif season. Till the 26th of June, however, only 46,665 kgms. of seeds had reached the blocks. So also the N.C. Statements had been prepared only for 27,478 acres. The stock of pesticides at the block level was considered to be quite adequate for the purpose. It was mentioned in a similar note that quite a large number of farmers who had taken part in the hybrid bajra seed production programme, possessed large quantities of the rejected seed. This seed was a little smaller in size and it was likely that a number of cultivators might purchase such rejected seed at a cheaper price and 20 per cent of the targetted acreage may, thus, get covered through the natural spread.

Additional executive functions assigned to the staff in the district

Specific jobs were assigned to the different officials in the district as brought out in a printed note mentioned earlier. Besides the staff employed in the state sector for the different programmes in this district, for example, soil conservation, was also requisitioned for the purpose. Though the Gramsevaks and the Agricultural Assistants had their own areas of operation for their routine duties, for the purpose of this programme,

the areas of operation were narrowed down to avoid overlapping and each of these personnel were given only two or three villages for the implementation of the programme. The staff from the state sector had been also assigned specific groups of villages nearby their areas of operation.

The role of the Panchayat Raj Bodies

The Zilla Parishad and the Panchayat samities held the final responsibilities for the implementation of the programme at the district level and the block level respectively. The President of the Zilla Parishad and the Chairman of the Panchayat Samities were the authorities controlling these bodies. Being the office bearers of the elected bodies, no specific functions, were as such assigned to them in the implementation of the programme. They had, however, the complete authority over making any changes in the programme in the areas under their jurisdiction. The President and the Chairmen always presided over the meetings held for this programme and we were told that being the peoples representatives, the farmers could follow them more readily than the officials of the Department.

It was not possible for us to discuss the problems with the individual members of these bodies as they could be met only at the time of meetings held once a month. The discussions with the President and the other office bearers of the Zilla Parishad and the Chairmen of the Panchayat Samities in the selected blocks, however, revealed certain interesting matters. The kharif

season programme being synchronised with the period of election of these bodies, it was not possible for these office bearers and the members to work for the programme so enthusiastically as in the previous year. These panchayat raj bodies had, however, taken a lead in the fixing of the targets for the district and the blocks. In the Chandvad block, for example, quite a low target was fixed initially by the officials but the President himself took interest in the programme and raised the target to a level noted earlier. During the course of the field work we were told that this was likely to be the only block in which the target was likely to be achieved fully.

The Chairmen of the panchayat samities mainly took active part in organizing meetings for the programme in some of the villages. So also along with the other members they took part in persuading the cultivators to grow the new variety over blocks of compact irrigated areas and in solving their difficulties about credit, fertilizers etc. Some of the members, as was brought to our notice, played an important role in organizing seed production programmes as such area programmes required well coordinated activities over large blocks of land. It, therefore, appeared from the discussions with these office bearers that the elected representatives on the Panchayat Bodies had a specific role in organising and coordinating the various activities in the area programmes and in convincing the people about the importance of the variety on behalf of the officials of the Department. Not all the members were, however, active in these respects and such activities as we learnt, were undertaken only at a few places in the selected blocks.

Disbursement of the inputs in the district and the selected blocks

The hybrid bajra crop was to be financed at the rate of Rs. 180 per acre. The finance was to be provided in two instalments. The first instalment consisted of a kind component of Rs. 115 and a cash component of Rs. 40. The kind component consisted of seeds worth Rs. 15, fertilizers worth Rs. 70, pesticides worth Rs. 20 and oil for the engines worth Rs. 10. The second instalment involved disbursement of Rs. 25 in cash.

The District Cooperative Bank had made the beginning for the implementation of the programme in December 1966 itself. It was stated in a circular issued in this month that the N.C. Statements should reach the supervisors by the 31st of December and the Bank should receive these statements by the 15th of January 1967 for the final sanction. But since the Bank had not received any statements even upto the 27th of January, a fresh reminder was issued on that date.

Another action programme was formulated at the divisional level meeting held at Bombay, according to which the N.C. Statements were to be prepared and submitted to the Bank by the end of February and the Bank was to sanction the statements by the 15th of March. Dates were also fixed for getting the credit limits sanctioned by the State Cooperative Bank and the Reserve Bank.

So also it was decided that all the societies should procure the seeds and fertilizers from the supplying agencies by the 15th of May.

In spite of these action programmes, the preparation of the N.C. Statements itself took much time. There were 1047 primary societies in the district, out of which 119 societies belonged to 'D' class and were not eligible for the loans. By the end of May, the Bank received only 306 N.C. Statements out of which 275 could be sanctioned during the month. The number of statements received upto the end of July was 771. The Bank sanctioned all these statements except one. Nearly 5/8th of the N.C. Statements thus reached the Bank in June and July. There were 134 and 108 societies in Malegaon and Baglan Blocks and N.C. Statements were sanctioned for 96 and 75 of these societies respectively.

The amount sanctioned through the N.C. Statements for the total High Yielding Varieties Programme in Nasik district came to Rs. 94.10 lakhs. The amount sanctioned for hybrid bajra worked out to Rs. 55.91 lakhs for an area of 30,700 acres. The cultivators borrowed only Rs. 19.38 lakhs or 34 per cent of the amount sanctioned. Similar percentages for Malegaon and Baglan blocks worked out to around 40 and 30 per cents respectively.

In addition to the loans through the cooperatives, taccavi loans were disbursed for the programme through the Revenue Department. These loans were given only in kind in the form of seed and fertilizer and they were restricted only to the cultivators who were not members of the cooperative societies. An amount of Rs. 6 lakhs was granted to Nasik district for this purpose. The amounts allotted to Malegaon and Baglan blocks were Rs. 75,000 and Rs. 60,000 respectively. Out of these allotments, the cultivators borrowed Rs. 32,000 and Rs. 3,000 in these blocks respectively. It appears that the taccavi loans could not be channelised properly in the Baglan block as the block agency had not taken any initiative in their disbursement. In Malegaon block, on the contrary, the Block Development Officer had instructed the Gramsevaks to include the non-members of the cooperative societies desirous of growing the variety in the village lists and forward their names to the Patwaris.

In addition to the taccavi loans for the nonmembers, the Government has made a provision to finance even those who had become defaulters in the repayment of their cooperative loans for some genuine reasons. An amount of Rs. 5000 was allotted to the district for financing such cases. This order was, however, issued quite late on 25th August 1967 (when the crop had flowered) and it was received in the district even later. As a result, the entire amount had to be surrendered back to the State Government.

Even though a quantity of 476 quintals of seed had reached the blocks, the actual distribution of seed in all blocks came to 336 quintals. This meant that seed sufficient only for around 33,000 acres was purchased by the cultivators. The quantities distributed in the Malegaon and Baglan blocks were 64.11 and 34.56 quintals respectively.

Apart from the delay in the preparation of the N.C. Statements, there was also delay in the purchase of the seed by the taluka sale and purchase unions. The first consignment of seed was received by the unions in the selected blocks by the 10th of June. This delay was solely due to the policy of the Government in asking these sub-agents to purchase the seed in cash and not on a consignment basis as was the general practice with the purchase of materials. This meant that the village level societies would have also to purchase the seed on a cash basis. None of the societies could come forward to purchase the seed initially and hence it created difficulties in the supply of seed for the programme. The policy was, however, modified by the 12th of June and the sub-agents could resume their normal procedures in the supply of seed on a consignment basis.

Though fertilizers were supplied in adequate quantities along with the seed, it was not possible for us to get any figures for the disbursement of fertilizers for the variety as the data had not been compiled separately for the bajra crop. According to an estimate of the Agricultural Department in the district, the supply of fertilizers for the total high yielding varieties programme, however, worked out to 8132 M. tons only by the end of December 1967. The quantities supplied in the Malegaon and Baglan blocks were 1,447 and 1,850 M. tons respectively.

The Achievement of the target

After the season was over, it was reported that the variety was grown over 52,487 acres in the district. The official agencies had supplied seed only for 33,000 acres. A part of the seed produced in the district during the previous year was rejected by the Seed Corporation. In the opinion of the Block Agency this seed was also largely used by the cultivators as it was sold at a cheaper rate. The Block Agency after contacting the seed growers estimated that nearly 20,000 acres in the district were covered through such seed. For Malegaon and Baglan Blocks the coverages through the distribution of seed through the official agencies were reported to be 5,966 and 3,456 acres respectively. It was claimed that in addition to the above, the coverage through natural spread of rejected seed was 3,000 and 5,591 acres in these blocks respectively. As the seed production programme was undertaken only in two villages in these blocks, it would be unlikely that the seed was percolated naturally through these villages on such a large scale.

Based on the figures for the distribution of the seed, the Agricultural Department in the district had estimated the figure of 32,487 acres as the coverage in the district. A figure of 20,000 acres was merely added to this estimation hoping that there was really such a large coverage from the rejected seed. Moreover this coverage through the rejected seed was as high as 60 per cent of the coverage through the official distribution of the seed. The validity of such a large coverage can be judged more from the study of the four selected villages presented in the ensuing chapter.

Chapter 3

IMPLEMENTATION OF THE PROGRAMME IN THE SELECTED VILLAGES

Characteristics of the Selected Villages

All the selected villages were fairly small in size. The population of Kukane, Varhane and Aundane ranged from 900 to 1000 whereas the twin village Khamatane and Tilwan had a population of about 700 and 800 respectively. The earlier three villages were located on good roads having connections to important urban centres as Malegaon, Manmad and Satana whereas the later villages were connected to Satana by a cart track running around 4 miles. There were Grampanchayats, cooperative societies and schools imparting education upto the 7th standard in every village. Irrigation facilities were also available in every village. Well was the main source of irrigation in Kukane and Varhane in Malegaon block and in Khamatane in Baglan block whereas canal irrigation was an additional source in Aundane and Tilwan in Baglan block. The canal irrigation system in these villages was organised on the traditional cooperative basis and it was known known as the 'phad' system of irrigation.

The 'Phad' System

This system is centred around the construction of diversion bandharas for irrigation on mutual cooperation. Such bandharas irrigate around 65 acres in Aundane and 40 acres in Tilwan. The work of constructing a katcha bandhara and digging a canal for the purpose is done jointly and every family having land in the command area supplies one worker per acre. The 'phad' in Tilwan is useful only for the supplementary irrigation in the Kharif season whereas the one in Aundane is useful for perennial irrigation. The area to be irrigated in Aundane is divided into four blocks according to the volume of water that can be made available to each block. Usually the block nearer the opening of the main canal gets perennial water and the one farthest from it gets only seasonal irrigation. The cropping pattern for each block is decided jointly in a meeting of the beneficiaries held for the purpose in the beginning of the seasons. Every beneficiary in a block has to grow only those crops decided in the meetings. Two servants known as 'patakaris' are employed for irrigating the fields and they are paid in kind by the beneficiaries on the basis of the crop and the area irrigated. So also four watchmen known as 'Jagale' are appointed for the four blocks to protect the crop and they are also paid in kind on the basis of the area. The crops usually being grown under the 'phad' in Aundane, were bajra or cotton in the kharif season, wheat and gram in the rabi season and sugarcane at times on a part of the land according to the nature of flow of water available in the river. At Tilwan, the phad was being used exclusively for growing bajra or cotton because of the scarcity of water.

Previous experience about the variety in the selected villages

The variety was grown by a few farmers in Aundane, Varhane and Khamatane as well as in the neighbourhood of Kukane during the last year. At Aundane it was grown by four cultivators including the village level worker himself and the chairman of the cooperative society. Three of them had grown it with irrigation and they could harvest ten quintals or more of bajra per acre. The same was the case with one cultivator who had tried it as an irrigated crop in Varhane. The cultivator who had grown the variety as a rain-fed crop in Aundane could not get a good yield in relation to the yield from the local variety. In Khamatane it was grown by the Chairman of the Panchayat Samiti for the Baglan Block, who stayed in this village. Though he had grown it with irrigation, he could not get a good yield because of delayed sowing and the consequent attack of birds on the crop due to late maturity. The same was the experience at Munjawad in a village in the neighbourhood of Khamatane. As far as the villages Khamatane and Tilwan were concerned the experience with the variety was, thus, inadequate to establish the high yielding nature of the variety. In Kukane, on the contrary, there was adequate experience in this even though the variety was grown just in a neighbouring village in the last year. These experiences had an impact on the number of cultivators who agreed to participate in the programme in the current year.

Village targets and the arrangements for their achievement

The Agricultural Assistants in both blocks were informed about the programme in December. Each Agricultural Assistant was given a target for his circle consisting of about 8 to 12 villages and was informed to prepare lists of the cultivators who would be participating in the programme and to submit the lists to the cooperative societies for the preparation of the N.C. Statements. Such lists were ready within a month or so in the selected villages in Malegaon block but it took much time in Baglan block. In the meanwhile the targets were revised and villages were distributed among the Agricultural Assistants, Gramsevaks and the Soil Conservation Assistants and targets were fixed for each village. When the target for the district was revised for the third time, the targets given for the villages in Baglan block were reduced to suit the new target but the village level workers in the Malegaon block were not informed about the revision. The final targets for Kukane and Varhane were fixed at 50 acres for each village whereas for Aundane, Khamatane and Tilwan, the targets were 90, 60 and 44 acres respectively.

A number of meetings were held in all these villages to inform the cultivators about the programme. The Gramsevaks also canvassed for the programme with the individual cultivators to get as far as possible long lists of cultivators participating in the programme. The B.D.Os. and Agricultural Assistants also visited these villages and held meetings to ensure a good response for the variety.

In the villages from Malegaon Blocks, it was observed that

the Block Agency was very particular in getting the lists of participants as enlarged as possible and the Gramsevaks in the two selected villages were persuaded to prepare supplementary lists again and again. These lists were, for example, prepared twice in Varhane and thrice in Kukane. In addition to these lists, the Gramsevaks in these villages were asked to persuade cultivators who were not members of the cooperative societies, to grow the variety and prepare their list for submission to the revenue department for getting the taccavi loans for the variety. Not only this, a part of the seed was handed over to the Gramsevaks for sale in these villages on the cash basis. All these later steps were not undertaken in Baglan block. These efforts and the previous experience had, naturally, their impact on the proportion of the cultivators who could participate in the programme in the selected villages.

The presence of a large number of defaulter members in the cooperative societies in these villages created a problem in the implementation of the programme. The defaulters were eligible neither for the loan through the cooperatives nor through the revenue department. The proportions of defaulter members in the total membership in the societies in Kukane, Varhane, Aundane and Khamatane worked out to 52.0, 35.1, 56.1, and 22.3 per cents respectively.

The prevalence of the 'phad' system of cultivation which implied cooperative use of canal water and crop planning over large blocks of land under canal irrigation, was, however, a factor favourable for the implementation of the programme in the villages in the Baglan block. At Aundane, the Gramsevak could succeed in organizing the hybrid bajra programme in a 'phad' in this village whereas at Tilwan, the cultivators took a decision to devote the entire land in the 'phad' in this village for the cultivation of cotton.

Number of participants

The total number of bajra growing cultivators and the number of cultivators growing local bajra and hybrid bajra with and without irrigation in the selected villages during the kharif season of 1967-68, have been noted in Table 2.

The table indicates that out of 647 cultivators growing bajra crop in these villages, 110 or nearly 17 per cent had grown hybrid bajra. These percentages were quite high viz. 31 and 38 per cent in Aundane and Varhane whereas in Kukane 12 per cent of the bajra growing cultivators had grown hybrid bajra. The percentage was the least viz. 6.5 per cent in Khamatane (including Tilwan). 1/ Hybrid bajra was, however, mainly grown in the irrigated fields. Out of the 110 hybrid bajra growing cultivators, only 4 cultivators in Khamatane had grown it as a rain-fed crop. If the number of hybrid bajra growing cultivators are, however, compared with the number of cultivators growing their bajra crop

1/ All data for the twin villages Khamatane and Tilwan have been combined together for presentation henceforth.

TABLE 2. NUMBER OF CULTIVATORS GROWING LOCAL AND HYBRID BAJRA WITH AND WITHOUT IRRIGATION

Item	Kukane	Varhane	Aundane	Khamatane	Total
Total number of cultivators growing the bajra crop	168	110	93	276	647
Number of cultivators growing bajra with irrigation:					
Cultivators growing hybrid bajra	21	42	29	14	106
Cultivators growing local bajra	67	46	33	147	293
Total number of cultivators growing bajra with irrigation	88	88	62	161	399
Percentage of the number of cultivators growing hybrid bajra to the total number of cultivators	23.9	47.7	46.7	8.7	26.5
Number of cultivators growing bajra without irrigation:					
Cultivators growing hybrid bajra	-	-	-	4	4
Cultivators growing local bajra	80	22	31	111	244
Total number of cultivators growing bajra without irrigation	80	22	31	115	248
Percentage of the number of cultivators growing hybrid bajra to the total number of cultivators	-	-	-	3.4	1.6
Total number of cultivators growing hybrid bajra	21	42	29	18	110
Total number of cultivators growing local bajra	147	68	64	258	537
Percentage of the number of cultivators growing hybrid bajra to the total number of cultivators growing the bajra crop	12.5	38.2	31.2	6.5	17.0

with irrigation, it would be observed that even in Kukane 23 per cent of the cultivators of this category had grown hybrid bajra whereas in Aundane and Varhane, similar percentages worked out to nearly 47 per cent of both villages. In Khamatane, however, the percentage was quite low even in this respect.

Distribution of Seed

The seed was distributed in Kukane and Varhane in the first and the second week of July and in Aundane in the last week of June. In Khamatane, however, the seed had been procured by the society quite early and it was distributed by the 15th of June. The seed distribution on the taccavi basis and the cash sales through the block also coincided with the dates of seed distribution through the societies in the earlier two villages. On the whole, the supply of seed was delayed in the villages in Malegaon block whereas in Baglan block the seed was available quite in time. This was due to the delay in the preparation of the N.C. Statements in the earlier block.

The quantities of seed distributed in these villages through the different agencies have been noted in Table 3.

TABLE 3. QUANTITIES OF SEED DISTRIBUTED THROUGH THE DIFFERENT AGENCIES IN THE SELECTED VILLAGES

Village	Seed distributed through the societies kgs	Seed distributed through the revenue department kgs	Seed sold through the block agency kgs	Seed purchased through the sale and purchase union
Kukane	18.0	Not available	10.5	-
Varhane	67.5	18.0	3.0	-
Aundane	49.5	-	-	-
Khamatane	46.5	-	-	1.5
Total	181.5	18.0	13.5	1.5

Cooperative society was the main source of supply of seed in all these villages except in Kukane. In Kukane, 10.5 kgs of seed were sold through the block in cash as against distribution of only 18 kgs of seed through the society. Quite a number of persons had also obtained seed through the revenue department but the quantity obtained was not known. One cultivator in Khamatane had purchased the seed directly from the Sale and Purchase Union. In Khamatane the quantity of seed distributed by the society appeared to be quite large when compared to the number of participants in the village but three of the cultivators who had purchased 9 kgs of seed had not sown the seed by the time of this survey. So also one of the cultivators at Aundane had purchased 4.5 kgs of seed but had sold out 1.5 kgs to another cultivator and the remaining quantity was lying unused with him.

Distribution of fertilizers

Fertilizers were distributed either through the Cooperative Society or through the revenue department as a taccavi loan. The value of the fertilizers distributed in the villages Kukane, Varhane, Aundane, Khamatane and Tilwan came to Rs. 4930, Rs.4292, Rs. 2570, Rs. 980 and Rs. 547 respectively.

The supply of fertilizers was strictly according to the Normal Credit Statements sanctioned by the bank. Even though the supply of fertilizers was to be made at the rate of Rs. 70 worth of fertilizers per acre as noted earlier, quite varying per acre amounts had been sanctioned for the purpose in the selected villages. In Khamatane, the cultivators were sanctioned an amount of Rs.75 per acre for the purchase of fertilizers and pesticides as the first instalment and Rs. 35 per acre again as the second instalment. In Tilwan Rs. 50 were sanctioned per acre for the purchase of fertilizers under the intensive cultivation scheme and this was to be given in one instalment. Later an additional N.C. Statement was sanctioned and the cultivators were granted Rs. 25 per acre as the second dose. In Aundane, the amount sanctioned for fertilizers was Rs. 67.5 per acre and fertilizers were to be given in one instalment only. In Kukane Rs. 63 were sanctioned per acre for distribution in one instalment. In Varhane the first instalment was Rs. 55 and the second was Rs. 38 per acre. The cultivators could, however, get fertilizers worth about Rs. 70 per acre as decided in the provisions of fertilizers for the variety.

The same cultivators were counted again and again for the different crops either in the statements for short term credit or intensive cultivation credit or the hybrid programme credit. As a result, there was no paucity in the supply of fertilizers or credit for a farmer who could borrow for his farm as and when he needed. As the recommended seed rate was 1 kg. per acre, supplies of fertilizer were made for the programme on the basis of the kilograms of seed supplied and not on the basis of the area sown.

The cultivators were free to purchase any fertilizer of their choice from the amounts sanctioned. Not all the types of fertilizers were, however, always available through these societies. Only ammonium sulphate was available in Kukane and Tilwan; in Khamatane ammonium sulphate was provided along with manure mixture and along with super phosphate in Varhane whereas in Aundane a variety of fertilizers had been stocked such as ammonium sulphate, ammonium chloride, super phosphate, urea and a variety of manure mixtures.

The cultivators getting the seed from the revenue department on the taccavi basis had also received adequate taccavi for the purchase of the fertilizers as we were told. The figures for the same were, however, not available. Those who purchased the seed on the cash basis through the block agency had to face difficulties in the procurement of fertilizers for the crop. Some of them who were members of the societies but were not defaulters, had purchased fertilizers in cash through the short term loan. But those who were defaulters had to purchase small quantities of fertilizers on the cash basis or to obtain fertilizers through the American Missionary at Manmad.

Six of the selected participants in Aundane and one in Khamatane had received fertilizers worth Rs. 992 from the Missionary. It was lent as an interest free loan which was to be recovered after the harvest of the crop along with some donations according to the capacity of the borrower. The Missionary had appointed its own agents who were known as the 'Masters' for the distribution and recovery of these loans.

Disbursement of loan in cash

Loan was not disbursed in cash in any village except in Aundane. At Aundane, 5 cultivators received a cash loan of Rs.440 at the rate of Rs. 40 per acre. Other cultivators did not ask for the cash. One cultivator in this village, for whom a statement was sanctioned for four acres but who had actually purchased seed for two acres, was given cash for four acres as it was already sanctioned. There was in general no specific demand for cash for growing this variety as the cultivators had already received some cash loan for their farms again through the N.C. Statements prepared for the Short Term Credit and the Intensive Cultivation Credit Schemes. The Bank also adopted a policy of not issuing any cash for the purpose as the N.C. Statements prepared for the programme were of a supplementary nature and over and above the N.C. Statements for the other schemes.

Actual Input of seed

The actual input of seed per acre as revealed through the study of the selected fifteen participants in each village is noted in Table 4.

TABLE 4. ACTUAL INPUT OF SEED PER ACRE IN CASE OF THE SELECTED PARTICIPANTS

Village	Area under hybrid bajra acres	Input of seed per acre Rs.
Kukane	16.50	12.1
Varhane	22.33	12.2
Aundane	12.75	13.1
Khamatane	23.95	13.9
Total	75.53	13.0

Though the recommended seed rate was only 1 kg of seed costing Rs. 8 per acre, the selected participants had used seed worth Rs. 13 per acre. This worked out to a seed rate of 1.65 kg. per acre. There was not much variation in this respect in the different villages. This was evident as the normal seed rate for local bajra also varied around 1.5 to 2.0 kg per acre. It was recommended through the Agricultural Department that the crop should be sown at a distance of 18 inches between the rows. But since none of the cultivators possessed a seed drill for this

distance, the crop had to be sown at a distance of only 9 inches between the rows as in the case of local bajra. This factor was also largely responsible for the high seed rate. Thirdly, those cultivators or their farm servants who sowed the hybrid bajra crop were habituated to dropping the seed through the drill at this rate. It was, therefore, difficult for them to control the seed rate.

Characteristics of the participants and the non-participants

The selected participants and the nonparticipants have been classified according to the size of the cultivated holding in Table 5.

TABLE 5. CLASSIFICATION OF THE SELECTED PARTICIPANTS AND THE NONPARTICIPANTS BY SIZE OF THE CULTIVATED HOLDING

Size-group (acres)		Khamatane	Aundane	Kukane	Varhane	Total
0.1- 5.0	A	-	5	3	-	8
	B	1	5	4	3	13
5.1-10.0	A	3	3	6	2	14
	B	6	4	5	4	19
10.1-25.0	A	5	5	4	6	20
	B	8	6	4	7	25
25.1-50.0	A	6	2	2	4	14
	B	-	-	2	-	2
50.1 and above	A	1	-	-	3	4
	B	-	-	-	1	1
Total	A	15	15	15	15	60
	B	15	15	15	15	60

A = Participant. B = Nonparticipant.

Two-thirds of the participants had holdings above 10 acres whereas nearly half of the nonparticipants belonged to this category. Farmers with larger holdings had generally participated in the programme. In Aundane and Kukane, however, many of the farmers even with holdings below 5 acres had participated in the programme. This was a result of the phad system prevalent in the former village and of the large scale taccavi loans disbursed in the latter villages.

Table 6 gives the average size of the holdings and the land-use pattern for the participants and the non-participants in the selected villages whereas Tables 7 to 10 give the details in respect of the same for the individual villages. The average size of the cultivated holding for the participants was around

TABLE 6 : SIZE OF THE CULTIVATED HOLDING AND LAND USE PATTERN OF THE PARTICIPANT AND THE NON-PARTICIPANTS SELECTED FROM THE FOUR VILLAGES

Size group (acres)	Participants or non-participants	Average size of the cultivated holding (acres)	Of which owned (acres)	Percentage of the area owned to the cultivated holding (percent)	Of the cultivated holding area irrigated (acres)	Percentage of the area irrigated to the cultivated holding (percent)	Area sown more than once (acres)	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 - 5	A	3.62	3.60	99.45	1.81	50.00	1.13	31.22
	B	2.71	2.70	99.63	1.69	62.36	0.61	22.51
5.1 - 10	A	7.67	7.23	94.26	4.48	58.41	1.30	16.95
	B	7.47	7.11	95.18	2.63	35.21	1.11	14.86
10.1 - 25	A	16.90	14.70	86.98	7.80	46.15	2.80	16.57
	B	15.74	15.15	96.25	4.50	28.59	1.80	11.44
25.1 - 50	A	34.64	34.43	99.39	12.54	36.20	4.96	14.32
	B	31.63	31.63	100	9.04	28.58	3.75	11.86
50.1 & above	A	64.75	64.75	100	16.02	24.74	9.06	13.99
	B	63.00	63.00	100	16.75	26.59	7.30	11.59
Total	A	20.31	19.42	95.62	7.21	35.50	3.15	15.51
	B	11.63	11.25	96.73	3.65	31.39	1.46	12.55

A = Participants

B = Non-participants

TABLE 7 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN KHAMATANE

Size group (acres)	Participants or non-participants	Average size of the cultivated holding (acres)	Of which owned (acres)	Percentage of the owned holding to the cultivated holding (percent)	Of the cultivated holding area irrigated (acres)	Percentage of the irrigated holding to the cultivated holding (percent)	Area sown more than once (acres)	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 - 5	A	-	-	-	-	-	-	-
	B	4.50	4.50	100.00	-	-	-	-
5.1 - 10	A	7.83	6.00	76.63	3.31	42.27	0.79	10.1
	B	6.99	6.99	100.00	2.27	32.47	1.53	21.88
10.1 - 25	A	18.82	15.02	79.81	3.91	20.77	2.11	11.21
	B	17.65	17.65	100.00	4.15	23.51	1.94	10.99
25.1 - 50	A	35.50	35.00	98.60	7.60	21.41	2.83	7.97
	B	-	-	-	-	-	-	-
50.1 & above	A	90.0	90.0	100.00	16.25	18.56	15.00	16.67
	B	-	-	-	-	-	-	-
Total	A	28.04	26.21	93.47	6.09	21.72	2.99	10.66
	B	12.51	12.51	100.00	3.12	24.95	1.67	13.35

A = Participants

B = Non-participants

TABLE 8 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE
SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN AUNDANE

Size group (acres)	Partici- pants or non-parti- cipants	Average size of the cul- tivated holding (acres)	Of which owned (acres)	Percentage of the own- ed holding to the cul- tivated holding (percent)	Of the culti- vated holding area irriga- ted (acres)	Percentage of the area irrigated to the cul- tivated holding (percent)	Area sown more than once (acres)	Percentage of the area sown more than once to the cul- tivated holding (percent)
0.1 - 5	A	3.94	3.90	98.98	1.54	39.09	1.29	32.74
	B	2.63	2.63	100.00	1.39	52.85	1.00	38.02
5.1 - 10	A	6.41	6.17	96.26	2.89	45.09	1.90	29.64
	B	7.88	7.88	100.00	1.19	15.10	0.79	10.03
10.1 - 25	A	16.48	15.73	95.45	5.56	33.74	3.44	20.87
	B	15.25	15.00	98.36	3.81	24.98	1.90	12.46
25.1 - 50	A	32.00	32.00	100.00	15.13	47.28	10.00	31.25
	B	-	-	-	-	-	-	-
50.1 & above	A	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-
Total	A	12.35	12.04	97.49	4.96	40.16	3.29	26.64
	B	9.08	8.98	98.89	2.31	25.44	1.30	14.32

A = Participants

B = Non-participants

TABLE 9 : SIZE OF CULTIVATED HOLDING AND LAND USE PATTERN OF THE
SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN KUKANE

Size group (acres)	Partici- pants or non-parti- cipants	Average size of the cul- tivated holding (acres)	Of which owned (acres)	Percentage of the area owned to the culti- vated hold- ing(percent)	Of the culti- vated holding area irriga- ted (acres)	Percentage of the area irrigated to the cul- tivated holding (percent)	Area sown more than once (acres)	Percentage of the area sown more than once to the cul- tivated holding (percent)
0.1 - 5	A	3.08	3.08	100	2.93	95.13	0.85	27.60
	B	2.88	2.88	100	2.23	77.43	0.73	25.38
5.1 - 10	A	7.87	7.87	100	5.89	74.84	0.94	11.94
	B	8.05	6.65	82.61	4.65	57.76	1.00	12.42
10.1 - 25	A	14.71	14.71	100	11.52	78.31	3.57	24.27
	B	14.00	14.00	100	7.78	55.57	2.56	18.29
25.1 - 50	A	31.00	31.00	100	27.00	87.10	9.13	29.45
	B	31.63	31.63	100	9.04	28.58	3.75	11.86
50.1 & above	A	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-
Total	A	11.82	11.82	100	9.48	80.20	2.71	22.93
	B	11.40	10.93	95.88	5.45	47.81	1.71	15.00

A = Participants

B = Non-participants

TABLE 10 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE
SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN VARHANE

Size group (acres)	Partici- pants or non-parti- cipants	Average size of the cul- tivated holding (acres)	Of which owned (acres)	Percentage of the own- ed holding to the cul- tivated holding (percent)	Of the culti- vated holding area irriga- ted (acres)	Percentage of the area irrigated to the cul- tivated holding (percent)	Area sown more than once (acres)	Percentage of the area sown more than once to the cul- tivated holding (percent)
0.1 - 5	A	-	-	-	-	-	-	-
	B	2.25	2.0	88.89	2.04	90.67	-	-
5.1 - 10	A	8.75	8.75	100.00	4.35	49.71	2.25	25.71
	B	7.07	7.07	100.00	2.07	29.28	0.91	12.92
10.1 - 25	A	17.13	13.59	79.33	5.42	31.64	2.32	13.54
	B	14.95	13.1	87.63	3.60	24.08	1.11	7.42
25.1 - 50	A	36.5	36.5	100.00	8.91	24.41	3.56	20.78
	B	-	-	-	-	-	-	-
50.1 & above	A	56.33	56.33	100.00	15.94	28.30	7.08	12.57
	B	63.00	63.00	100.00	16.75	26.59	7.30	11.59
Total	A	29.02	27.60	95.11	8.31	28.64	3.57	12.30
	B	13.51	12.59	93.91	3.76	27.83	1.25	9.25

A = Participants

B = Non-participants

20 acres whereas the average size for the non-participants was nearly half of the size for the participants. These differences were quite narrow in Aundane and Kukane. Around 95 per cent of the holding was cultivated by the owners themselves in case of both the participants and the non-participants in every village. Both participants and non-participants had irrigation facilities on an average on one-third of their holding. It was only in Aundane and Kukane where the extent of participation was also large that the participants had irrigation facilities over a much large proportion of the holding when compared to the non-participants. The area sown more than once was much small when compared to the irrigated area. This was so because the irrigation available in the area was of a supplementary nature and it was possible to irrigate only the kharif crops at the end of the season. The participants were, however, utilizing the land for more than one crop on a somewhat larger scale in Aundane and Kukane when compared to the nonparticipants.

The cropping pattern of the selected participants and the nonparticipants is noted in Table 11. Both the participants and the nonparticipants were growing kharif crops over three fourth of their area of crops. Bajra was being grown on around 60 per cent of the area of crops in the kharif season in case of both groups of cultivators. A larger proportion of the area of crops was being utilised for bajra in the smaller size groups than in the larger size ones. The participants had devoted 12 per cent of their area under bajra to the cultivation of hybrid bajra. The small farmers having holdings upto 10 acres had devoted 20 to 30 per cent of their area under bajra to the cultivation of hybrid bajra whereas similar proportion for the larger size groups varied only between 8 and 12 per cent.

From the above tables, it appears that it is mainly the size of the holding that had influenced the participation. A scrutiny of a number of individual cases in these villages indicated that some other factors had also influenced the participation. Those cultivators who had very small holdings and who could devote only a small proportion of the area to bajra thereon, had refrained from the participation. The defaulters had to refrain from the participation as they were not eligible either for the taccavi loans or the loans through the cooperatives. So also some of the cultivators who had borrowed heavily under the medium term loan facilities had not participated in the programme merely to avoid fresh additional borrowing and the risk in trying out new varieties. Uncertainty of water in the well was another major reason for the nonparticipation in a few cases even though these cultivators possessed resources for irrigation in the form of wells. Inadequate bullock holding or the absence of bullocks was also a major reason in case of a few cultivators as they had to depend for this resource entirely upon their friends and relatives. Disabled head of the family, chronic illness of the head of the family were the other minor reasons for nonparticipation.

TABLE 11 : CROPPING PATTERN OF THE PARTICIPANTS AND THE NON-PARTICIPANTS SELECTED FROM THE FOUR VILLAGES

Size group (acres)	Partici- pents or non-parti- cipants	Total cultivated area (acres)			Kharif			Area under bajra (acres)	Proportion of area under bajra to the area under crops in the kharif season (percent)	Proportion of area under hybrid bajra to the area under bajra (percent)
		Kharif	Rabi	Other crops	Hybrid bajra	Local bajra	Other crops			
0.1 - 5	A	3.55	0.98	0.30	0.69	1.63	1.23	2.32	65.35	29.74
	B	2.63	0.57	0.17	-	1.98	0.64	1.98	75.29	-
5.1 - 10	A	7.14	1.341	0.5	0.90	3.52	2.73	4.42	61.90	20.36
	B	6.46	1.09	0.93	-	4.72	1.83	4.72	73.07	-
10.1 - 25	A	14.32	2.82	2.56	1.05	7.23	6.04	8.28	57.82	12.68
	B	12.95	1.64	2.93	-	7.76	5.20	7.76	59.92	-
25.1 - 50	A	29.09	4.59	5.92	1.46	15.45	12.18	16.91	58.13	8.63
	B	28.19	3.75	3.437	-	17.56	10.63	17.56	62.29	-
50.1 & above	A	58.55	7.99	7.26	3.38	30.41	24.77	33.79	57.71	10.00
	B	42.50	16.70	11.10	-	14.00	38.50	14.00	32.94	-
Total	A	17.60	2.99	2.88	1.22	9.08	7.31	10.30	58.52	11.84
	B	9.66	1.56	1.85	-	5.97	3.88	5.97	61.80	-

A = Participants

B = Non-participants

Chapter 4

COSTS OF CULTIVATION, CREDIT REQUIREMENTS AND PRODUCTION FROM THE VARIETY

Outlays over the inputs

Before examining the outlays on the inputs for hybrid bajra and local bajra it is necessary to mention here the different concepts used and their meaning in the analysis of the data. The cash expenditures given in the tables for these outlays include the expenditures incurred by the cultivators in cash as well as on credit. Fertilizers, for example, were purchased on credit and they have been treated as the cash expenditures in these tables. The cash expenditures also include the payable expenditures. Expenditures over certain items, which were due and inevitable but not incurred by the time of these investigations such as, land revenue, rent and wages for the permanent farm servants, have been included in the cash expenditures. In addition to the expenditures in cash, certain expenditures were incurred in kind such as wages for the casual labour and permanent farm servants according to the conventions prevalent in the area. These expenditures have been separated from the cash expenditures and their imputed values are given in the tables at the prices prevalent at the time of investigations. Parts of certain inputs such as seed and farm yard manure were produced on the farm. The imputed values of such inputs were also worked out. From the cash expenditures and the imputed values of the kind inputs, an attempt is made in the tables to determine the total costs over raising the hybrid and local varieties, excluding the costs over family labour.

Overhead expenditures such as those on wages of the permanent farm servants and fodder for the bullocks were attributed to each crop on the basis of the proportion of the area under the crop in the cropping pattern on the holdings. This was inevitable as data were not collected for these inputs over each crop separately.

Instead of giving absolute figures for the cash expenditures and the costs in the tables, the per acre figures have been given to facilitate the comparison. All per acre calculations for the inputs in these tables are based on the total areas devoted by all selected families to a respective crop and not the areas which were directly concerned with the input. The per acre expenditure over fertilizers for local bajra refers to the total area under local bajra and not the area of local bajra which received the fertilizer.

The per acre cash expenditure and the per acre costs over hybrid bajra over the different items for the different size groups of the participants have been noted in Table 12. Similar cash expenditures and costs over local bajra for the different size groups of the participants and the nonparticipants have been noted in Table 13.

Table 12 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER HYBRID BAJRA
IN CASE OF THE PARTICIPANTS

(Figures in Rs. per acre)

Item	0.1 - 5	5.1 - 10	10.1 - 25	25.1 - 50	50.1 & above	Total
Seed - Farm produced	-	-	-	-	-	-
Purchased	12.19	13.63	12.35	12.99	14.74	13.19
Fertilizers	56.98	51.57	56.40	52.60	47.18	55.50
Manures - Farm produced	77.27	67.49	65.24	39.52	31.43	52.89
Purchased	4.55	22.95	5.93	36.63	42.86	24.34
Pesticides	1.64	0.64	-	2.23	-	0.86
Irrigation expenditure	-	7.73	4.91	16.82	12.12	9.71
Land revenue	2.43	1.40	1.24	1.32	0.72	1.28
Land rent	8.73	7.63	-	-	-	1.95
Casual Labour	-	-	-	-	-	-
Preparatory tillage - kind	-	0.36	-	-	-	0.06
cash	18.73	0.80	-	0.29	-	1.62
Sowing - kind	-	-	-	-	-	-
cash	3.64	0.32	0.57	0.78	0.36	0.77
Inter-culture - kind	1.40	0.20	4.65	1.03	1.58	2.07
cash	20.00	18.17	8.99	10.53	5.36	11.13
Harvesting & - kind	7.04	3.13	4.07	4.51	4.04	4.25
threshing - cash	18.22	10.31	12.82	13.69	12.42	12.96

(continued)

Table 12 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER HYBRID BAJRA
(contd.) IN CASE OF THE PARTICIPANTS

(Figures in Rs. per acre)

I t e m	0.1 - 5	5.1 - 10	10.1 - 25	25.1 - 50	50.1 & above	Total
Total labour charges - kind	8.44	3.69	8.72	5.59	5.62	6.38
cash	60.59	29.60	22.38	25.34	18.14	26.48
Permanent farm servant - kind	-	5.95	7.59	17.98	13.22	10.71
cash	9.51	6.32	8.86	16.31	13.13	11.36
Fodder - cash	2.13	1.15	2.50	0.28	0.55	1.25
Feeds - cash	2.25	0.58	3.88	0.38	0.86	1.64
Other - kind	-	-	-	-	-	-
cash	-	-	1.59	-	-	0.45
Total cash expenditure	161.10	143.20	120.04	164.90	150.30	148.01
Imputed value of expenditure in kind	85.71	9.64	81.55	63.09	50.27	69.98
Total cost	246.81	152.84	201.59	227.99	200.57	217.99
Proportion of cash expenditure to the total cost(per cent).	65.27	93.69	59.55	72.33	74.94	67.90

Table 13 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER LOCAL BAJRA IN CASE OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

(Figures in Rs. per acre)

Item	Size group											
	0.1 - 5		5.1 - 10		10.1 - 25		25.1 - 50		50.1&above		Total	
	A	B	A	B	A	B	A	B	A	B	A	B
Seed- Farm												
produced-	2.76	2.02	1.34	1.50	2.00	1.73	1.94	1.89	1.87	2.00	1.91	1.81
-Purchased-	-	0.53	1.13	0.72	-	0.17	0.22	-	-	-	0.19	0.31
Fertilizers-	5.74	8.83	6.81	5.02	8.43	7.35	13.18	7.12	3.92	6.43	9.12	6.18
Manures-Farm												
produced-	66.67	47.91	17.86	20.82	11.55	10.49	10.77	19.72	4.93	8.57	11.66	17.16
-Purchased-	1.30	8.83	7.26	3.72	3.86	4.48	9.64	10.98	9.45	3.57	7.66	5.20
Pesticides	-	-	-	1.23	-	-	-	-	-	-	-	0.03
Irrigation												
expenditure-	1.15	1.59	4.61	2.65	0.63	2.38	3.23	1.00	1.67	2.78	2.28	2.28
Land Revenue-	2.53	2.42	1.50	1.04	1.32	1.22	1.44	1.17	1.05	0.67	1.35	1.23
Land Rent	-	1.86	1.43	7.14	1.86	0.62	-	-	-	-	0.62	2.25
Casual Labour												
Preparatory												
tillage -Kind	-	-	-	1.01	-	-	-	-	-	-	-	0.25
- Cash	10.29	5.85	2.58	3.55	-	0.26	0.02	-	-	2.43	0.49	1.54
Sowing- Kind	-	-	-	0.24	-	-	-	-	-	-	-	0.06
Cash	2.18	1.00	0.10	0.32	0.09	0.23	0.07	0.91	-	0.29	0.11	0.38
Interculture												
- Kind	-	0.56	0.04	0.35	0.38	0.65	0.27	-	2.41	-	0.74	0.48
- Cash	7.56	5.76	6.91	3.80	3.66	2.46	2.56	3.30	4.42	2.29	3.78	3.11
Harvesting & threshing-Kind	3.71	1.33	1.82	0.86	2.07	1.83	2.07	-	4.27	2.48	2.57	1.40
-Cash	5.83	5.13	6.31	4.70	6.03	4.77	6.70	3.64	5.00	8.57	6.09	4.93
Total Labour												
Charges-Kind	3.71	1.89	1.86	2.46	2.45	2.48	2.34	-	6.68	2.48	3.31	2.19
Cash	25.86	17.73	15.86	12.37	9.40	7.72	9.08	7.85	7.01	13.58	9.72	12.15
Permanent												
Farm Servant												
- Kind	-	-	3.27	2.05	7.74	4.77	13.26	15.67	13.50	-	12.63	4.63
- Cash	5.39	-	4.23	1.73	9.47	5.87	15.27	13.94	16.30	-	12.72	4.97

(continued)

Table 13 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER LOCAL BAJRA IN CASE OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

(Figures in Rs. per acre)

I t e m	Size-group										Total	
	0.1 - 5		5.1 - 10		10.1 - 25		25.1 - 50		50.1&above		A	B
	A	B	A	B	A	B	A	B	A	B	A	B
Fodder -Cash	1.30	1.50	1.31	1.58	2.03	1.38	0.07	-	0.54	-	0.83	1.25
Feeds - Cash	2.16	-	0.37	0.54	1.29	1.09	0.53	-	1.09	-	0.88	0.73
Other - Kind	-	-	-	-	0.36	-	-	-	-	-	0.09	-
Cash	-	-	-	-	0.35	-	-	-	-	-	0.09	-
Total cash expenditure	45.43	43.30	44.55	37.74	39.02	32.28	52.93	42.06	43.44	27.03	46.21	34.39
Imputed value of total expenditure in kind	73.14	51.82	24.33	26.83	24.10	19.47	33.31	37.28	26.98	13.05	29.60	25.79
Total cost	118.57	95.12	68.88	64.57	63.12	51.75	76.98	79.34	75.62	40.08	75.81	60.18
Proportion of cash expenditure to total cost(per cent)	38.31	45.56	64.68	58.45	61.82	62.38	68.76	53.01	57.45	67.44	60.96	57.15

A = Participants B = Non-participants.

These tables would indicate that the per acre costs over hybrid bajra (excluding the cost of family labour) came to Rs. 217 per acre. Sixty seven per cent of these costs were incurred in cash. The per acre costs over local bajra came to Rs. 75 and Rs. 60 per acre in the case of the participants and the non-participants respectively and around 60 per cent of these costs were incurred in cash. The difference between the cash expenditures over the hybrid and the local varieties worked out to around Rs. 100 per acre. The major items of expenditure in cash in respect of hybrid bajra were seed, fertilizer, farm yard manure and casual labour which together made up 80 per cent of this expenditure. As against a cash expenditure of about Rs. 6 to Rs. 9 per acre over fertilizers for local bajra, the cash expenditure over the same for hybrid bajra came to Rs. 55 per acre. Besides the participants had spent Rs. 13 per acre over the hybrid bajra seed as against only a nominal amount for the seed of the local variety. The cost over farm yard manure worked out to around Rs. 77 per acre for hybrid bajra, but to around Rs. 20 per acre only for the local variety. Around one third of these costs in both cases were incurred in cash. The participants had, thus, grown hybrid bajra on plots which had received about 10 to 15 cart loads of farm yard manure per acre. The cash expenditure on casual labour for hybrid bajra worked out to Rs. 26 per acre whereas that for local bajra was around Rs. 10 per acre for the two groups of cultivators. This difference in the per acre expenditure over casual labour was due to larger expenditure on interculturing, harvesting and threshing hybrid bajra when compared to that on local bajra. The cost over pesticides came to only Rs. 0.86 per acre for hybrid bajra as the variety did not suffer from attack of a pest or a disease. Only a few of the farmers had used pesticides as a protective measure. The cost of pesticides for local bajra was negligible. The cost of irrigation (excluding the cost over labour) was around Rs. 9 per acre and it was nearly thrice the cost of irrigating the local variety. This difference was mainly due to the larger number of irrigations for the hybrid variety. The costs over items such as land revenue, land rent, fodder and feeds etc. were negligible for both varieties.

The size-wise distribution of the costs and cash expenditures for the two varieties indicates that there were not much differences in the expenses incurred over seed and fertilizer for hybrid or local bajra among the different size groups of the participants and the nonparticipants. The participants in the smaller size groups had used relatively more farm yard manure for hybrid bajra when compared to the participants in the upper size groups. A larger proportion of the farm yard manure applied to hybrid bajra by the participants in the smaller size groups was farm produced whereas a larger proportion of the farm yard manure used by the participants in the upper size groups for the same variety was purchased in cash. The input of farm yard manure for local bajra was also much high in the smallest size group in case of both the participants and the nonparticipants. So also the participants and the nonparticipants in the smaller size groups had spent more on casual labour for both varieties as they had to get the land cultivated by hired labour on contract basis for the different operations on account of the inadequacy of bullocks.

Financing the outlays

The sources of finance and the amounts of cash expenditure over hybrid and local bajra financed through the different sources in case of the participants and the nonparticipants have been noted in Tables 14 and 15. It may be mentioned here that there were some difficulties though in a very few cases in investigating the exact source of finance for a particular item of expenditure. The cultivators, for example, possessed a pool of their owned funds and the amounts borrowed through the cooperative or other agencies and in such cases when the expenditure was incurred through this pool, it was difficult to judge the precise source of finance for that particular expenditure. In such cases, the sources of finance reported by the cultivators themselves were recorded after proper interrogations with all hopes that the sources were based on the purposes in the minds of the cultivators for which they borrowed.

Table 14 would indicate that nearly two-thirds of the cash expenditure over the seed of the hybrid variety was financed through the loans borrowed from the cooperatives whereas half of the remaining expenditure was financed through the taccavi loans and another half through the owned funds. Nearly 60 per cent of the expenditure over fertilizers for hybrid bajra was financed through the cooperatives, 20 per cent through the taccavi loans and 12 per cent through the owned funds. Private sources of finance accounted for an insignificant part of the expenditure. This was, however, not so in the case of the expenditure incurred over casual labour. Nearly 80 per cent of the expenditure over this item was incurred through the owned funds and about 14 per cent through the loans from the cooperatives. In the total, it may be observed that nearly half of the cash expenditure over the variety was financed through the owned funds, about a third through the loans from the cooperatives and the remaining through the taccavi loans and the loans obtained from private sources of finance. Private sources of finance accounted for hardly 5 per cent of the total cash expenditure. There is not much difference in these trends for the two varieties or between the participants and the nonparticipants as may be observed from Table 15.

The amounts borrowed and the number of families borrowing from the different sources for the two varieties have been noted in Table Nos. 16 and 17. These tables would indicate that the amounts borrowed per acre came to Rs. 76 for hybrid bajra but to Rs. 16 and Rs. 10 only for local bajra in case of the participants and the nonparticipants respectively. Fifty-five of the 60 selected participants had borrowed for the cultivation of hybrid bajra whereas the remaining five cultivators had grown the variety entirely with the help of the owned funds. Nearly three fourth of the participants and half of the nonparticipants had borrowed for the cultivation of the local variety.

Production from the hybrid and local varieties

A village-wise and size-wise distribution of the per acre production of grains from the hybrid and local varieties on the irrigated and the nonirrigated farms has been given in Table 18. The distribution of the per acre production of fodder has been given in Table 19.

Table 14 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER HYBRID BAJRA IN CASE OF THE SELECTED PARTICIPANTS

(Figures in Rupees per acre)

I t e m	Size group					Total
	0.1-5	5.1-10	10.1-25	25.1-50	50.1 & above	
Seed - Total expenditure	12.29	13.63	12.35	12.99	14.74	13.19
Of which financed from-						
(a) Owned funds	1.45	1.49	1.87	2.35	3.37	2.05
(b) Borrowings from -						
i) Cooperatives	6.48	4.43	7.75	9.40	10.26	8.11
ii) Government	4.36	6.69	2.73	-	1.11	2.51
iii) Other agencies	-	1.02	-	1.24	-	0.52
Fertilizers - Total expenditure	56.98	51.57	56.40	52.60	47.18	55.50
Of which financed from-						
(a) Owned funds	27.73	-	5.31	4.58	11.29	7.02
(b) Borrowings from-						
i) Cooperatives	4.55	15.37	32.92	44.65	28.75	32.97
ii) Government	24.70	28.00	15.20	-	7.14	12.33
iii) Other agencies	-	8.20	2.97	3.37	-	3.18
Pesticides - Total expenditure	1.64	0.64	-	2.23	-	0.86
Of which financed from -						
(a) Owned funds	-	0.64	-	1.52	-	0.42
(b) Borrowings from -						
i) Cooperatives	1.64	-	-	0.71	-	0.44
ii) Government	-	-	-	-	-	-
iii) Other agencies	-	-	-	-	-	-
Other - Cash expenditure	90.19	77.36	51.29	97.08	88.38	78.46
Of which financed from -						
(a) Owned funds	79.82	47.70	36.77	78.86	81.88	62.43
(b) Borrowings from -						
i) Cooperative	9.64	21.69	9.40	10.78	6.00	11.44
ii) Government	0.73	-	-	-	-	0.05
iii) Other agencies	-	7.97	3.53	7.44	0.50	4.54

(continued)

Table 14 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER HYBRID BAJRA IN CASE OF THE
(contd.) SELECTED PARTICIPANTS

(Figures in Rupees per acre)

I t e m	Size group					Total
	0.1 - 5	5.1 - 10	10.1 - 25	25.1-50	50.1&above	
Total expenditure	161.10	143.20	120.04	164.90	150.30	148.01
Of which financed from -						
(a) Owned funds	109.00	49.83	45.54	87.31	96.54	71.92
(b) Borrowings from						
1) Cooperatives	22.31	49.49	50.07	65.54	45.01	52.96
2) Government	29.79	34.69	17.93	-	8.25	14.89
3) Other agencies	-	17.19	6.50	12.05	0.50	8.24

Table 15 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER LOCAL BAJRA IN CASE OF THE
SELECTED PARTICIPANTS AND NON-PARTICIPANTS

(Figures in Rs. per acre)

I t e m	0.1 - 5		5.1 - 10		10.1 - 25	
	A	B	A	B	A	B
Seed - Total expenditure	-	0.53	1.13	0.72	-	0.17
Of which financed from-						
(a) Owned funds	-	0.53	0.96	0.60	-	0.17
(b) Borrowings from-						
1) Co-operatives	-	-	-	-	-	-
2) Government	-	-	-	-	-	-
3) Other agencies	-	-	0.17	0.12	-	-
Fertilizers - Total expenditure	5.74	8.83	6.81	5.02	8.43	7.35
Of which financed from-						
(a) Owned funds	2.87	2.71	1.09	3.01	1.83	5.94
(b) Borrowings from						
1) Cooperatives	2.87	-	0.49	0.84	4.85	0.26
2) Government	-	-	2.29	-	1.12	-
3) Other agencies	-	6.12	2.04	1.17	0.63	1.15
Pesticides - Total expenditure	-	-	-	1.23	-	-
Of which financed from -						
(a) Owned funds	-	-	-	-	-	-
(b) Borrowings from -						
1) Cooperatives	-	-	-	1.23	-	-
2) Government	-	-	-	-	-	-
3) Other agencies	-	-	-	-	-	-
Other expenditure	39.69	33.94	36.61	30.77	30.59	24.76
Of which financed from-						
(a) Owned funds	33.90	19.92	26.93	24.99	22.26	18.72
(b) Borrowings from-						
1) Cooperatives	5.33	1.52	6.40	3.58	3.94	4.23
2) Government	0.46	-	-	-	-	-
3) Other agencies	-	12.50	3.28	2.20	4.39	1.81

(Continued)

Table 15 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER LOCAL BAJRA IN CASE OF THE
(contd.) SELECTED PARTICIPANTS AND NON-PARTICIPANTS

(Figures in Rs. per acre)

I t e m	0.1 - 5		5.1 - 10		10.1 - 25	
	A	B	A	B	A	B
Total expenditure	45.43	43.30	44.55	37.74	39.02	32.28
Of which financed from-						
(a) Owned funds	36.77	23.16	28.98	28.60	24.09	24.83
(b) Borrowings from-						
1) Cooperatives	8.20	1.52	6.89	5.65	8.79	4.49
2) Government	0.46	-	2.29	-	1.12	-
3) Other agencies	-	18.62	6.39	3.49	5.02	2.96

A = Participants. B = Non-participants.

(continued)

Table 15 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER LOCAL BAJRA IN CASE OF THE
(contd.) SELECTED PARTICIPANTS AND NON-PARTICIPANTS

(Figures in Rs. per acre)

I t e m	25.1 - 50		50.1 & above		Total	
	A	B	A	B	A	B
Seed - Total expenditure	0.22	-	-	-	0.19	0.31
Of which financed from -						
(a) Owned funds	0.04	-	-	-	0.10	0.28
(b) Borrowings from						
1) Cooperatives	0.18	-	-	-	0.06	-
2) Government	-	-	-	-	-	-
3) Other agencies	-	-	-	-	0.03	0.03
Fertilizers - Total expenditure	13.18	7.12	3.92	6.43	9.12	6.18
Of which financed from						
(a) Owned funds	1.48	7.12	3.05	6.43	1.92	4.91
(b) Borrowings from						
1) Cooperatives	11.45	-	0.87	-	6.16	0.35
2) Government	-	-	-	-	0.51	-
3) Other agencies	0.25	-	-	-	0.53	0.92
Pesticides - Total expenditure	-	-	-	-	-	0.03
Of which financed from -						
(a) Owned funds	-	-	-	-	-	-
(b) Borrowings from-						
1) Cooperative	-	-	-	-	-	0.03
2) Government	-	-	-	-	-	-
3) Other agencies	-	-	-	-	-	-

A = Participants. B = Non-participants.

(continued)

Table 15 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER LOCAL BAJRA IN CASE OF
(contd.) THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS

(Figures in Rs. per acre)

I t e m	25.1		50.1 & above		Total	
	A	B	A	B	A	B
Other expenditure	39.53	34.94	39.52	20.60	36.90	27.87
Of which financed from -						
(a) Owned funds	26.45	19.53	35.83	9.16	27.78	19.08
(b) Borrowings from -						
1) Cooperatives	10.90	15.41	2.87	-	6.59	5.09
2) Government	-	-	-	-	0.01	-
3) Other agencies	2.18	-	0.82	11.44	2.52	3.70
Total expenditure	52.93	42.06	43.44	27.03	46.21	34.39
Of which financed from -						
(a) Owned funds	27.97	26.65	38.88	15.59	29.80	24.27
(b) Borrowings from -						
1) Cooperatives	22.53	15.41	3.74	-	12.81	5.47
2) Government	-	-	-	-	0.52	-
3) Other agencies	2.43	-	0.82	11.44	3.08	4.65

A = Participants. B = Non-participants.

Table 16 : AMOUNTS BORROWED AND THE NUMBER OF PARTICIPANTS BORROWING FROM THE DIFFERENT SOURCES FOR THE CULTIVATION OF HYBRID BAJRA

Item	0.1 - 5	5.1 - 10	10.1 - 25	25.1 - 50	50.1 & above	Total
Total Borrowed funds	286.50	1171.65	1569.45	1609.99	752.64	5390.23
Amount borrowed per acre	52.10	93.37	74.50	77.59	53.76	76.09
Number of families borrowing	8	13	18	13	3	55
Amount per borrowing family	35.81	90.13	87.19	123.85	250.88	98.00
Number of families reporting borrowings from :						
(1) Cooperatives	5	5	13	12	2	37
(2) Government	2	6	4	-	1	13
(3) Other agencies	-	2	3	3	1	9
Total entries	7	13	20	15	4	59

Table 17 : AMOUNTS BORROWED AND THE NUMBER OF PARTICIPANTS AND NON-PARTICIPANTS BORROWING FROM THE DIFFERENT SOURCES FOR THE CULTIVATION OF LOCAL BAJRA.

	0.1 - 5		5.1 - 10		10.1 - 25		25.1 - 50		50.1 & above		Total	
	A	B	A	B	A	B	A	B	A	B	A	B
Total borrowed funds	112.90	519.50	782.55	819.63	2165.00	1456.14	5486.21	541.28	554.61	160.00	9101.72	3496.55
Amount borrowed per acre	8.66	20.14	15.57	9.14	14.93	7.45	24.96	15.41	4.56	11.44	16.41	10.12
Number of families borrowing	3	6	10	9	15	13	12	2	3	1	43	31
Amount per borrowing family	37.63	86.58	78.26	91.07	144.33	112.01	457.18	270.64	184.87	160.00	211.67	112.79
Number of families reporting borrowings from :												
(1) Co-operatives	2	1	4	5	10	9	10	2	2	-	28	17
(2) Government	1	-	3	-	2	-	-	-	-	-	6	-
(3) Other agencies	-	5	3	4	5	4	3	-	1	1	12	14
Total entries	3	6	10	9	17	13	13	2	3	1	46	31

A = Participant

B = Non-participant

Table 18 : PRODUCTION OF GRAINS FROM THE HYBRID AND LOCAL VARIETIES ON THE IRRIGATED AND THE NON-IRRIGATED FARMS IN THE DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN THE DIFFERENT VILLAGES

(Figures in Kgs. per acre)

A or B	Village and Variety	0.1 to 5 acres		5.1 to 10 acres		10.1 to 25 acres	
		Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated
<u>Kukane</u>							
A	Hybrid bajra	309	-	403	-	488	-
	Local bajra	178	69	151	146	172	133
B	Local bajra	140	-	200	108	242	101
<u>Varhane</u>							
A	Hybrid bajra	-	-	700	85	271	-
	Local bajra	-	-	-	240	189	74
B	Local bajra	246	117	180	98	224	77
<u>Khamtane</u>							
A	Hybrid bajra	-	-	581	250	773	400
	Local bajra	-	-	254	378	283	108
B	Local bajra	-	80	450	140	293	134
<u>Aundane</u>							
A	Hybrid bajra	647	360	814	-	476	-
	Local bajra	-	128	434	66	387	115
B	Local bajra	302	88	469	81	259	90
<u>Total</u>							
A.	Hybrid bajra	474	360	525	168	467	400
	Local bajra	178	120	196	145	215	102
B.	Local bajra	199	90	244	109	255	105
<u>Average Irrigated and Unirrigated</u>							
A	Hybrid bajra	472		469		464	
B	Local bajra	130		169		132	
B	Local bajra	157		142		144	

(continued)

A = Participant. B = Non-participant

Table 18 : PRODUCTION OF GRAINS FROM THE HYBRID AND LOCAL VARIETIES ON THE IRRIGATED AND THE NON-IRRIGATED FARMS IN THE DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS AND THE NON-PARTICIPANTS IN THE DIFFERENT VILLAGES.

(Figures in Kgs. per acre)

A or B	Village and Variety	25.1 to 50 acres		50.1 acres & above		Total		
		Irrigated	Unirrigated	Irrigated	Un- irrigated	Irrigated	Unirri- gated	
<u>Kukane</u>								
A	Hybrid bajra	633	-	-	-	427	-	
	Local bajra	357	240	-	-	254	158	
B	Local bajra	200	148	-	-	203	125	
<u>Varhane</u>								
A	Hybrid bajra	592	-	615	-	501	85	
	Local bajra	320	80	374	102	697	94	
B	Local bajra	-	-	150	75	194	83	
<u>Khamtane</u>								
A	Hybrid bajra	528	300	444	500	567	393	46
	Local bajra	450	117	375	117	376	117	
B	Local bajra	-	-	-	-	322	134	
<u>Aundane</u>								
A	Hybrid bajra	700	200	-	-	604	218	
	Local bajra	300	73	-	-	354	99	
B	Local bajra	-	-	-	-	287	87	
<u>Total</u>								
A	Hybrid bajra	588	267	545	500	524	337	
	Local bajra	344	102	374	106	284	106	
B	Local bajra	200	148	150	75	231	109	
<u>Average Irrigated and Unirrigated</u>								
A	Hybrid bajra	541		536		501		
	Local bajra	165		140		152		
B	Local bajra	157		129		145		

A = Participant. B = Non-participant.

Table 19 : PRODUCTION OF FODDER FROM THE HYBRID AND THE LOCAL VARIETIES ON THE IRRIGATED AND THE UNIRRIGATED FARMS IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS AND THE NON-PARTICIPANTS IN THE DIFFERENT VILLAGES.

(Figures in number of bundles per acre)

A or B	Village and variety	0.1 to 5 acres		5.1 to 10 acres		10.1 to 25 acres	
		Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated
<u>Kukane</u>							
A	Hybrid bajra	118	-	148	-	267	-
	Local bajra	78	34	58	78	112	75
B	Local bajra	84	-	112	38	99	50
<u>Varhane</u>							
A	Hybrid bajra	-	-	200	100	152	-
	Local bajra	-	-	-	140	94	59
B	Local bajra	123	83	110	67	213	67
<u>Khamtane</u>							
A	Hybrid bajra	-	-	242	100	320	150
	Local bajra	-	-	109	67	83	59
	Local bajra	-	60	133	59	88	73
<u>Aundane</u>							
A	Hybrid bajra	314	160	457	-	286	-
	Local bajra	-	102	270	52	213	84
B	Local bajra	248	100	310	58	228	93
<u>Total</u>							
A	Hybrid bajra	214	160	218	100	244	150
	Local bajra	78	93	84	81	113	70
B	Local bajra	130	88	125	56	147	74
<u>Average Irrigated and Unirrigated</u>							
A	Hybrid bajra		213		199		240
	Local bajra		90		83		81
B	Local bajra		113		73		94

47

A = Participants; B = Non-participants

(continued)

Table 19 : PRODUCTION OF FODDER FROM THE HYBRID AND THE LOCAL VARIETIES ON THE IRRIGATED AND THE UNIRRIGATED FARMS IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS AND THE NON-PARTICIPANTS IN THE DIFFERENT VILLAGES

(figures in number of bundles per acre)

A or B	Village and Variety	25.1 to 50 acres		50.1 acres & above		Total	
		Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated
<u>Kukane</u>							
A	Hybrid bajra	233	-	-	-	180	-
	Local bajra	151	60	-	-	116	70
B	Local bajra	117	69	-	-	102	57
<u>Varhane</u>							
A	Hybrid bajra	200	-	154	-	170	100
	Local bajra	160	61	96	55	120	60
B	Local bajra	-	-	80	63	141	67
<u>Khamtane</u>							
A	Hybrid bajra	168	150	111	133	195	136
	Local bajra	175	52	100	400	122	51
	Local bajra	-	-	-	-	96	68
<u>Aundane</u>							
A	Hybrid	300	100	-	-	320	107
	Local bajra	250	58	-	-	243	75
B	Local bajra	-	-	-	-	239	83
<u>Total</u>							
A	Hybrid bajra	206	133	136	133	209	128
	Local bajra	168	56	97	51	129	61
B	Local bajra	117	67	80	63	131	69
<u>Average Irrigated and Unirrigated</u>							
A	Hybrid bajra		195		136		199
	Local bajra		85		57		78
B	Local bajra		77		75		88

48

A = Participants

B = Non-participants

Table 18 would indicate that the new variety proved to be quite productive as on an average it produced 501 Kgs. of grains per acre when compared to the average production of 152 Kgs. per acre from the local variety in the case of the participants and 145 kgs. per acre in the case of the nonparticipants. It must, however, be noted here that the new variety was grown mainly on the better types of soil whereas the local variety was grown even on soils which were very inferior. So also the new variety had received a much larger initial dose of farm yard manure. On the irrigated farms the new variety produced on an average 524 kgs. per acre whereas the production from local variety under similar conditions was 284 kgs. per acre for the participants and 231 kgs. per acre for the nonparticipants. Under the rain-fed conditions also the new variety produced 337 kgs. per acre as against the yield of about 110 kgs. per acre from the local variety for the participants and the nonparticipants.

The size-wise distribution of the yield would indicate that the yield on the irrigated farms varied between 467 and 588 kgs. per acre but on the nonirrigated farms it varied from 168 to 500 kgs. per acre according to the nature of the soil. There was not such a great variation in the yield of local bajra on the non-irrigated farms. Quite high yields of 844 and 773 kgs. per acre were obtained in the second and third size groups in the village Aundane and Khamtane respectively. The village-wise distribution also indicates that the per acre production was higher in the village Khamtane and Aundane in Baglan block when compared to the villages Kukane and Varhane in Malegaon block.

It would be observed from Table 19 that the new variety also produced a larger quantity of fodder when compared to the local variety. This was, however, the result of thick sowing and narrower spacing when compared to the recommended spacing of 18" between rows and the profuse tillering habit of the new variety. On the irrigated farms, the new variety produced on an average 209 bundles of fodder per acre against about 130 bundles per acre from the local variety in case of both groups of cultivators. So also under the rain-fed conditions the new variety produced 128 bundles per acre as against around 65 bundles from the local variety for the two groups of cultivators.

Repayment performance of the participants and the nonparticipants

The production, sales, and the repayment performance of the participants and the nonparticipants may be noted from Table 20. Upto the time of these investigations the participants had sold out about 7 per cent of the produce of the hybrid variety but only an insignificant part of the produce from the local variety. The non-participants had also sold out only an insignificant part of the produce from the local variety. As far as preference in selling out the produce from the different varieties is concerned it appears that the participants preferred to sell out the produce from the hybrid variety to selling out the produce from the local variety.

It is only in the largest size group that the produce from the hybrid variety was sold to the cooperatives. In the other groups, the produce was sold to the other agencies outside in the open markets. The price realized for the produce from the hybrid variety worked out to Rs. 84 per quintal only. As against this price, the participants had realized a price of Rs. 95 per quintal for the local variety and the nonparticipants had realized a price of Rs. 89 per quintal for the same variety.

TABLE 20 : SALES AND REPAYMENT PERFORMANCE OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

Size-group (acres)	Variety A-Hybrid B-Local bajra	Production (Quin- tals)	Sales		To whom, sold			Repayment and Borrowings	
			Quan- tity (Quin- tals)	Value (Rs.)	Coope- rative Society (Rs.)	Govern- ment (Rs.)	Others (Rs.)	Current borrow- ing (Rs.)	Previous short-term borrowing (Rs.)
<u>PARTICIPANTS</u>									
0.1 - 5	A	25-95	-	-	-	-	-	594-75	-
	B	17-0	-	-	-	-	-	-	-
5.1 - 10	A	58-55	-	-	-	-	-	3918-00	-
	B	85-90	-	-	-	-	-	-	-
10.1 - 25	A	97-80	4-0	280-00	-	-	280-0	10405-75	-
	B	191-0	2-0	200-00	-	-	200-0	-	-
25.1 - 50	A	111-0	9-0	774-00	-	-	774-0	15113-50	-
	B	364-50	1-0	94-00	94-00	-	-	-	-
50.1 & above	A	40-0	8-20	729-94	729-94	-	-	564-00	-
	B	170-50	5-0	470-00	470-00	-	-	-	-
Total	A	333-30	21-20	1783-94	729-94	-	1054-00	30596-00	-
	B	828-90	8-00	764-00	564-00	-	200-00		-
<u>NON-PARTICIPANTS</u>									
0.1 - 5	B	40-45	-	-	-	-	-	800-00	-
5.1 - 10	B	127-45	-	-	-	-	-	374-00	-
10.1 - 25	B	276-91	2-20	197-00	-	-	197-00	3141-25	-
25.1 - 50	B	55-0	-	-	-	-	-	193-00	-
50.1 & above		18-0	-	-	-	-	-	-	-
Total		517-81	2-20	197-00	-	-	197-00	4508-25	-

50

The participants and the nonparticipants had by the time of these investigations repayed amounts of Rs. 30596 and Rs. 4508 respectively. These repayments had, however, no relationship with the sales of the hybrid or local variety as the value of the sales formed only an insignificant part of the repayments.

Profitability of the new variety

An attempt can be made from the tables on the costs and production to work out the margins left after deducting the costs from the values of the production of grains and fodder, separately for the two varieties. The prices prevalent in the market for grains of the hybrid and local varieties were around Rs. 80 and Rs. 90 per quintal respectively. So also the price of fodder from both varieties was around Rs. 30 per hundred bundles at the time of the survey. These prices can be made use of to determine the value of the production from the two varieties.

On the irrigated farms, the margin for hybrid bajra works out to Rs. 271 per acre whereas that for local bajra works out to Rs. 181 and Rs. 144 per acre for the participants and the non-participants respectively. As far as the use of irrigation for the variety is concerned, the margin from the cultivation of the new variety is nearly 1.5 times the margin from the cultivation of the local variety in the case of the participants and 1.8 times of that in the case of the nonparticipants.

On the unirrigated farms, the margin for hybrid bajra works out to only Rs. 88 per acre whereas that for local bajra works out to Rs. 52 and Rs. 69 per acre for the participants and non-participants respectively. Under the rain-fed conditions, the margin from the cultivation of the new variety is, thus, nearly 1.6 times the margin from the cultivation of local bajra in the case of the participants and only 1.3 times of that in the case of the nonparticipants. The new variety has thus, enabled the cultivators to get larger monetorial returns on both the irrigated and the non-irrigated farms.

Chapter 5

SUMMARY AND CONCLUSIONS

Formulation of the target

In December 1966, the State Agricultural Department had suggested a tentative target of 75,000 acres for hybrid bajra in Nasik district. The district officials were asked to work out a target on this basis and discuss the same in a divisional level meeting to be held in January 1967. Since it was possible to extend the variety only over 3,500 acres in 1966-67 against a target of 54,000 acres for the purpose, the district officials felt that the suggested target of 75,000 acres would be too large for their district. They, therefore, suggested that a target of only 56,000 acres may be fixed for the variety during the current year. The failure in the previous year was, however, mainly due to the shortage of seed. There were greater prospects for extending the variety over large areas during the current year due to large stock of seed and satisfactory performance of the variety in the previous year on the farms of the cultivators who had received the seed. Besides, bajra was being grown partly as an irrigated crop in some of the blocks. This factor was also favourable for extending the variety on a large scale in Nasik district.

In the divisional level meeting, however, the target suggested through the district was completely ignored. The district was given a target of 1.19 lakh acres for hybrid bajra on the ground that the new variety should be introduced at least on 10 per cent of the area under the crop in every district. Since Nasik district was the main bajra growing district in the State, the target of 1.19 lakh acres meant covering nearly half the target for the State through a single district because of the adoption of the 10 per cent basis.

The earlier and the later targets were allocated among 10 of the 13 blocks in the district as the remaining three blocks were located in the paddy growing area. Six of these blocks accounted for two-thirds of the target. According to the earlier target Malegaon and Baglan blocks were expected to implement the programme over 10,000 acres in each case. The target was raised to 14,000 acres for each block after the break up of the final target.

Plans for achievement of the target

When compared to the other districts, Nasik district was somewhat well equipped with staff because of the Intensive Agricultural Area Programme (IAAP), commenced in the district since 1963-64. Fifteen Agricultural Officers and 150 Agricultural Assistants were available directly for the implementation of the programme for the 15 IAAP Blocks in the district. Including the normal staff at the block and the district level and the staff for some special schemes, the total strength of the technical staff available for the district was 263. Only 7 of the officials in this staff were, however, graduates in agriculture.

Even with the large number of the Agricultural Assistants available for the IAAP Blocks, the number of villages per Agricultural Assistant would have become quite large. Hence the Agricultural Assistants for other special schemes such as soil conser-

vation, were also assigned some villages for the implementation of the programme.

The State Agricultural Department had issued detailed instructions for the implementation of the programme. The circulars issued for this purpose contained instructions about selection of farmers, selection of areas, arrangements for co-operative and taccavi loans, supply of inputs, recovery of loans, formation of co-ordination committees etc. The duties to be assigned to the different officials and assistants were also spelt out. The same instructions were passed on to the block officials.

Leaflets describing the cultural practices for the variety were also issued by the State, district and one of the selected blocks, viz. Baglan block. These leaflets were distributed mainly among the Gramsevaks and some progressive cultivators whereas leaflets describing in brief the cultural practices for the variety were distributed with each bag of the seed. All the leaflets emphasized the adoption of broad sowing, thinning and the use of fertilizers. The recommended seed rate was one to one and a half kilograms of seed per acre and the seed was packed in one and a half kilogram bags for the purpose. The recommendations for the use of fertilizer, however, varied from 20:15:10 to 30:20:15 kgs. of NPK per acre in the different leaflets. The merits and demerits of the variety were also brought out in one of these leaflets. The programme appeared to have been well planned as far as the State, district and block levels were concerned.

A co-ordination committee consisting of the representatives of the Zilla Parishad, Co-operation Department, District Co-operative Central Bank and Co-operative Sale and Purchase Union was formed for supervision over the implementation of the programme. A number of State officials also visited the district and held meetings for the programme. Even the Chief Minister for the State visited the district to encourage the officials in the matter.

Revision of the target

After the Gramsevaks prepared the lists of the cultivators who would participate in the programme, it was found that it may not be possible to achieve such a large target of 1.19 lakh acres. To avoid the wastage of the mobilized resources the district officials, therefore, suggested that the target may be pruned to 75,000 acres. This decision was got confirmed verbally in the AGRESCO meeting at the State level. Though the official target stood at 1.19 lakh acres, the working target was, thus, fixed at 75,000 acres. This happened not only in Nasik district but even in Poona district surveyed for the rabi programme, wherein the official and the working targets differed.

Estimation of requirements and the disbursement of inputs

Since the size of the programme was reduced, only 646 quintals of seed sufficient for an area of 64,000 acres was retained in the district and the remaining quantity was supplied to the other districts. Out of this quantity, 336.67 quintals or nearly a half

could only be distributed during the season. The quantities, distributed in the Malegaon and Baglan blocks were 64.11 and 34.56 quintals respectively as against the target of 14,000 acres for each block.

The requirements of fertilizers for the total high yielding varieties programme for the year over 2.68 lakh acres was estimated to be 26 to 30 thousand M. Tons according to the type of fertilizer. The total stock of fertilizers at hand in June was 8,371 M. Tons whereas identifications had been placed for 11,602 M. Tons. These supplies were thought to be adequate for the programme in the kharif season. Separate figures for the supplies made for the different crops were not available. But after the end of December 1967, it was observed that the quantity of fertilizers supplied for all the high yielding varieties was only 8,132 M. Tons, ¹/_{as} against an estimation of 26 to 30 thousand M. Tons for the purpose. The quantities distributed in Malegaon and Baglan blocks for the purpose were 1,447 and 1,850 M. tons respectively.

The crop was to be financed at the rate of Rs. 180 per acre in two instalments with a kind and cash component of Rs. 115 and Rs. 65 respectively. The preparation of the N.C. Statements was considerably delayed even though the Bank had issued a circular for the purpose in December 1966 and again a reminder in January 1967. Upto the end of July, the Bank had received such Statements from 771 societies out of 1,047 primary societies in the district. Nearly five-eighths of these Statements were received in June and July. The total amount sanctioned for hybrid bajra was Rs. 55.91 lakhs for an area of 30,700 acres. The cultivators, however, borrowed only 34 per cent of the above amount sanctioned. Similar percentages for Malegaon and Baglan Blocks worked out to around 40 and 30 per cents respectively.

In addition to the loan from the Bank, the Government had offered taccavi loans for cultivators who were not members of the society but who had a desire to participate in the programme. The loan was available only in kind at the same rate of finance as by the Bank. The total allotment for the district was Rs. 7.5 lakhs out of which Rs. 3.9 lakhs were utilized for the purpose. Against an allotment of Rs. 75000 and Rs. 60000 in Malegaon and Baglan blocks the cultivators had borrowed only 43 and 5 percents of these amounts for these blocks respectively. The taccavi loans it appears were not properly channelized in Baglan Block.

In addition to the taccavi loans for the non-members, the government had also allotted Rs. 5,000 for financing the defaulter members who had not repaid their previous loan. But this order was issued late and hence the entire amount was surrendered.

Village targets and the arrangements made for their achievement

The targets for the selected villages were fixed after taking into account the irrigated areas under bajra in these villages and the capability of the individual Gramsevaks in implementing the targets. In view of the frequent revision of the targets at the district level, the village targets were also revised from time to time.

1 - These figures were worked out by the District Agricultural Department. Neither the District Central Cooperative Bank nor the Cooperative Sale and Purchase Union had worked out figures for the different crops.

The variety was tried out by a few farmers in the previous year in the selected villages Aundane, Varhane and Khamtane and in the neighbourhood of Kukane. These cultivators had, however, acquired varying experiences about the variety and except for Khamtane, the experience was adequate to establish the high yielding nature of the variety.

The Gramsevaks were asked to prepare the lists of the cultivators who would participate in the programme. In the villages from Malegaon Block, it was observed that the Block Agency was very particular in getting the lists of participants as enlarged as possible and the Gramsevaks in the two selected villages were persuaded to prepare two or more supplementary lists. In addition to these lists, the Gramsevaks in these villages were asked to persuade cultivators who were not members of the co-operative societies, to grow the variety and prepare a list for submission to the revenue department for getting the taccavi loans for the variety. Besides, a part of the seed was handed over to the Gramsevaks for sale in these villages on the cash basis. All these later steps were not undertaken in Baglan block. These efforts and the previous experience had, naturally, their impact on the proportion of the cultivators who participated in the programme in the selected villages.

The presence of a large number of defaulter members in the co-operative societies in these villages created a problem in the implementation of the programme. The proportions of defaulter members in the total membership in the societies in the selected villages varied from 22 to 56 per cent.

The prevalence of the 'phad' system of cultivation was, however, a factor favourable for the implementation of the programme in the villages in Baglan block. At Aundane, the Gramsevak could succeed in organizing the hybrid bajra programme in a 'phad' in this village whereas at Tilwan, the cultivators took a decision to devote the entire land in the 'phad' in this village for the cultivation of cotton.

Distribution and use of the seed supplied

The distribution of seed was somewhat delayed in the villages in Malegaon Block due to the delay in the preparation of the N.C. Statements for the purpose. The co-operative society was the main source of supply of seed in all villages except Kukane. In Kukane, however, nearly half of the seed had to be channelized through the Revenue Department for the non-members who were in fact the family-members of the defaulters.

The seed was, however, not sown by a few cultivators even after obtaining the seed. It was evident that these cultivators had obtained the seed merely to secure a loan and fertilizers for their farm. The extent of misuse was, however, small as only 6 per cent of the 245 kgs. of seed supplied to these villages had remained unsown.

The cultivators had sown the seed not at the recommended dose of 1 kg. per acre but at the rate varying from 1.52 to 1.70 kgs.

per acre for the selected villages as was observed through the study of the selected participants. The seed rate adopted for local bajra on the contrary varied from 1.70 kgs to even 2.56 kgs. per acre in the same cases.

The number of participants varied from 18 to 48 in the selected villages. Quite a large proportion of the cultivators had participated in the programme in a village wherein the programme was organized around a 'phad'. The selected participants had, on an average, devoted 1.22 acres or 6.01 per cent of their cultivated holding for the new variety.

The real achievement of the target

The report about the area covered under the variety viz. 52,487 acres was based upon the seed-rate of 1 kg. per acre and on the quantum of seed supplied through official agencies as well as the probable supply of seed through natural spread. A part of the seed produced in the district during the previous year was rejected and in the opinion of the Block Agency, this seed was largely used by the cultivators as it was cheap. The Block Agency, after contacting the cultivators whose seed was rejected, estimated that nearly 20,000 acres in the district were covered through such seed.

The coverage through the distribution of seed through the official agencies was 32,487 acres and this was based on the quantum of 336 quintals of seed distributed for the purpose. Here again 1 kg. of seed was taken to have covered 1 acre by the Gramsevaks reporting these coverages. If we, however, apply the seed rate of 1.65 kgs. per acre arrived at through the survey this coverage would come to 20,404 acres which appeared to be the real magnitude of the coverage. If we, however, apply the seed rate of 1.65 kgs. per acre arrived at through the survey, this coverage would come to 20404 acres which appears to be the real magnitude of the coverage. If this is accepted it is unlikely that another 20,000 acres could get covered through natural spread from a few of the villages participating in the seed production programme. It would be realistic to say that at the most an area of 5,000 acres might have been sown through the natural spread. The real achievement of the target therefore, appears to be about 25,000 acres which is only a third of the working target adopted by the Zilla Parishad and a fifth of the official target given by the State.

Characteristics of the participants and the non-participants

Generally, the farmers having large size holdings had participated in the programme. Two-thirds of the selected participants had holdings above 10 acres whereas nearly the same proportion of the non-participants had holdings below 10 acres. It was noted that both the participants and the non-participants had irrigation facilities on an average over one-third of their holdings. It, therefore, appears that the proportion of the irrigated area in a holding had no influence in the tenurial status of the participants and the non-participants. A number of other reasons were, however, found to be responsible for the non-participation of some of the cultivators in this programme. Those cultivators who could devote only a small proportion of their holding for bajra could not participate in the programme. The defaulters and those who had borrowed heavy amounts under the medium term loan facilities also refrained from participation in the programme.

Uncertainty of water in the well and inadequate bullock holding were the other reasons for non-participation. Disabled head of the family, chronic illness of the head of the family were the other minor reasons for the same.

Distribution and use of fertilizers

Fertilizers were distributed either through the cooperative societies or through the Revenue Department as a taccavi loan. The village-wise figures for the supply through the Revenue Department were not available. The societies in the selected villages had, however, supplied the fertilizers in varying doses for the different villages according to the amounts granted by the Bank inspectors. These fertilizers were distributed along with the seed and hence those few cultivators who had not sown the seed, had also obtained fertilizers. The value of the fertilizer distributed per bag of the seed varied from Rs. 63 to Rs. 93 in these villages as against the provision of Rs. 70 per acre according to the pattern.

Those defaulter cultivators who had purchased the seed in cash from the Block Agency could not get loan for the purpose either through the society or through the Revenue Department. They had, therefore, to use only those meagre quantities of fertilizers which they could purchase through their owned funds.

The American Missionary headed by Father Farer had distributed fertilizers among 6 of the selected participants in Aundane and to one participant in Khamtane. The total value of the fertilizer, thus, distributed was Rs. 922.

Though the cultivators in some villages had received somewhat large quantities of fertilizers per acre than needed for the area under the variety, they had used fertilizers at nearly the recommended dose. The selected participants, for example, had used fertilizers worth Rs. 44 to Rs. 70 per acre in the different villages. In terms of nitrogen, the irrigated crop had on an average received 18.80 kgs. of nitrogen per acre whereas the un-irrigated crop had received 10.66 kgs. per acre. These figures varied from 17 to 20 kgs. per acre and from 8 to 11 kgs. per acre for the different villages in the respective cases. Irrigated local bajra had received, on the contrary, only 6.11 kgs. of nitrogen and unirrigated local bajra had received 1.18 kgs. per acre in case of the same participants. The use of nitrogen for hybrid bajra was, thus, quite satisfactory as it was nearer the recommended dose of 20 to 30 kgs of nitrogen per acre.

Distribution and use of the pesticides

There was a provision for pesticides worth Rs.20 per acre in the loans granted either by the Bank or the Revenue Department. Pesticides were not, however, supplied through the societies in two villages. Only a few cultivators had borrowed for this purpose in the other two villages.

As the variety did not suffer from any disease, there was no occasion for the farmers to use the pesticides. Only a few cultivators had used pesticides worth Rs.2 per acre as a precautionary measure in two of the selected villages.

Disbursement of credit in cash

The N.C. Statements prepared for the High Yielding Varieties Programme were supplementary in nature and hence the area under bajra for a cultivator had been counted again in these statements. The Bank had already sanctioned an amount of Rs. 55 per acre in cash for local bajra for the cultivators included in the earlier N.C. Statements. An amount of Rs. 65 per acre in cash was also sanctioned for hybrid bajra when the supplementary N.C. Statements were prepared for the same cultivators. When the Bank realised this problem of double counting of the area, it adopted a policy of not disbursing any cash for hybrid bajra to avoid over-financing. Cash loans were not, therefore, disbursed for the variety in three of the selected villages whereas in the fourth village only five cultivators had borrowed Rs.440 in cash before this problem came to the notice of the Bank.

Cash expenditure over local and hybrid varieties

The cost of production for hybrid bajra (excluding the cost over family labour) in case of the selected participants was observed to be Rs. 217 per acre. Sixty seven per cent of this cost (i.e. Rs. 148) was incurred in cash. The per acre costs of local bajra in case of the participants and the non-participants worked out to Rs. 75 and Rs. 60 per acre only. For both the groups of cultivators, 60 per cent of the cost was incurred in cash. Thus, the difference between the cash expenditures over the hybrid and the local varieties worked out to about Rs. 100 per acre. The major items of expenditure in cash in respect of hybrid bajra were seed, fertilizer, farm-yard manure and casual labour which together made up 80 per cent of this expenditure. As against a cash expenditure of about Rs. 6 to Rs. 9 per acre over fertilizers for local bajra, the cash expenditure over the same for hybrid bajra came to Rs. 55 per acre. Besides, the participants had spent Rs. 13 per acre over the hybrid bajra seed as against only a nominal expenditure for the seed of the local variety. The cash expenditure on casual labour for hybrid bajra worked out to Rs. 26 per acre whereas that for local bajra was around Rs. 10 per acre for the two groups of cultivators. This difference in the per acre expenditure over casual labour was due to larger expenditure on interculturing, harvesting and threshing hybrid bajra when compared to that on local bajra.

Sources of financing the cash expenditure

Nearly two-thirds of the cash expenditure over the seed of the hybrid variety was financed through the loans borrowed from the co-operatives whereas half of the remaining expenditure was financed through the taccavi loans and another half through owned funds. Nearly 60 per cent of the expenditure over fertilizers for hybrid bajra was financed through the co-operatives, 20 per cent through the taccavi loans and 12 per cent through owned funds. Private sources of finance accounted for an insignificant part of the expenditure. This was, however, not so for the expenditure incurred over casual labour. Nearly 80 per cent of the expenditure over this item was incurred through owned funds and about 14

per cent through the loans from the co-operatives. In the total, it was observed that nearly half of the cash expenditure over the variety was financed through the owned funds, about a third through the loans from the co-operatives and the remaining through the taccavi loans and the loans obtained from private sources of finance. The private sources of finance, accounted for hardly 5 per cent of the total cash expenditure. Similar general trends were observed in the case of the cash expenditure on local bajra.

Requirements of credit for the new variety

From the cash expenditures and the borrowings from the different sources of finance, it is possible to comment on the per acre requirements of credit for the new variety in relation to the per acre rates of finance sanctioned by the Bank. As far as expenditure over seed and fertilizers is concerned, the rates of finance of Rs. 15 and Rs. 70 per acre for the purpose appear to be quite adequate and in accordance with the technological recommendations for the variety. The farmers had also to purchase these inputs mainly through the borrowed funds.

Though the Bank had sanctioned an amount of Rs. 20 per acre for the pesticides, a large part of it, was not only not borrowed but even those who had borrowed the amount had no occasion to use it. This amount might, however, be needed in case of a severe attack of pests and diseases. The variety being, however, immune to such severe attacks, it might be worthwhile to disburse the sanctioned amounts in the later part of the season only in the case of such an urgent need.

There was a provision of cash loan of Rs. 65 per acre in the pattern for financing this variety. Though the cash expenditure over items other than seed, fertilizers and pesticides for the variety was on an average about Rs. 78 per acre, a major part of it was financed through the owned funds. The cultivators had borrowed only Rs. 16 per acre on this account. Even in the different size groups, the amount borrowed on this account varied from Rs. 7 to Rs. 30 per acre. It, therefore, appears that the loan needed for the purpose may not in any case exceed say, Rs. 40 per acre.

Productivity of the new variety

The new variety proved to be quite productive as, on an average it produced 501 kgs. of grains per acre when compared to the average yield of 152 kgs. per acre from the local variety in the case of the participants and 145 kgs. per acre in the case of the non-participants. It must, however, be noted here that the new variety was grown mainly on the better types of soil whereas the local variety was grown even on soils which were very inferior. On the irrigated farms the new variety produced on an average 524 kgs. per acre whereas the yield from local variety under similar conditions was 284 kgs. per acre for the participants and 231 kgs. per acre for the non-participants. Under the rain-fed conditions also the new variety produced 337 kgs. per acre as against the yield of about 110 kgs. per acre from the local variety for the participants and the non-participants.

It was observed that the new variety also produced a larger quantity of fodder. This was, however, the result of thick sowing, narrower spacing when compared to the recommended spacing of 18" between rows and the profuse tillering habit of the new variety. On the irrigated farms, the new variety produced on an average 209 bundles of fodder per acre against about 130 bundles per acre from the local variety in case of both groups of cultivators. So also under the rain-fed conditions the new variety produced 128 bundles per acre as against around 65 bundles from the local variety for the two groups of cultivators.

Profitability of the new variety

An attempt was made to work out the margins left after deducting the costs from the values of the production of grains and fodder, separately for the two varieties. On the irrigated farms, the margin for hybrid bajra worked out to Rs. 271 per acre whereas that for local bajra worked out to Rs. 181 and Rs. 144 per acre for the participants and the non-participants respectively. As far as the use of irrigation for the variety was concerned, the margin from the cultivation of the new variety was nearly 1.5 times the margin from the cultivation of the local variety in the case of the participants and 1.8 times of that in the case of the non-participants.

On the unirrigated farms, the margin for hybrid bajra worked out to only Rs. 88 per acre whereas that for local bajra worked out to Rs. 52 and Rs. 69 for the participants and non-participants respectively. Under the rain-fed conditions, the margin from the cultivation of the new variety was, thus, nearly 1.6 times the margin from the cultivation of local bajra in the case of the participants and only 1.3 times of that in the case of the non-participants. The new variety had, thus, enabled the cultivators to get larger moneterial returns both on the irrigated and non-irrigated farms.

Conclusions and some lessons from the study

Nasik district was suited well for the implementation of the hybrid bajra programme on a large scale as it is the main bajra growing district in the State. The cultivators had also become conscious of the use of improved varieties of seed and fertilizers even for the food crops under the rain-fed conditions. Urea was, for example, being largely mixed with local bajra seeds while sowing the crop. This was said to be the impact of the Intensive Agricultural Area Programme introduced in the district since the last four years. In addition to this factor, bajra was being grown as an irrigated crop with supplementary irrigation in some parts of the district even though in the Season and Crop Reports, areas under irrigated bajra had not been reported for this district.

The target given to the district, however, appeared to be too large especially in the context of the area brought under the variety in the preceding year. The result was that the target had to be pruned. Even after this pruning the variety could not be

introduced on a half of the area contemplated after this pruning despite the commendable efforts made by the district officials. One must, however, note that though there was a shortfall in the achievement in the current year, the achievement itself was commendable when compared to that in the previous year.

The reasons responsible for this shortfall in the achievement of such a large target may be summarized as under. Firstly, the number of Gramsevaks and Agricultural Assistants was limited to canvass the programme and put in special efforts for such a large programme in each and every village. There was a large target for every village but each Gramsevak or Agricultural Assistant had to look after 4 to 8 villages. The Gramsevaks, therefore, had to concentrate their efforts in a few villages which were well responsive. Secondly, there was some confusion at the district level in recommending the variety under the rain-fed conditions. Even though a decision was taken finally to recommend the variety even as a dry crop, the Gramsevaks and Agricultural Assistants advised the cultivators to grow it as far as possible on the irrigated farms to avert its failure. This considerably reduced the number of prospective participants. Thirdly, very intensive efforts were needed to propagate the variety on such a large scale but some of the blocks, it appears, failed in intensive efforts. The Block Development Officer of the Malegaon block on the contrary approached the problem through a number of angles. Firstly he insisted upon the Gramsevaks to prepare supplementary lists to enlist the participation of a large number of cultivators and to inform them about the programme. Secondly, he issued instructions to the Gramsevaks to prepare the lists of the cultivators who would borrow taccavi loans and asked them to hand over these lists to the revenue officials. The revenue officials at the village level had not much interest in the programme and hence the Gramsevaks were made to work on behalf of the revenue officials. Thirdly, he handed over a part of the seed to the Gramsevaks to sell it in cash or on short term credit in case a cultivator was not eligible either for the cooperative or the taccavi loan. These steps enabled him to achieve much greater success in the implementation of the programme in his block when compared to the other blocks.

The variety proved to be quite productive with as well as without the use of irrigation. The yield of grains as well as fodder was observed to be higher under both the above conditions.

It is with these experiences about the achievement of the target and the performance of the variety that the target for Nasik district has been fixed at 2 lakh acres for the ensuing year viz. 1968-69. This target may seem to be quite logical as it is only two times the official target given to the district in the current year and four times the target achieved. It must be, however, noted here that it is as much as eight times the probable achievement of the target worked out in the earlier pages. Special efforts may have, therefore, to be put in for the achievement of such a large target. It might for example, be helpful to concentrate more on those villages which were left out by the

Gramsevaks, out of their intensive efforts. The other villages in which conspicuous success was achieved, may be left to the natural spread of the variety. All inputs may have, however, to be supplied to these villages in time but all efforts may have to be concentrated mainly on the left-out villages. Secondly, the 'phad' system which implies joint management of the sources of water in some parts of the district may have to be specially tapped for the expansion of the variety. It should be possible to introduce bajra in the kharif season in these 'phads' if systematic steps are taken by the officials and the office bearer and the members of the Panchayat Samitis to organize the cultivators in a 'phad' for the purpose. Thirdly, all those steps which were followed by the Block Development Officer of the Malegaon Block, may have to be followed in all other blocks.

In no case, however, the lists to be prepared by the Gramsevaks may be made use of to build up a target for a block or a district. The purpose of the original and the supplementary lists should be merely to enlist the desire of the cultivators and to pursue the Gramsevaks to keep contact with the cultivators in the matter. As in Poona district surveyed for the rabi programme, it was also observed in Nasik district that a number of cultivators had not participated in the programme even though they had earlier agreed to participate in it and had even signed these lists.

In view of the difference of Rs. 100 per acre in the cash expenditures over the hybrid and the local variety, the Bank may have to play a major role in the successful implementation of the target. The overdues may have to be recovered promptly to reduce the number of defaulter cultivators who cannot get a loan for the purchase of inputs. The Bank may have also to introduce stricter measures of supervision over the use of the credit to discourage fictitious borrowing for the programme as noted in a few cases. The Bank has already introduced a method of preparing N.C. statements jointly for the high yielding varieties and the other crops and this would therefore, help in getting the N.C. Statements prepared earlier as well as check over-financing due to double counting of areas. The Bank may have also to reconsider its pattern of finance especially for the loans for pesticides and the cash out-lay over the variety as noted earlier.

The seed rate to be recommended for the variety may have also to be given a second thought to avoid financing over and above the needs for an acre. The cultivators were already used to sow bajra at the rate of more than 1.5 kgs. per acre and this was inevitable because of the use of the local seed-drill having a distance of 10 inches between the coulter. Unless attempts are made to introduce a seed-drill with the recommended spacing of 18 inches between the counters, the cultivators may find it difficult to adopt a lower seed rate. Because of the profuse tillering, it is necessary to sow the variety with a wider spacing but some of the farmers themselves reported to us that it may not be profitable to double the spacing for the new variety. One of the cultivators who had sown the crop with wider spacing of 18" observed that the crop looked quite thin inspite of adoption of all other recommended practices for the variety. In his opinion this factor had reduced the
yield from

the variety to only 950 kgs. per acre when he was expecting a yield of 1,200 to 1,500 kgs. per acre because of the adoption of the scientific method. Another cultivator could on the contrary, harvest a good crop of 1,100 kgs. per acre even by adopting a spacing of 9 inches between the rows. The seed rate and spacing may have, therefore, to be viewed once again by the technologists in the context of these local conditions. A suitable seed-drill combining the experiences of the cultivators and the results on the experimental farms may have also to be introduced for the purpose much before the programme gains momentum in the district.

PART II

RABI JOWAR IN POONA DISTRICT

1. Introduction

The High Yielding Varieties Programme in Maharashtra State envisaged a coverage of 39 lakh acres in the year 1967-68 which was the second year of the programme.

Out of the target of 39 lakh acres, the target fixed for the rabi season was 10 lakh acres. During the rabi season, hybrid jowar was to be extended over 7 lakh acres. The target for hybrid jowar accounted for 0.80 per cent of the total area and 93.7 per cent of the irrigated area under jowar in the State. The target for hybrid jowar, thus, nearly equalled the irrigated area under the crop in the State. The targets set for the different districts also followed the same trend with a few exceptions. This indicated that an area equal to the irrigated area under the crop was to be brought under the new variety in the second year of the programme.

Out of the target of 7 lakh acres, the Poona division comprising of 6 of the 25 districts in the State, accounted for 5.15 lakh acres. The targets for the different districts in this division varied from 0.35 lakh acres to 1.50 lakh acres. After the preliminary reports regarding the achievement of the targets were available, it was, however, observed that the programme had not received much response from the cultivators. In districts having a target of 1.50 lakh acres, the areas covered under the programme came to be even below 5 thousand acres. It was only in Poona district that the variety was reported to have been grown over 9 thousand acres as against a target of one lakh acres for this district. Poona district was, therefore, selected for the survey.

As quite sizable areas had been brought under the variety in Baramati and Dhond Blocks when compared to the other blocks in Poona district, these two blocks were selected for the detailed study. The villages Khanote and Bhandgaon were selected from Dhond Block and Korhale and Pimpali were selected from Baramati Block. From among the cultivators in these villages, 15 participants and 15 non-participants were selected from each village by stratifying the cultivators according to the size of the holding and the cultivation of the variety with or without the use of irrigation. The number of participants and non-participants selected for the study thus came to 60 in each case.

2. Formulation of the target

As early as in December 1966, the Agricultural Department of the Zilla Parishad was informed about making the preliminary arrangements for implementing a target of 60,000 acres for the variety during the rabi season. This target was, however, raised to 1 lakh acres in March 1967, in accordance with the upward revision of the targets for the State. As rabi jowar was already being grown as an irrigated crop over 1.17 lakh acres in Poona district and as the cultivators had gained some experi-

ence about the variety in the previous year and were again to get more experience in the ensuing kharif season, it was thought that it should be possible to implement a large target in this district. Both the earlier and the later targets were distributed over the different blocks in the district. Rabi jowar was being extensively grown in only 6 of the 13 blocks in the district. Hence these six blocks accounted for nearly 80 per cent of the target. According to the earlier target, Baramati and Dhond Blocks were expected to implement the programme over 6 and 5 thousand acres respectively. These targets were raised to 20 and 16 thousand acres after the break-up of the revised target.

3. Previous experience about the variety

The previous experience about the implementation of the target under the hybrid jowar programme in the rabi season (1966-67) in Poona district was not so encouraging. As against a target of 10,000 acres, it was possible to grow the variety on 532 acres only, due to the shortage of seed. So also in the kharif season (1967-68) preceding the rabi season under study, it was possible to introduce the crop over 520 acres only as against a target of 5,000 acres for the season. Poona district is, however, mainly a rabi jowar area. Though the experience in the two preceding seasons was not very encouraging, the prospects for a successful implementation of the programme during the rabi season of the year 1967-68 were not considered very bleak, because of the large area under irrigated jowar in the rabi season.

4. Staff available for the programme

The district was also somewhat well equipped with staff because of the Intensive Agricultural Area Programme (IAAP) which was commenced therein in 1962-63. There were 9 IAAP Blocks and one Irrigation Project Block having the same staff component as an IAAP Block. As many as 102 Agricultural Assistants and 10 Agricultural Officers were, thus, directly available for the implementation of the High Yielding Varieties Programme in these ten blocks. There were 36 officials and 136 supervisors and assistants belonging to the technical cadre, out of whom only 6 officials were graduates in agriculture. The remaining members of the technical staff had completed only middle school or high school education through the Agricultural Schools.

5. Seed Production Programme

A massive seed production programme had been undertaken in the district in the previous year to produce the seed required for the commercial programme. 1/ The seed programme was under-

1/ The term commercial programme was being used by the Agricultural Department to indicate the programme of cultivation of the crop for grains as against for the seed in the seed production programme.

taken on 800 acres in the cultivators fields during the kharif and the rabi seasons of the year 1966-67. About 2,000 quintals of seed sufficient for an area of 66,000 acres at the seed rate of 3 kgs. per acre was produced over the area.

6. Administrative arrangements for the programme

The Agricultural Department for the State had issued detailed instructions to the Zilla Parishad for the implementation of the programme. These instructions pertained to the selection of the areas, selection of the cultivators, supply of inputs, recovery of loans, general supervision over the programme and steps to be followed in case of the delay in the supplies of inputs. The duties to be assigned to the officials, assistants and the Gram-sevaks were also spelt out. A ready reckoner was provided to the officials to calculate the supplies of inputs required for the programme. So also detailed proformae were supplied to block officials for getting the monthly progress reports to put a vigilant watch on the implementation of the programme.

Similar detailed instructions were passed on by the District Agricultural Department to the officials in the Blocks. Circulars were also issued from time to time through the Department to solve the problems arising in the implementation of the programme. Orientation training classes were held at two places in the district to train the Agricultural Assistants and the Gramsevaks in the implementation of the programme. So also meetings were organised in each block either by the Parishad Agricultural Development Officer or the District Agricultural Officer to train the staff in the matter. Farmers' camps were also held in each block to train the cultivators in the practices in the cultivation of the variety. A proforma was also circulated among the Gram-sevaks to enlist the cultivators growing the jowar crop with the use of irrigation and the cultivators desirous of growing the new variety. This was expected to give a precise idea about the potential for the implementation of the programme during the year.

7. Estimation of the inputs

After the lists were received it was, however, observed that only 31,000 cultivators in the entire district were prepared to grow the variety on 61,600 acres or on an average at the rate of 2 acres per cultivator. Sixty per cent of the cultivators were prepared to purchase the inputs through their owned funds whereas 36 and 4 per cent desired to borrow the inputs through the co-operatives and the Revenue Department respectively. This clearly indicated that the target could be of the order of about 65,000 acres and not 1 lakh acres if the cultivators in these lists were to respond according to their desire expressed while preparing these lists.

Though the district had produced 2,000 quintals of seed,

half of it was sent to the other districts for the kharif season and nearly the same quantity was brought from another district for the rabi programme in Poona district. Including the stocks of seed from the previous seasons with the District and Taluka Sale and Purchase Unions, the total quantity of seed available for the rabi programme was 2,280 quintals which was sufficient just for 76,000 acres at the rate of 3 kg. per acre. The Zilla Parishad, therefore, adopted a working target of 76,000 acres even though the official target stood at 1 lakh acres. This happened not only in Poona district but even in the case of hybrid bajra in Nasik district where the working target and the official targets were observed to be different. There was some hesitation in the matter of implementing the large targets in many of the Zilla Parishads and requests were even made to the Agricultural Department at the State to reduce the targets. The Director of Agriculture, however, informed the Zilla Parishads that since the State had assigned the targets, they should not be reduced and every effort should be made to fulfil them.

The requirement of fertilizer for the above programme was estimated to be 17,000 M. tons of mixtures and 4,500 M. tons of ammonium sulphate. There was already a stock of 11,000 M. tons of mixtures and 5,200 M. tons of ammonium sulphate in the district in addition to the unsold stocks of the previous year at the block level. These quantities were, therefore, thought to be sufficient for the programme on 76,000 acres. The stock of pesticides was already quite adequate for the programme and pesticides were also readily available in the market.

8. Organization of the programme

Though the variety was recommended for cultivation both by the use of irrigation and as a rainfed crop, greater emphasis was laid on its cultivation with the use of irrigation. The cultivators were advised to grow it as a rainfed crop only where the soils were low lying or had a high water holding capacity. The recommended seed rate was 3 to 3.5 kgs. per acre and the seed was packed in 3, 4 and 6 kgs. bags. The seed was to be sold at Rs. 8 per kilo and a subsidy of Rs. 8 per 3 kgs. of the seed, was to be operated through the Zilla Parishad funds. The seed was, thus, available to the cultivators at Rs. 16 per 3 kgs. bag. Fertilizers were recommended at the rate of 30 kgs. of nitrogen, 20 kgs. of phosphoric acid and 15 kgs of potash per acre. Where facilities for irrigation were available for superior soils, it was recommended that the dose of nitrogen be raised even to 50 to 55 kgs of nitrogen per acre. In the recommendations made by the State mention was made only about the dose of 30 kgs. of nitrogen per acre and it was suggested that the dose may be even reduced to 15 kgs. per acre where the conditions are not favourable.

Because of the great emphasis on the use of irrigation for

the variety, the programme was undertaken not in all villages in a block but in some selected villages only. Targets were, for example, fixed for 50 of the 63 villages in Baramati Block and 40 of the 65 villages in Dhond Block. The earlier target given in December was distributed only over 25 villages in Baramati Block but the number of villages was doubled at the time of distribution of the second target to accommodate the increase therein. Only the canal irrigated villages were included in the previous list whereas the well irrigated villages were added to this list when the target was revised. In the distribution of the earlier target in this block, it was observed that five of the villages growing the variety in the previous year were eliminated only because there was no canal irrigation in these villages. The number of villages in the lists prepared at the time of allocation of the different targets in Dhond Block, however, remained the same. The targets for the villages in the earlier list in this Block were merely raised to accommodate the increase due to the revision of the target.

The selected villages were divided into groups and each Extension Officer was asked to implement the programme in a group of villages. As the Gramsevaks and the Agricultural Assistants could not influence the cultivators to any appreciable extent in the adoption of the variety, even the Extension Officers for industries, education and building construction were assigned with such groups of villages.

9. Achievement of the targets

After the implementation of the programme it was found that the area covered under the variety came to 9,059 acres only for the entire district. It may be noted that not all of this area was covered through the distribution of the certified seed. In Baramati Block, for example, it was observed that an area of 3,000 acres was covered through the certified seed and 640 acres were covered through the natural spread of the seed rejected by the National Seed Corporation. So also in Dhond Block the reported coverage over 960 acres was based on the quantity of seed supplied to the Gramsevaks. After receiving the stock of seed which was not used by the cultivators, it was found that the coverage came to 780 acres only. The reporting about the coverage was based on the quantity of seed handed over to the cultivators and it did not, therefore, involve any considerations such as the use of the seed for cultivation or otherwise or its use at the recommended seed rate.

10. Disbursement of the inputs

On account of low coverage under the programme only 270 quintals of seed could be distributed among the cultivators in the district. The Poona District Sale and Purchase Union held a stock of 1,560 quintals of seed excluding the stocks held at the block agencies. This seed was sufficient to cover more than 50,000 acres in the ensuing year.

The quantum of credit disbursement also suffered on this account. The Normal Credit Statements were ready quite in time as they were prepared jointly for the kharif and rabi programmes. The crop was to be financed at Rs. 320 per acre out of which Rs. 110 were to be advanced in cash. The Bank received only 132 statements demanding loans for 8,090 acres for the entire district. The total demand was Rs. 34.25 lakhs out of which an amount of Rs. 17.08 lakhs was sanctioned by the Bank for an area of 5,694 acres. The cultivators could, however, borrow an amount of Rs. 1.28 lakhs only out of which nearly a fourth was borrowed in cash. The presence of a large number of defaulters was reported to be the main factor for such a low level of the disbursement of loan. Even in the programme of Normal Crop Loan it was observed that the cultivators had borrowed Rs. 2.20 crores as against a sanction of Rs. 8.35 crores for the purpose. The Bank had made a change in its loaning policy for the High Yielding Varieties Programme and any member of a society who had repaid his previous loan, was made eligible for fresh loan irrespective of the percentage of recovery from the society. Similar trends were observed in the selected blocks. In Dhond Block only 13 societies had disbursed an amount of Rs. 45,920 for 142 acres whereas in Paramati Block only 5 societies had disbursed an amount of Rs. 8,795 for 29 acres.

It was not possible to get the figures for the disbursement of fertilizers for this specific variety. The District Sale and Purchase Union had sold 13 thousand M. tons of fertilizers in 1965-66 and 35 thousand metric tons in 1966-67 but upto the end of January 1968 the sales were of the order of 7 thousand M. tons only. This shortfall in the sale of fertilizers was partly due to the accumulation of the unsold stocks of the previous year at the block level and partly due to the lower coverage under the High-yielding Varieties Programme. The stock with the District Union at the end of January 1968 was 5 thousand M. tons which indicated that the Union had distributed even less than 60 per cent of the fertilizers stocked during the year.

11. Targets for the selected villages and arrangements made for their achievement

The Nira Canal was the main source of irrigation in villages, Korhale and Pimpali in Baramati Block. There was a small tank managed through the Revenue Department, at Bhandgaon in Dhond Block whereas the well formed the main source of irrigation at Khanote in the same block. A lift irrigation project was, however, about to be started on the Bhima river at Khanote when the target was fixed for this village.

Though the sources of irrigation were taken into account in the selection of these villages for the programme, the targets given to these villages appeared to be much unrealistic. The targets in some of the selected villages even exceeded the irrigated areas under the crop and they, therefore, implied a change in the cropping pattern itself at this experimental stage on the part of the farmers. In Pimpali, for example, the total irrigated

area was 790 acres whereas the target given was 600 acres when hardly half of the irrigated area in this village was under jowar cultivation in the previous season. At Khanote the total irrigated area hardly exceeded 50 acres but a target of 800 acres was allotted to this village because of the proposed lift irrigation project which was expected to irrigate 300 to 500 acres. Moreover, the fixation of such targets implied that the cultivators would not only devote all irrigated area under local jowar on their farms to the new variety but would also grow the variety in place of the other irrigated crops.

The Gramsevaks were asked to prepare the lists of the cultivators to note their willingness to grow hybrid jowar as noted earlier and also to help the secretaries of the cooperative societies in the preparation of the N.C. Statements. But these lists included only 40 to 52 cultivators in every village and included only the cultivators growing the crop by irrigation. The areas to be brought under the variety as recorded in these lists appeared to be quite large. In Khanote, for example, a cultivator was expected to devote on an average an area of 8.4 acres for the new variety. Basically these lists which were made use of to build up the working target for the district as noted earlier, appeared to be somewhat misleading and fictitious even though in many cases they carried the signatures of the responding cultivators.

The Block Development Officers and Extension Officers had visited these villages a number of times and it appeared that no pains were spared to convince at least a few of the cultivators in the adoption of the variety. During the previous year the variety had been tried only at Khanote. The cultivators in the other villages had no experience about it. At Khanote also the variety had not given the expected results either due to the shortage of water or the high incidence of the stem-borer or poor germination of the seed due to deeper sowing in moist soils.

12. Distribution of the seed

The seed was supplied to the cultivators just when the sowing was in progress. Except for Khanote, the seed could not be supplied to the cultivators before the commencement of sowing as the cultivators were reluctant to take any initiative on their own in purchasing the seed. At Khanote which was the place of residence of the chairman of the Panchayat Samiti in Dhond Block, the chairman himself had an influence over the cultivators and he could, therefore, help the Gramsevak in earlier distribution of the seed. The proposal for the lift irrigation project was also a factor for the initiative on the part of the cultivators. In the other villages the Extension Officers themselves had to visit the villages for the distribution of seed as the Gramsevaks could succeed in distributing the seed only among a very few of the cultivators included originally in their lists. The Extension Officers moved from house to house and supplied the bags of seed. Where the cultivators were eligible for loan through the cooperative societies, the amount was debited to their account whereas

in the other cases the Gramsevaks were asked to recover the amount from the cultivators at a later date. It was only through the influence of the Chairman at Khanote and through the use of some influence of the Extension Officers in the other villages, that it was possible to distribute at least a part of the seed. At Bhandgaon, the supply of water through the tank had to be linked to the cultivation of the variety. An announcement was made in this village that only those cultivators who would grow the variety, would be eligible for getting water from the tank. As a result of these different factors the seed could be distributed among only 14 to 18 per cent of the cultivators growing jowar by irrigation in Korhale and Pimpali in Baramati Block but to more than 60 per cent of the cultivators in Khanote and Bhandgaon in Dhond Block, despite the large irrigation facilities in the earlier Block.

13. Use of the seed

It was found that the seed could not be sown by all those who got the seed. At Khanote only 34 of the 46 cultivators who got the seed had sown the seed whereas the others returned the unused seed to the Gramsevak. At Pimpali, all except one of the 24 cultivators had sown the seed but four others had to uproot the crop in the seedling stage due to the heavy incidence of the stemborer. So also in Korhale all except 3 of the 25 cultivators had sown it. It was only in Bhandgaon that as many as 37 cultivators had sown the seed by sharing the seed mutually when only 29 cultivators were given the seed. This mutual distribution was effected mainly to get the benefit of the supply of tank water linked with the cultivation of the variety.

A number of reasons contributed to the misuse of seed. A few of the cultivators had to accept the seed only to please the Chairman or the Extension Officers who had come to their doors. Secondly, the purchase of the seed provided an opportunity for those cultivators who were defaulters, to obtain a permit for ammonium sulphate from the Gramsevak. Thirdly, the distribution of the seed being somewhat delayed two cultivators had to accept the seed from the Extension Officer, even though their crop was already sown.

The total areas devoted by these participants to the variety varied from 15 acres in Pimpali to 52 acres in Khanote. From the supply of seed to the village and the area brought under the variety therein, it appeared that the cultivators were supplied with seed at the rate varying from 3.53 to 4.07 kgs. per acre at Khanote, Bhandgaon and Korhale. The seed rate, however, worked out to 8.85 kgs. per acre at Pimpali because of the uprooting of the seedlings. The average supply worked out to 4.52 kgs. per acre in all villages. A study of the selected participants, however, indicated that they had used the seed at the rate of 3.53 kgs. per acre on the farms getting irrigation and 3.02 kgs. per acre for the crop grown under the rainfed conditions.

14. The real achievement of the target

From the rate of supply of seed to these villages and the seed rate adopted by the cultivators, it appears that the reported coverage of 9,000 acres under the variety is likely to be only of the order of 6,000 to 7,000 acres. This is obvious as the reports about the coverage at the village level itself were based not on the area actually brought under the variety but on the basis of the bags of seed supplied. The area under hybrid jowar reported by the Gramsevaks of the selected villages also indicated that the total coverage in these villages was 160 acres whereas the actual area as observed through the survey came to 123 acres.

15. The participants and the nonparticipants

A participant cultivator for the purpose of this enquiry was the one who had sown the seed of the high-yielding variety whereas the nonparticipant was the one who had sown a local variety of jowar but had not sown the high yielding variety. A few cultivators had obtained the seed of the high-yielding variety, but had not sown it for some reasons. They were considered nonparticipating cultivators even though they had obtained the seed through the regular channels of the cooperative society or the block agency. On the contrary, there were some cultivators who had not obtained the seed through these regular channels but had purchased the seed from their relatives with a sincere desire to sow, the variety. They were, therefore, considered as the participant cultivators even though their names were not recorded either in the registers maintained by the cooperative societies or the village level workers. Those who had sown the high-yielding variety were thus considered as the participants irrespective of the source of obtaining the seed whereas the others who had sown only the local variety of jowar even though they might have obtained the seed of the hybrid variety, were considered as the non-participants for the selection of cultivators for this enquiry.

16. Participation in relation to the size of the holding

The classification of the selected participants according to the size of the cultivated holding (Table 1) leads to the trend already established through the earlier reports that the medium and large cultivators have participated in the programme in a larger proportion when compared to the cultivators holding upto 10 acres of land. Only 13 of the 60 participants have holdings upto 10 acres whereas as many as 35 of the 60 nonparticipants fall in this class.

17. Land use pattern of the participants and the nonparticipants

Table 2 gives the average size of the holdings and the land use pattern for the participants and the nonparticipants in the selected villages. The average size of the holding for the participants works out to 23.69 acres and that for the nonparticipants to 11.86 acres. The classification of the cultivators according

Table 1 : CLASSIFICATION OF THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS
BY SIZE OF THE CULTIVATED HOLDING

Size group (acres)		Khanote	Korhale	Pimpali	Bhandgaon	Total
0.1 to 5.0	A	-	1	6	1	2
	B	5	8	8	1	22
5.1 to 10.0	A	3	3	4	1	11
	B	1	3	4	5	13
10.1 to 25.0	A	5	6	9	9	29
	B	6	4	2	8	20
25.1 to 50.0	A	4	3	1	3	11
	B	3	-	1	1	5
50.1 and above	A	3	2	1	1	7
	B	-	-	-	-	-
Total	A	15	15	15	15	60
	B	15	15	15	15	60

A = Participants

B = Non-participants

Table 2 : SIZE OF THE CULTIVATED HOLDING AND LAND USE PATTERN OF THE PARTICIPANTS AND THE NON-PARTICIPANTS SELECTED FROM THE FOUR VILLAGES

Size group (acres)	Participants or Non-participants	Average size of cultivated holding (acres)	Of which owned (acres)	Percentage of the owned holding to the cultivated holding (percent)	Of the cultivated holding irrigated (acres)	Percentage of the irrigated holding to the cultivated holding (percent)	Of the irrigated holding area, sown more than once (acres)	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 to 5.0	A	5.00	5.00	100.00	4.00	80.00	1.00	20.00
	B	3.09	3.09	100.00	1.88	60.84	0.29	9.39
5.1 to 10.0	A	7.50	7.32	97.60	4.29	57.20	0.77	10.27
	B	7.63	7.25	95.02	3.30	43.25	0.55	7.21
10.1 to 25.0	A	15.91	15.69	98.62	7.17	45.07	1.44	9.05
	B	17.44	17.28	99.08	2.56	14.68	0.70	4.01
25.1 to 50.0	A	33.52	32.15	95.91	11.15	33.26	1.99	5.94
	B	39.09	35.89	91.81	4.69	12.00	0.19	0.49
50.1 and above	A	71.21	69.57	97.70	9.71	13.63	3.18	4.47
	B	-	-	-	-	-	-	-
Total	A	23.69	23.10	97.51	7.50	31.66	1.61	6.80
	B	11.86	11.45	96.54	2.65	22.34	0.47	3.96

A = Participants

B = Non-participants

to the tenurial status indicates that there was no difference in the tenurial status of the two groups of cultivators and practically the entire part of the land was cultivated by the owners themselves in both groups. Nearly 32 per cent of the area cultivated by the participants was under irrigation whereas the non-participants were irrigating 22 per cent of their area. The participating as well as the nonparticipating farmers in the smaller size groups had facilities for irrigating a larger proportion of their holding when compared to the farmers in the larger size groups, exceeding 10 acres. This indicated that the mere presence of irrigation facilities was not enough for participation in the programme. The area available for double cropping had also no influence on the participation as the trends in the areas available for double cropping followed mainly the trends in the irrigated area.

A village-wise classification of the data (Tables 3 to 6) indicated nearly the same trends of equalities and differences between the two groups of cultivators within a village. There were, however, some differences among the individual villages. At Korhale and Pimpali in Baramati block, irrigation facilities were available on a large scale for both groups of cultivators when compared to the facilities available at Khanote and Bhandgaon in Dhond block. This difference between the villages in the two blocks was due to the availability of water from the Nira right bank canal in Baramati block. At Khanote in Dhond block, on the contrary, the cultivators could irrigate only those farms which were on the bank of the Bhima river, by lifting the water whereas at Bhandgaon tank and well irrigation was available for a small area. These differences in irrigation largely influenced the number of cultivators who could participate in the programme in these villages.

18. Cropping pattern of the participants and the nonparticipants

The cropping pattern of the selected participants and non-participants (Table 7) indicated that the selected blocks being located in the rabi tract of Poona district, more than three fourths of the area cultivated by the participants as well as the non-participants, was under rabi cultivation. Jowar itself occupied 80 to 95 per cent of the rabi area in the different size groups of both groups of cultivators. Though the participants in a size group had devoted a little larger proportion of their holding to rabi jowar in relation to the nonparticipants in the same size group, the difference was insignificant. This indicated that merely the proportion of the area available for jowar cultivation on a farm had no relevance to the participation in the programme. This table further indicated that the participants had devoted 6.4 per cent of their area under jowar to the cultivation of hybrid jowar. In terms of acreage it amounted to only 1.09 acres per participating cultivator. It increased from 0.75 acre to 1.82 acres per cultivator in an ascending order from the smallest to the largest size group. The small farmers in the first two size groups having holdings upto 10 acres had to devote nearly 20 per cent of their average area under jowar cultivation

Table 3 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN KHANOTE

Size group (acres)	Participants or non-participants	Average size of cultivated holding (acres)	Of which owned (acres)	Percentage of the owned holding to the cultivated holding (percent)	Of the cultivated holding area irrigated (acres)	Percentage of the irrigated holding to the cultivated holding (percent)	Of the irrigated area sown more than once (acres)	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 to 5.00	A	-	-	-	-	-	-	-
	B	3.42	3.42	100.00	1.11	32.46	-	-
5.1 to 10.00	A	8.50	8.50	100.00	1.91	2.25	-	-
	B	8.20	8.20	100.00	-	-	-	-
10.1 to 25.0	A	13.98	13.98	100.00	2.10	15.02	0.40	2.86
	B	18.36	18.36	100.00	1.17	6.37	0.42	2.29
25.1 to 50.0	A	36.00	33.50	93.06	1.25	3.47	-	-
	B	38.33	38.33	100.00	1.00	2.61	-	-
50.1 and above	A	82.17	78.33	95.33	1.50	1.82	-	-
	B	-	-	-	-	-	-	-
Total	A	32.39	30.94	95.52	1.72	5.31	0.13	0.40
	B	16.74	16.74	100.00	1.04	6.21	0.17	1.01

A = Participants

B = Non-participants

Table 4 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE
SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN BHANDGAON

Size group (acres)	Participants or non-participants	Average size of cultivated holding (acres)	Of which owned (acres)	Percentage of the holding to the cultivated holding (percent)	Of the owned cultivated holding area irrigated	Percentage of the irrigated holding to the cultivated holding (percent)	Of the irrigated holding area sown more than once (acres)	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 to 5.0	A	5.00	5.00	100.00	3.00	60.00	-	-
	B	4.00	4.00	100.00	1.00	25.00	-	-
5.1 to 10.0	A	5.12	3.30	64.45	3.30	64.45	-	-
	B	8.20	7.20	87.80	2.30	28.05	0.82	10.00 ¹⁴
10.1 to 25.0	A	14.94	14.44	96.65	3.98	26.63	0.80	3.35
	B	16.26	16.09	98.95	2.69	16.54	0.73	4.49
25.1 to 50.0	A	30.53	28.86	94.53	6.53	21.39	2.25	7.37
	B	30.38	14.38	47.33	6.95	22.88	0.95	3.13
50.1 and above	A	51.10	51.10	100.00	2.75	5.37	1.00	1.95
	B	-	-	-	-	-	-	-
Total	A	19.17	18.40	95.98	4.30	22.43	0.99	5.16
	B	13.73	12.24	89.14	2.73	19.88	0.72	5.24

A = Participants

B = Non-participants

Table 5 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE
SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN KORHALE

Size group (acres)	Participants or non-participants	Average size of cultivated holding (acres)	Of which owned (acres)	Percentage of the owned holding to the cultivated holding (percent)	Of the cultivated holding area irrigated	Percentage of the irrigated holding to the cultivated holding (percent)	Of the irrigated holding area sown more than once	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 to 5.0	A	5.00	5.00	100.00	5.00	100.00	2.00	40.00
	B	2.19	2.19	100.00	1.85	84.47	0.74	33.79
5.1 to 10.0	A	7.54	7.54	100.00	6.38	84.62	2.73	36.21
	B	6.42	6.42	100.00	5.42	84.42	1.00	15.58
10.1 to 25.0	A	17.63	17.63	100.00	11.87	67.33	3.87	21.95
	B	17.73	17.23	97.18	3.53	19.90	1.03	5.81
25.1 to 50.0	A	32.04	32.04	100.00	24.04	75.03	5.06	15.79
	B	-	-	-	-	-	-	-
50.1 and above	A	72.88	72.88	100.00	21.38	29.34	10.62	14.57
	B	-	-	-	-	-	-	-
Total	A	25.02	25.02	100.00	14.02	56.04	4.55	18.18
	B	7.15	7.02	98.18	3.01	42.38	0.87	12.17

A = Participants

B = Non-participants

Table '6 : SIZE OF THE CULTIVATED HOLDING AND LAND-USE PATTERN OF THE
SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN PIMPALI

Size group (acres)	Parti- cipants or non- parti- cipants	Average size of cultivat- ed holding (acres)	Of which owned (acres)	Percentage of the own ed holding to the culti- vated holding (percent)	Of the culti- vated holding irrigat- ed area	Percentage of the irrigated holding to the cultivated holding (percent)	Of the irrigated holding area sown more than once	Percentage of the area sown more than once to the cultivated holding (percent)
0.1 to 5.0	A B	- 3.64	- 3.64	- 100.00	- 2.50	- 68.68	- 0.62	- 17.03
5.1 to 10.0	A B	7.27 7.62	7.27 7.62	100.00 100.00	4.75 3.80	65.34 49.87	- -	- -
10.1 to 25.0	A B	16.59 18.50	16.59 18.50	100.00 100.00	10.04 4.25	60.52 22.97	1.03 0.75	6.21 4.05
25.1 to 50.0	A B	37.00 44.20	37.00 49.20	100.00 100.00	26.00 13.50	70.27 27.44	- -	- -
50.1 and above	A B	55.0 -	55.00 -	100.00 -	18.00 -	32.73 -	- -	- -
Total	A B	18.03 9.77	18.03 9.77	100.00 100.00	10.23 3.81	56.74 38.99	0.62 0.13	3.44 1.33

16

A = Participants

B = Non-participants

Table 7 : CROPPING PATTERN OF THE PARTICIPANTS AND THE NON-PARTICIPANTS SELECTED FROM THE FOUR VILLAGES

Size group	Parti- cipants or non- parti- cipants	Total Cultivated Area (acres)			Rabi (acres)			Area under Jowar (acres)	Proportion of area under	
		Kharif	Rabi	Other crops	Hybrid Jowar	Local Jowar	Other crops		Jowar to the area under crops in the rabi season (per cent)	Hybrid Jowar to the area under Jowar (per cent)
0.1 to 5.0	A	2.0	3.75	0.25	0.75	2.50	0.50	3.25	86.67	23.08
	B	0.35	2.68	0.35	-	2.17	0.51	2.17	80.97	-
5.1 to 10.0	A	1.11	6.00	1.15	0.98	3.89	1.14	4.87	81.17	20.12
	B	1.83	5.54	0.81	-	4.91	0.63	4.91	88.63	-
10.1 to 25.0	A	3.02	11.83	2.50	0.91	9.17	1.75	10.08	85.21	9.03
	B	2.74	14.32	1.08	-	13.39	0.89	13.39	93.50	-
25.1 to 50.0	A	4.82	28.58	2.02	1.30	23.89	3.40	25.18	88.10	5.16
	B	2.67	36.01	0.60	-	34.37	1.94	34.37	95.44	-
50.1 and above	A	6.04	63.43	4.93	1.82	54.21	7.39	56.11	88.46	3.24
	B	-	-	-	-	-	-	-	-	-
Total	A	3.33	19.58	2.37	1.09	15.93	2.56	17.03	86.98	6.40
	B	1.66	9.96	0.71	-	9.17	0.78	9.17	92.07	-

A = Participants

B = Non-participants

to the cultivation of hybrid jowar whereas in the largest size-group this proportion declined to 3.24 per cent only in a descending order. This was quite obvious as even a small farmer had to purchase at least one bag of the seed sufficient for an acre and the large farmers were not prepared to experiment with the variety over more than one or two acres.

19. The main factors influencing participation

The size of the holding was thus, an important factor to influence the participation in the programme. The tenurial status, facilities for irrigation and the proportion of area available for jowar cultivation on a holding had no relevance to the participation of the cultivators in the programme as far as their aggregative behaviour in the different size groups was concerned. The area which a cultivator could devote to growing jowar with the use of irrigation had, however, some influence on his participation in the programme (Table 8). The table indicated that practically in every size group the area devoted to irrigated jowar by the participants was much larger than the area devoted to the same by the nonparticipants in the same size group. On an average the participants had grown irrigated jowar over 4.24 acres whereas the nonparticipants had devoted only 1.99 acres for the same. It was, therefore, obvious that those who could devote a sizeable area to the cultivation of irrigated jowar could adopt the new variety for trial over a small area of one or two acres as noted earlier. There were yet a few nonparticipating cultivators as in the size group 25.1 to 50.0 acres who has not tried the variety even though they had used 3.58 acres of their holding for the cultivation of irrigated jowar. A number of other reasons were responsible for the nonparticipation in such cases.

20. Other factors influencing participation

It was observed through the study of some of the cases that many of the big farmers could not participate in the programme as they had committed a default in the repayment of the loans for the previous year and hence they were not eligible for fresh loans for the programme. The owned funds which they possessed were reserved by them for the cultivation of other profitable crops such as sugarcane. It was also observed that those farmers who had a large cattle holding could not participate in the programme as they were growing jowar on their irrigated lands mainly to meet their requirements of fodder. Families in which the decision making rested with old or disabled heads of the households had also not participated in the programme despite of large irrigated areas on their holdings. In two cases in Korhale, the cultivators possessing large sized holdings had purchased the seed but it could not be sown in time because of the urgency of other operations on their farms. In the same village, a few cultivators refused to participate in the programme as they could not get any firm assurance for the supply of canal water from the canal inspector. In Bhandgaon, the whole programme was canvassed only among those cultivators whose lands were situated under the command of the local tank. Cultivators having facilities for well

Table 8 : AVERAGE PER CULTIVATOR AREA DEVOTED TO IRRIGATED JOWAR IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

Size-group	Average per cultivator area devoted to irrigated jowar by	
	Participants (acres)	Non-participants (acres)
0.1 - 5.0	3.10	1.36
5.1 - 10.0	2.53	2.27
10.1-25.0	3.60	2.09
25.1-50.0	9.14	3.58
50.1 & above	4.44	-
Total	4.24	1.99

irrigation were not even approached in this village. Two of the big cultivators in Pimpali who were well educated and who had participated in the hybrid seed production programme did not participate in the commercial programme. In their opinion, it was more profitable to take part in the former programme than in the latter.

21. The problem of irrigation

Initially all cultivators except one at Korhale who had purposely grown the variety in a low lying piece of land, had sown the variety with a view to irrigate it. At Khanote, however, the proposed irrigation project could not materialise and as many as 17 of the 35 participants had to grow the crop without irrigation. So also at Korhale 2 of the participants could not get water from the canal in spite of their following the regular procedure of applying through Form No. 7 to the Irrigation Department for the purpose. The Block Development Authorities had on the contrary publicised in this village that all cultivators applying for canal water for hybrid jowar through Form No. 7 would get water. It was on the basis of this assurance that these cultivators had grown hybrid jowar. They had to suffer merely on account of the lack of coordination between the Zilla Parishad and the Irrigation Department. Another cultivator in the same village had to solve his problem by using the water from the canal without permission to save his crop. One cultivator at Bhandgaon could not hire an oil engine for irrigation as the owners of the oil engines in the village quoted high hire charges. He had sown the crop on superior low lying land and as such did not suffer much on this account. But all others who could not get the canal water at Korhale or water from the proposed project at Khanote had to suffer heavily on these accounts.

The district authorities had experienced that the cultivators themselves at times refused to sow hybrid jowar even after completion of an irrigation project. In areas where the cultivators had signed bonds and promised to grow hybrid jowar over 2,000 acres after the completion of a project in Ambegaon Block in Poona district, it was reported that they had grown the variety only over 600 acres after the project was complete. It was stated that no action was also possible against such defaulting cultivators.

Even where irrigation facilities were available in the selected villages, the use of irrigation for this variety was neglected in a few cases because of the demand for irrigating the other crops. Upto the end of January, the cultivators had given on an average 2.5 irrigations for hybrid jowar in Korhale, Pimpali and Bhandgaon whereas in Khanote the average came to only 1.5. Local jowar had, on the contrary, received nearly 2 irrigations on an average in the former villages and one in the latter.

The interval at which canal water was available for the crop also created problems in this respect. The variety needed

irrigations at least at an interval of 18 to 20 days but canal water could not be supplied for the variety at Pimpali even for a month. It was, however, only those cultivators who had to lift water for the food and fodder crops from outside the two seasonal and the perennial irrigation blocks by applying through Form No. 7, that had to suffer on these various accounts. Those who got water for the two seasonal blocks by the flow method had to suffer only for the delay in the supply of water.

In the opinion of the officials of the Irrigation Department for these canal divisions, the canal was being utilized to its fullest capacity. Because of the earlier commitments for 6 years for the perennial and the two seasonal blocks, there remained little scope to provide water for areas outside these earmarked irrigation blocks. The next revision for these commitments was due after March 1968 and in case if provision is made specially for hybrid jowar in these blocks, it would be possible to regularize the supply of water for the crop.

22. Distribution of credit

Because of the large number of defaulters varying from one third to one half of the membership of the societies, it was not possible to disburse the credit even though the Bank had sanctioned varying amounts for the purpose. None of the cultivators at Pimpali could borrow through the society because of some dissensions. So also only 24 of the 72 cultivators participating in the programme in the villages selected in Dhond Block and 2 of the 22 cultivators in Korhale in Baramati Block were eligible for credit. The value of the seed supplied to them was debited to their accounts in the societies. They were also supplied with fertilizers at the rate of Rs. 125 to Rs. 128 per 3 kgs. of the seed. Credit was, however, supplied solely upon the production of a certificate from the Agricultural Assistant for having grown the variety and no field verifications were made for the purpose.

In addition to the fertilizers the above noted cultivators in Korhale and Bhandgaon were supplied with cash loan at the rate of Rs. 110 and Rs. 55 per 3 kgs. bag of the seed respectively whereas no cash loan was disbursed at Khanote. So also the same cultivators in Korhale and Bhandgaon were supplied with pesticides worth Rs. 18 per 3 kgs. of seed. Only one cultivator at Khanote obtained loan for this purpose. As many as 47 of the 72 cultivators in the villages selected in Dhond Block and 39 of the 41 cultivators in the villages selected in Baramati Block had to cultivate the variety either by utilising their owned funds for the inputs or borrowing from the other sources.

23. Use of the fertilizers and pesticides

As a major part of the fertilizers was purchased through owned funds, there was no problem of misutilization of the loan for fertilizer in this district. A few of the cultivators getting the fertilizers through the societies had, however, used lower doses. As against a recommended dose of Rs. 125 worth of ferti-

lizers per acre, the cultivators had used on an average fertilizers worth Rs. 88 per acre for the irrigated fields and worth Rs. 5 per acre for the nonirrigated fields. The per acre value of the fertilizers used in the irrigated fields varied from Rs. 45 at Khanote to Rs. 105 at Korhale. Fertilizer was not used for the nonirrigated crop at Khanote.

Only half the number of the selected participants had used pesticides for hybrid jowar. Hybrid jowar grown under the rain-fed conditions, was not sprayed at all. The average cost over pesticides came to Rs. 11 per acre in Baramati Block and Rs. 7 per acre in Dhond Block.

24. Outlays over the inputs : The concepts used

Before examining the outlays on the inputs for hybrid jowar and local jowar it is necessary to mention here the different concepts used and their meaning in the analysis of the data. The cash expenditures given in the tables for these outlays include the expenditures incurred by the cultivators in cash as well as on credit. Fertilizers, for example, were purchased on credit and they have been treated as the cash expenditures in these tables. The cash expenditures also include the payable expenditures. Expenditures over certain items, which were due and inevitable but not incurred by the time of these investigations such as, land revenue, rent and wages for the permanent farm servants, have been included in the cash expenditures. In addition to the expenditures in cash, certain expenditures were incurred in kind such as wages for the casual labour and permanent farm servants according to the conventions prevalent in the area. These expenditures have been separated from the cash expenditures and their imputed values are given in the tables at the prices prevalent at the time of investigations. Part of certain inputs such as seed and farm yard manure were produced on the farm. The imputed values of such inputs were also worked out. From the cash expenditures and the imputed values of the kind inputs, an attempt is made in the tables to determine the total costs over raising the hybrid and local varieties, excluding the costs over family labour.

Overhead expenditures such as those on wages of the permanent farm servants and fodder for the bullocks were attributed to each crop on the basis of the proportion of the area under the crop in the cropping pattern on the holdings. This was inevitable since data were not collected for these inputs over each crop separately.

Instead of giving absolute figures for the cash expenditures and the costs in the tables, the per acre figures have been given to facilitate the comparison. All per acre calculations for the inputs in these tables are based on the total areas devoted by all selected families to a respective crop and not the areas which were directly concerned with the input. The per acre expenditure over fertilizer for hybrid jowar for example, refers to the total area under hybrid jowar and not the area of hybrid jowar which received the fertilizer.

Table 9 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER HYBRID JOWAR IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS

(Figures in rupees per acre)

		0.1 to 5.0	5.1 to 10.0	10.1 to 25.0	25.1 to 50.0	50.1 & above	Total
Seed-farm produced		-	-	-	-	-	-
	purchased	16.00	24.43	22.67	21.33	20.70	22.15
Fertilizers		21.17	79.12	67.88	43.12	46.61	59.27
Manures-farm produced		-	1.49	29.10	19.92	78.43	37.40
	purchased	-	4.65	15.39	32.98	9.61	15.97
Pesticides		-	14.23	13.61	9.40	10.43	11.90
Irrigation expenditure		3.00	5.67	5.32	8.28	12.75	7.38
Land Revenue		1.70	1.34	1.93	1.65	1.22	1.63
Land Rent		-	-	-	-	-	-
Casual Labour		-	-	-	-	-	-
Preparatory tillage	Kind	-	-	-	-	-	-
	Cash	36.00	30.98	4.54	3.51	-	8.43
Sowing	Kind	-	-	-	-	-	-
	Cash	14.00	6.51	0.81	-	0.24	1.74
Inter-culture	Kind	-	-	0.73	-	-	0.30
	Cash	2.61	15.02	22.06	15.72	5.96	16.05
Harvesting and threshing	Kind	-	2.01	7.88	5.56	11.14	6.88
	Cash	-	3.07	8.17	5.75	1.25	5.32

(continued)

Table 9 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER HYBRID JOWAR IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS.

(Figures in rupees per acre)

Item	0.1to 5.0	5.1to 10.0	10.1to 25.0	25.1to 50.1	50.1 & above	Total
Total Labour Charges						
Kind	-	2.01	8.61	5.56	11.14	7.18
Cash	52.67	55.86	35.59	21.47	7.45	31.59
Permanent Farm Servant						
Kind	-	-	3.56	4.36	2.73	2.92
Cash	-	-	28.41	12.08	4.78	15.74
Fodder						
Kind	-	-	-	-	-	-
Cash	-	3.87	3.40	1.83	-	2.41
Feeds						
Cash	-	8.59	23.90	14.78	6.44	15.59
Kind	-	-	-	-	-	-
Others						
Cash	-	-	-	-	-	-
Kind	-	-	-	-	-	-
Total Cash expenditure	94.54	197.76	218.10	166.92	119.99	183.63
Imputed value of the expenditure	-	3.50	41.27	29.84	92.30	47.50
Total Cost	94.54	201.26	259.37	196.76	212.29	231.13
Proportion of cash expenditure to the total cost (percent)	100.00	98.36	84.08	84.83	56.49	79.44

25. Cash expenditure and the costs

The per acre cash expenditure and the per acre costs over hybrid jowar over the different items for the different size groups of the participants have been given in Table 9. Similar cash expenditures and costs over local jowar for the different size groups of the participants and the nonparticipants have been given in Table 10.

These tables indicate that the costs over growing hybrid jowar (excluding the cost of family labour) came to Rs. 231 per acre. These costs varied from Rs. 196 to Rs. 259 in the different size groups except the lowest size group wherein the cost came to only Rs. 94 because of lower costs over fertilizer and no costs over manures, pesticides, permanent farm servants, fodder, feeds, etc. Around 80 per cent of these costs were incurred in cash. This proportion varied from 100 to 57 per cent in a descending order from the lower to the higher size groups. The costs over local jowar worked out to Rs. 60 and Rs. 40 per acre for the participants and the nonparticipants respectively. Unlike the costs over hybrid jowar, these costs declined from the lower to the upper size groups. The difference in the costs for the two groups of cultivators was mainly due to greater costs over certain items of overhead expenditure such as permanent farm servants, feeds, etc. in the case of the participants when compared to the nonparticipants. Around 70 per cent of the costs were incurred in cash in respect of both groups of cultivators. This proportion also generally declined from the lower to the upper size groups.

The difference in the cash expenditure over the hybrid and the local variety worked out to Rs. 141 per acre in case of the participants. In relation to the expenditure over local jowar in case of the nonparticipants, this difference worked out to Rs. 154 per acre.

26. Expenditure over different items

The major items of expenditure over hybrid jowar were the seed, fertilizer, manure and casual labour which together made up 70 per cent of the expenditure. The cash expenditure over the hybrid jowar seed worked out to Rs. 22 per acre as against only half a rupee for the seed of the local variety. The cost of the hybrid jowar seed was subsidized to the extent of 33 per cent. Otherwise the cash expenditure in this case would have come to Rs. 33 per acre. As the seed was purchased at Rs. 8 per kg. it appears that the seed was used at the rate of about Rs. 60 per acre for hybrid jowar against only a nominal expenditure of Rs. 2 to 3 per acre for local jowar. Fertilizer was, however, used by only 39 of the 60 participants and 14 of the 60 nonparticipants. The cost over farm yard manure used for hybrid jowar came to Rs. 53. Manure worth Rs. 16 was purchased in cash. The cost over manure used for local jowar on the contrary varied between Rs. 5 and Rs. 7 per acre. The cost over labour for hybrid jowar worked out to Rs. 39 per acre. The same for the local variety worked out to Rs. 9 to Rs. 12 per acre. This difference was due

Table 10 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER LOCAL JOWAR IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

(Figures in Rupees per acre)

Items	Size groups										Total	
	0.1 to 5		5.1 to 10		10.1 to 25		25.1 to 50		50& above		A	B
	A	B	A	B	A	B	A	B	A	B		
Seed-farm												
-produced	3.70	2.45	2.03	2.54	2.39	2.43	2.83	2.30	3.05	-	2.77	2.40
-purchased	-	0.85	1.28	1.41	1.17	0.39	0.65	0.27	-	-	0.56	0.51
Fertilizers	38.70	1.52	11.50	5.56	5.82	0.96	2.30	-	0.98	-	3.35	1.43
Manures -												
Farm Produced	8.00	11.36	3.33	8.15	9.91	2.08	0.30	3.94	0.84	-	3.35	4.20
Purchased	-	1.79	9.70	1.41	4.66	1.47	4.60	-	1.30	-	3.50	1.51
Pesticides	-	-	-	-	0.11	-	-	-	-	-	0.03	-
Irrigation expenditure	-	3.03	2.08	1.13	1.97	0.54	1.19	0.93	0.42	-	1.13	0.95
Land revenue	1.78	1.70	1.44	1.38	1.60	1.42	1.55	0.94	1.02	-	1.35	1.29
Land Rent	-	-	1.36	-	-	1.11	1.37	-	-	-	0.43	0.54
Casual labour												
Preparatory Kind	-	-	-	-	0.01	-	-	-	-	-	0.01	-
tillage Cash	22.60	30.21	18.80	16.36	3.61	1.85	2.53	0.81	0.05	-	2.66	5.78
Sowing - Kind	-	-	-	-	-	-	-	-	-	-	-	-
Cash	11.60	8.27	4.25	3.31	0.62	0.23	-	0.11	-	-	0.42	1.28
Inter-culture Kind	-	-	-	-	-	-	-	-	-	-	-	0.07
Cash	8.00	2.15	4.05	3.42	3.69	0.82	1.26	0.28	1.21	-	2.07	1.08
Harvesting & threshing - Kind	-	3.71	8.24	0.63	4.75	2.77	6.21	4.79	8.70	-	6.87	3.16
Cash	3.40	3.29	1.80	2.51	3.20	0.24	1.23	0.44	0.08	-	1.35	0.84
Total labour charges												
Kind	-	3.71	8.24	0.63	4.76	2.77	6.21	4.79	8.70	-	6.87	3.23
Cash	45.60	44.22	28.87	25.59	11.11	3.15	5.02	1.63	1.34	-	4.00	9.00

(continued)

Table 10 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER LOCAL JOWAR IN THE DIFFERENT SIZE GROUPS OF THE PARTICIPANTS AND THE NON-PARTICIPANTS

(Figures in rupees per acre)

Items	Size groups										Total	
	0.1 to 5		5.1 to 10		10.1 to 25		25.1 to 50		50 & above		A	B
	A	B	A	B	A	B	A	B	A	B	A	B
Permanent Farm												
Servant Kind	-	5.38	2.69	-	4.69	0.08	4.24	-	5.68	-	4.85	0.53
Cash	-	2.39	4.04	-	23.18	4.48	9.59	-	7.66	-	12.26	2.38
Fodder Cash	-	2.99	5.54	3.81	3.79	2.05	1.26	0.73	-	-	1.64	1.93
Feeds Kind	-	-	-	-	-	-	-	-	0.48	-	0.19	-
Cash	-	7.55	5.06	10.39	20.73	10.94	12.99	8.64	6.60	-	12.13	9.85
Others Kind	-	-	-	-	-	-	-	-	-	-	-	-
Cash	-	-	-	-	-	-	-	-	-	-	-	-
Total Cash expenditure	86.08	65.74	70.63	50.69	74.93	26.50	40.52	13.15	19.32	-	42.88	29.37
Imputed value of the expenditure in kind	11.70	22.90	16.56	11.32	22.57	7.36	13.58	11.03	18.75	-	18.04	10.36
Total cost	97.78	88.64	87.19	62.01	97.50	33.86	54.10	24.18	38.07	-	60.92	39.73
Proportion of cash expenditure to total cost (percent)	88.03	74.17	81.07	81.74	76.85	78.26	74.90	54.38	50.75	-	70.39	73.92

A : = Participants

B = Non-participants

to higher costs over interculturing and harvesting and threshing the hybrid variety. These two items covered practically three fourth of the total costs over casual labour. Preparatory tillage and sowing were being done largely with the use of family labour whereas casual labour had to be engaged for weeding, interculturing, spraying, harvesting and threshing.

The cost over pesticides worked out to Rs. 11 per acre for hybrid jowar and practically nil for the local variety. Pesticides were, however, used for the hybrid variety by only 33 of the 60 participants and for the local variety by two of the 60 nonparticipants. The costs over irrigating hybrid jowar came to Rs. 7 per acre and they varied from Rs. 3 to Rs. 12 or more per acre according to the source of irrigation. The cost of irrigating local jowar was negligible as the variety was largely grown under the rainfed conditions. Only 28 of the 60 participants had irrigated hybrid jowar whereas 21 participants had irrigated the local variety in addition. One fourth of the nonparticipants had also irrigated the local variety though the area irrigated by them was quite small. Twenty of the participants and 4 of the nonparticipants had employed farm servants. The costs cover the farm servants worked out to about Rs. 16 to Rs. 18 per acre for the hybrid and the local varieties grown by the participants and to Rs. 3 per acre for the local variety grown by the nonparticipants. The cost over feeds came to Rs. 15 and Rs. 12 per acre for the hybrid and local varieties grown by the participants and to Rs. 10 per acre for the local variety grown by the nonparticipants. The costs over items such as land revenue, land rent and fodder were negligible.

27. Size-wise distribution of the expenditure and the costs

The size-wise distribution of the costs and expenditures over hybrid jowar indicated that there were not much differences in the costs over seed in the different size groups except for the lowest size group wherein the cost over seed was only Rs. 16 per acre or nearer to the recommended seed rate. The participants in the second and the third size groups had used fertilizers in large quantities whereas the cultivators in the fifth and the largest size group had used a large quantity of farm yard manure. The costs over casual labour were larger in the lower size groups than in the upper. Moreover these costs declined from the lower to the upper size groups. Costs were incurred over the permanent farm servants only in the last three size groups and the cost was the highest in the third size group. The cultivators in the third size group had also incurred a high cost over the feeds. The costs over other items did not show much variation between the various size groups.

The size-wise distribution of the costs and expenditures over local jowar indicated that the participants in the lowest size group had used fertilizers for local jowar in a large quantity. The costs over manures and fertilizers generally declined from the lower to the upper size groups in case of both the groups of cultivators. The costs over casual labour also

Table 11 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER IRRIGATED AND NON-IRRIGATED HYBRID AND LOCAL JOWAR IN CASE OF THE PARTICIPANTS AND NON-PARTICIPANTS
(Figures in rupees per acre)

Item	Participants				Non-participants	
	Hybrid		Local		Local	
	Irrigated	Non-irrigated	Irrig- ated	Non-irrig- ated	Irrigated	Non-irrigated
Seed - farm produced	-	-	2.79	2.76	2.94	2.29
purchased	22.44	21.61	0.66	0.53	0.69	0.47
Fertilizer-purchased	88.52	5.70	16.60	0.26	8.05	-
Manures - farm						
produced	32.40	46.51	16.06	0.38	21.88	0.40
purchased	21.90	5.11	18.48	0.01	8.51	-
Pesticides	18.39	-	0.16	-	-	-
Irrigation expenditure	11.31	-	5.99	-	5.38	-
Land Revenue	1.64	1.63	1.58	1.30	1.35	1.28
Land*rent	-	-	1.38	1.20	0.03	0.65
Preparatory tillage Kind	-	-	0.01	-	-	-
Cash	10.83	4.04	5.65	1.97	21.34	2.42
Sowing Kind	-	-	-	-	-	-
Cash	2.36	0.62	1.00	0.28	4.85	0.51
Inter culture Kind	-	0.85	-	-	0.41	-
Cash	23.34	2.68	6.82	0.90	4.29	0.38
Harvesting & Kind	9.80	1.53	20.74	3.64	4.08	2.96
threshing Cash	6.81	2.60	4.02	0.73	3.18	0.34

(continued)

Table 11 : PER ACRE CASH EXPENDITURE AND PER ACRE COSTS OVER IRRIGATED AND NON-IRRIGATED HYBRID AND LOCAL JOWAR IN CASE OF THE PARTICIPANTS AND NON-PARTICIPANTS
(Figures in rupees per acre)

Item	Participants				Non-participants	
	Hybrid		Local		Local	
	Irri- gated	Non-irri- gated	Irri- gated	Non-irri- gated	Irrigated	Non-irrigated
Total labour charges						
Kind	9.80	2.38	20.75	3.64	4.49	2.96
Cash	43.41	9.94	17.50	3.94	33.81	3.66
Permanent farm servants						
Kind	4.51	-	7.79	4.17	1.13	0.40
cash	21.67	4.87	21.96	10.00	2.09	2.45
Fodder						
Cash	2.86	1.59	3.05	1.41	3.84	1.52
kind	-	-	-	-	-	-
Feeds						
Cash	18.36	10.51	21.17	10.03	12.05	9.38
Kind	-	-	-	0.24	-	-
Others	-	-	-	-	-	-
Total cash expenditure	250.50	60.96	108.52	28.58	75.65	19.80
Imputed value of the expenditure in kind	46.71	48.89	47.39	11.19	30.44	5.65
Total Cost	297.21	109.85	155.91	39.77	106.09	25.45
Proportion of cash expenditure to total cost (per cent)	84.28	55.49	69.60	71.86	71.31	77.80

followed the same trend. Though the participants in the lower size groups had not incurred any expenditure over the permanent farm servants as noted earlier, farm servants had been employed in all the size groups of the nonparticipants except in the lowest size group. The costs over the other items did not vary much from one size group to the other.

28. Variations in the outlays for irrigated and non-irrigated jowar

The per acre costs and the per acre cash expenditures over irrigated and non-irrigated hybrid and local jowar for the participants and the nonparticipants have been noted in Table 11. This table would indicate that there were considerable differences in the expenditures and the costs when a variety was grown with irrigation and when the same was grown without. The cost over growing hybrid jowar with irrigation was nearly 2.7 times the cost over growing it without irrigation whereas the cash expenditure for irrigated hybrid jowar was nearly 4.1 times the cash expenditure for growing the variety as a rainfed crop. Both the costs and the cash expenditures over growing the local variety with irrigation in case of the participants as well as the nonparticipants were roughly 4 times the respective costs and cash expenditures for growing the variety as a rainfed crop. Though the above ratios of the costs and the cash expenditures under the irrigated conditions to the costs and the cash expenditures under the non-irrigated conditions were nearly the same for local jowar grown by the participants and the nonparticipants, the difference between the ratios for hybrid jowar was mainly for the reasons that a greater amount of home produced inputs such as farm yard manure was used for nonirrigated hybrid jowar when compared to the irrigated one whereas a greater amount of purchased inputs such as fertilizer and labour were used for irrigated hybrid jowar in relation to the nonirrigated one. The expenses over irrigation which were incurred in cash were also responsible for this difference.

Since hybrid jowar is being largely recommended in Poona district and the western part of Maharashtra under the irrigated conditions, it is worthwhile noting here the outlays over the different inputs under the irrigated conditions. Table 11 would indicate that the expenditure over fertilizer came to around Rs. 90 per acre for hybrid jowar under the irrigated conditions and it formed nearly one third of the cash expenditure. Under the nonirrigated conditions the expenditure was very meagre viz. Rs. 5 per acre. Even local jowar had received a higher dose of fertilizer under the irrigated conditions when compared to hybrid jowar under the nonirrigated conditions. The cost over casual labour which came to about Rs. 53 per acre, formed a significant part of the cost for irrigated hybrid jowar. Casual labour was, however, an important part of the cost structure even for irrigated local jowar grown by the participants and the nonparticipants. There was yet a difference of about Rs. 20 per acre in the costs over labour for the two varieties under the irrigated conditions. This difference was mainly due to the larger requirements of

labour for the intercultural operations for hybrid jowar which included spraying. Farm yard manure worth Rs. 50 per acre was used for growing irrigated as well as unirrigated hybrid jowar. No discrimination was made by the cultivators in the use of farm yard manure for hybrid jowar under the two modes of cultivation. The cultivators growing local jowar with irrigation had used farm yard manure worth Rs. 30 per acre but the use of farm yard manure for nonirrigated local jowar in the same cases was almost negligible. The expenditure over pesticides for irrigated hybrid jowar came to Rs. 18 per acre. Pesticides were not used for the variety where it was grown without irrigation. So also pesticides were not used for the local variety except in the case of a small acreage of irrigated local jowar grown by the participants. The costs and cash expenditures over the other items which were mainly the overhead items, being worked out on the acreage basis as noted earlier it would not be proper to compare the costs and the cash expenditures over these items under the irrigated and the nonirrigated conditions.

29. Financing the outlays

The amounts of cash expenditure over the two varieties financed through the different sources in the case of the participants and the nonparticipants have been noted in Tables 12 and 13. It needs to be mentioned here that there were some difficulties although in a very few number of the cases in investigating the exact source of finance for a particular item of expenditure. This difficulty arose for the reason that the cultivators always pooled their owned funds and borrowed amounts and it was difficult for them to assign the source of finance for an item of expenditure. In such cases, the source of finance reported by a cultivator was recorded after careful interrogation with the hope that the reported source was based on the purpose of borrowing in the mind of the cultivator when he borrowed.

Table 12 would indicate that nearly 90 per cent of the expenditure over seed of the hybrid variety was financed through the owned funds. The cooperatives did not play any major role in providing finance for the purchase of seed except in the smallest size-group. This was for the reason that many of the cultivators were defaulters and the others had purchased the seed from the Gramsevaks either in cash or on short-term credit. So also nearly half of the finance required for the fertilizer was provided through the owned funds and about 40 per cent was supplied through the co-operatives. The other agencies such as friends and relatives accounted for about 10 per cent of the finance. Nearly three-fourths of the expenditure over pesticides was financed through the owned funds and the remaining mainly through the funds borrowed from the cooperatives. On the whole the owned funds accounted for 75 per cent of the finance for the cultivation of the new variety whereas the cooperatives accounted for only 20 per cent. The other agencies and the Government played a minor role in the supply of finance.

Regarding the financing of the expenditures for the local

Table 12 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER HYBRID JOWAR IN THE DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS

(Figures in rupees per acre)

	Size-Group (acres)					Total
	0.1-5.0	5.1-10.0	10.1-25	25.1-50	50.1 & above	
<u>Seed</u> Total expenditure	16.00	24.43	22.67	21.33	20.70	22.15
of which financed from -						
(a) Owned fund	10.67	23.69	19.80	18.52	19.45	19.89
(b) Borrowings from -						
(i) Co-operative	5.33	0.74	2.30	2.81	1.25	2.02
(ii) Government	-	-	-	-	-	-
(iii) Other agencies	-	-	0.57	-	-	0.24
<u>Fertilizers</u> Total expenditure	21.17	79.12	67.88	43.12	46.61	59.27
Of which financed from -						
(a) Owned fund	21.17	36.65	45.80	8.53	24.18	31.65
(b) Borrowings from-						
(i) Co-operative	-	36.65	15.15	31.09	22.43	23.09
(ii) Government	-	-	-	-	-	-
(iii) Other agencies	-	5.81	6.93	3.51	-	4.53
<u>Pesticides</u> Total expenditure	-	14.23	13.61	9.40	10.43	11.90
Of which financed from -						
(a) Owned fund	-	12.37	12.07	2.95	6.27	8.79
(b) Borrowings from-						
(i) Co-operative	-	1.86	1.32	4.77	4.16	2.66
(ii) Government	-	-	-	-	-	-
(iii) Other agencies	-	-	0.22	1.68	-	0.45
<u>Other cash expenditure</u>	57.37	79.98	113.94	93.07	42.25	90.31
Of which financed from-						
(a) Owned fund	57.37	76.16	103.79	67.91	37.15	79.16
(b) Borrowings from-						
(i) Co-operative	-	-	1.49	23.01	5.10	6.52
(ii) Government	-	-	0.09	-	-	0.04
(iii) Other agencies	-	3.82	8.57	2.15	-	4.59

33

(continued)

Table 12 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER HYBRID JOWAR IN THE
DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS
(figures in rupees per acre)

	Size-group (acres)					Total
	0.1-5.0	5.1-10.0	10.1-25	25.1-50	50.1 & above	
<u>Total cash expenditure</u>	94.54	197.76	218.10	166.92	119.99	183.63
Of which financed from -						
(a) Owned fund	89.21	148.87	181.45	97.90	87.05	139.48
(b) Borrowings from-						
(i) Co-operative	5.33	39.26	20.26	61.67	32.94	34.29
(ii) Government	-	-	0.09	-	-	0.04
(iii) Other agencies	-	9.64	16.30	7.35	-	9.82

Table :13 : SOURCES OF FINANCE FOR CURRENT FARM EXPENDITURE OVER LOCAL JOWAR IN THE DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS
(Figures in rupees per acre)

Items	Size-group (acres)					
	0.1 to 5.0		5.1 to 10.0		10.1 to 25.0	
	A	B	A	B	A	B
<u>Seed</u> - Total expenditure	-	0.85	1.28	1.41	1.17	0.39
Of which financed from -						
(a) owned fund	-	0.85	1.28	1.41	0.59	0.35
(b) borrowings from - (i)co-operative	-	-	-	-	-	-
(ii)government	-	-	-	-	0.21	-
(iii)other agencies	-	-	-	-	0.37	0.04
<u>Fertilizers</u> - Total expenditure	38.70	1.52	11.50	5.57	5.83	0.96
Of which financed from-						
(a) owned fund	38.70	1.52	11.50	5.57	3.20	0.96
(b) borrowings from-(i)cooperative	-	-	-	-	1.34	-
(ii)government	-	-	-	-	-	-
(iii) Other agencies	-	-	-	-	1.28	-
<u>Pesticides</u> - Total expenditure	-	-	-	-	0.11	-
Of which financed from-						
(a) owned fund	-	-	-	-	0.11	-
(b) borrowings from-(i)co-operatives	-	-	-	-	-	-
(ii)government	-	-	-	-	-	-
(iii)other agencies	-	-	-	-	-	-
<u>Other cash expenditure</u> - Total expenditure	47.38	63.37	57.85	43.71	67.83	25.15
Of which financed from-						
(a)owned fund	47.38	58.19	49.60	36.33	55.92	24.39
(b)borrowings from-(i)cooperative	-	-	-	-	0.35	0.20
(ii)government	-	-	-	-	0.54	-
(iii)other agencies	-	5.18	8.25	7.68	11.01	0.56
<u>Total expenditure</u>	86.08	65.74	70.63	50.69	74.93	26.50
Of which financed from-						
(a)owned fund	86.08	60.56	62.38	43.01	59.83	25.70
(b)borrowings from-(i)cooperative	-	-	-	-	1.69	0.20
(ii)government	-	-	-	-	0.75	-
(iii)other agencies	-	5.18	8.25	7.68	12.66	0.60

A = Participants

B = Non-participants

(continued)

varieties Table 13 would indicate that owned funds accounted for even more than 80 per cent of the finance required for their cultivation whereas the percentage for the cooperatives declined on an average, even to below 10 per cent. The finances required for the cultivation of the hybrid and the local varieties was thus mainly provided through the cultivators' owned funds.

30. The Problem of Fodder

The new variety being a dwarf variety it produced less quantity of fodder when compared to the local varieties. The experience with the variety in the previous year at Khanote indicated that the stalks being hard, the animals ate only the leaves and this led to a considerable wastage of fodder. The production of fodder appeared to be the main objective in growing jowar on the irrigated parts of the holdings in a number of cases. This was also one of the reasons for the nonparticipation in the programme. It was the practice to sow even upto 5 kgs. of local jowar seed per acre on the irrigated farms and drill the seed cross-wise, to accommodate a large number of plants. This practice was followed mainly to obtain large yields of fodder. The cultivators had to maintain a large number of animals in many cases to operate the water lifts or to plough the large holdings of inferior rainfed land on which they produced pulses. It was emphasized at Bhandgaon, that it is for cultivating the inferior land that they had to maintain one or two pairs of bullocks and it is to get fodder for these bullocks that they had to grow jowar on the irrigated farms. The prices of fodder fluctuated very widely and at times fodder had to be purchased at the rate of Rs. 2 per bundle which could be consumed by one bullock in a single day. The cultivators, therefore, made an attempt to make the farm self-contained as far as the requirement of fodder was concerned.

31. Crop Conditions

In spite of the use of fertilizers, the crop as we observed in all villages, could not give any indication about the high yielding nature of the variety except in a few cases. The crop was quite thin in some of the fields. This was either due to the smaller number of tillers per plant or due to improper germination of the seed due to defective sowing. So also the crop gave a poor appearance where it was grown on the non-irrigated inferior soils. The crop had suffered much on the inferior soils where only two irrigations had been given as in the case of Bhandgaon. Besides at Korhale and Pimpali the crop was heavily infested with the stem borer. The incidence of the pest was the heaviest at Pimpali and in some cases the crop was completely stunted in growth. The incidence was so heavy that the pest could not be controlled even after one or two sprayings. Moreover, it gave the impression that these fields might prove to be the breeding grounds for the pest unless steps were taken to control its spread. The cultivators had sprayed the crop only with endrine but no one had tried the use of thimate as a soil sterilizer for the eradication of the pest, as it was costly. It was only in two cases at Korhale and in one case at Khanote that the crop was very satisfactory because

of the superior soil and the timely use of inputs in adequate doses.

32. Production of grains from the hybrid and the local varieties

A village-wise and size-wise distribution of the per acre production of grains from the hybrid and local varieties on the irrigated and nonirrigated farms has been given in Table 14. This table would indicate that on an average the new variety produced 307 kgs. of jowar as against only about 140 kgs. of jowar from the local variety. A further probing into the data would, however, indicate that though the variety proved to be quite productive on an average there was a considerable variation within the different size groups and on the irrigated and the nonirrigated farms. The new variety had produced 366 kgs. per acre on the irrigated farms. The yield from the local variety on the participants' irrigated farms was on the contrary even higher by 20 kgs. per acre than the yield from the new variety whereas that on the nonparticipants irrigated farms was lower by 14 kgs. per acre when compared with the same. It is only on the nonirrigated farms that the new variety had produced 198 kgs. of jowar per acre as against only about 90 kgs. of jowar per acre from the local variety. As the local variety was grown without irrigation on as much as 80 per cent of the area under local jowar, the lower yield from the local variety on the nonirrigated farms had largely influenced the average for the local variety on both types of farms.

The table would further indicate that the new variety was grown under the rainfed conditions only in two of the four villages. It produced a good crop in Khanote on the bank of the Bhima river but in Korhale the performance of the new variety under the rainfed conditions was not better than the performance of the local variety on the nonparticipants' holdings under similar conditions. The variety had on the contrary, failed on the irrigated farms in Khanote and Pimpali whereas it had given good results on the irrigated farms in Korhale and Bhandgaon.

33. Size-wise distribution of the yield per acre for the different villages would further indicate that though the averages for these villages indicate the success of the variety in some villages, it was really the performance of a few cultivators in some size groups that had influenced this success. In Khanote for example, the variety had given good results as rain-fed crop, only in the last two size groups. So also in Korhale it had given a better yield with irrigation only in the third and the fourth size groups. The highest yield of 1000 kgs. per acre was recorded in the fourth size group in this village. Moreover, one cultivator in Korhale had produced 2700 kgs. per acre, in the same group. So also another cultivator in the third size group in the same village produced 1050 kgs. per acre. In Bhandgaon again the variety had shown a better performance with irrigation only in the last two size groups. In the last size group in this village which included a single cultivator, the cultivator had succeeded in getting a yield of 933 kgs. per acre with the use of six irrigations and a lavish dose of fertilizer. Barring these three cases in Korhale and Bhandgaon, the other cultivators could harvest not more than

Table 14 : PRODUCTION OF GRAINS FROM THE HYBRID AND LOCAL VARIETIES ON THE IRRIGATED AND THE NON-IRRIGATED FARMS IN THE DIFFERENT SIZE GROUPS OF THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN THE DIFFERENT VILLAGES

Village and variety		(Figures in Kgs. per acre)											
		0.1 to 5.0 acres		5.1 to 10.0 acres		10.1 to 25.0 acres		25.1 to 50.0 acres		50.1 and above acres		Total acres	
		Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated
Khanote													
A	Hybrid Jawar	-	-	125	50	244	131	-	225	350	300	212	226
	Local Jawar	-	-	266	119	610	100	-	144	600	117	553	123
B	Local Jawar	217	182	-	125	-	117	900	132	-	-	398	128
Kohale Bk													
A	Hybrid Jawar	10	-	244	-	573	18	1000	-	437	-	550	62
	Local Jawar	600	-	611	71	486	20	185	52	538	23	400	27
B	Local Jawar	561	109	282	83	368	69	-	-	-	-	399	72
Pimpli													
A	Hybrid Jawar	-	-	217	-	329	-	-	-	-	-	256	-
	Local Jawar	-	-	633	-	623	114	476	80	556	-	578	69
B	Local Jawar	438	192	412	62	246	34	462	69	-	-	401	65
Bhandgaon													
A	Hybrid Jawar	150	-	150	-	312	-	520	-	933	-	399	-
	Local Jawar	160	-	146	60	181	38	153	49	-	64	170	47
B	Local Jawar	150	50	261	75	297	38	94	29	-	-	241	43
Total													
A	Hybrid Jawar	57	-	182	50	370	95	688	225	396	300	366	198
	Local Jawar	380	-	521	84	420	69	230	108	549	80	386	85
B	Local Jawar	419	158	333	82	299	77	363	110	-	-	352	92

Table 14 : (continued)

Village and variety	0.1 to 5.0 acres		5.1 to 10.0 acres		10.1 to 25.0 acres		25.1 to 50.0 acres		50.1 and above acres		Total acres	
	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated
A Hybrid Jawar	57		170		295		428		343		307	
Local Jawar	380		239		172		135		112		142	
B Local Jawar	301		192		100		132		-		139	

A = Participants. B = Non-participants.

600 kgs. per acre even on the irrigated farms. In some of the cases, the yield was as low as 10 kgs. per acre on one irrigated farm as in the smallest size group in Korhale whereas in Pimpali a few farmers ploughed up the crop to make way for another crop.

A number of reasons were responsible for this variation. In Pimpali wherein the variety had failed in all size groups, the crop was heavily attacked by the stem borer. There were yet a few cases in this village wherein the cultivators had obtained a yield of 5 to 6 quintals per acre but on the whole the crop was stunted and badly damaged. In Bhandgaon the cultivators complained about the scarcity of water from the tank and it was, therefore, possible to give only two to three irrigations to the crop. Canal water could not be made available for the crop in a few cases in Korhale and hence the cultivators were either compelled to leave the crop at the mercy of nature or steal water from the canal for at least one irrigation. In Khanote, the cultivators could not get water for the variety as the lift irrigation project could not be commenced at the scheduled time. Those cultivators who had sown the variety on water-retentive soils could harvest a good crop whereas the crop failed on the light soils. The reason for the failure of the crop on the irrigated soils in Khanote could not be explained by the cultivators themselves. They were on the contrary, surprised by the yields from the rainfed crop. The rainfed crop as a matter of fact had received a high dose of farm yard manure as already noted earlier. The cost over farm yard manure for the nonirrigated local variety was even less than a rupee whereas the hybrid variety under the rainfed conditions had received farm yard manure worth Rs. 52 per acre. The hybrid variety had also received fertilizer worth Rs. 6 as against no fertilizer on the nonparticipants' holdings and fertilizers worth below a rupee per acre on the participants' holdings. The cost over tillage was also higher for the hybrid variety when compared to the local one. For all these reasons it was natural that the hybrid variety should produce more than the local variety on the retentive soils. The hybrid variety grown on the irrigated farms on the contrary suffered in relation to the local variety on the same type of farms for want of adequate water supply and incidence of the pest. The local variety was immune to the pest and the number of waterings which were available proved to be adequate for the variety.

34. Production of fodder from the hybrid and the local varieties

The production of fodder has been noted in Table 15. In terms of bundles of fodder per acre, the new variety had on an average produced more bundles of fodder per acre when compared to the local one. The trends in the production of bundles of fodder, however, followed all the trends in the production of grains noted above. The bundles of fodder produced from the hybrid variety were, however, fairly small in size because of the dwarfness of the variety. In the opinion of the cultivators the new variety produced much less fodder when compared with the local variety and the quality of fodder was also inferior. It was not, therefore, possible to arrive at any meaningful results from a comparison of the mere number of bundles produced from the two varieties.

Table 15 : PRODUCTION OF FODDER FROM THE HYBRID AND LOCAL VARIETIES ON THE IRRIGATED AND NON-IRRIGATED FARMS IN THE DIFFERENT SIZE GROUP OF THE SELECTED PARTICIPANTS AND NON-PARTICIPANTS IN THE DIFFERENT VILLAGES

(Figures in number of bundles per acre)

Village and variety	0.1 to 5.0 acres		5.1 to 10.0 acres		10.1 to 25.0 acres		25.1 to 50.0 acres		50.1 and above acres		Total acres	
	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated	Irri-gated	Non-irri-gated
Khenote												
A Hybrid Jawar	-	-	63	50	267	151	-	163	250	286	164	199
Local Jawar	-	-	266	119	235	93	-	113	350	107	266	108
B Local Jawar	145	195	-	125	-	145	400	92	-	-	212	122
Korhale Bk												
A Hybrid Jawar	50	-	424	-	311	50	367	-	350	-	310	50
Local Jawar	360	-	384	129	311	60	242	125	355	57	305	70
B Local Jawar	397	109	231	150	350	104	-	-	-	-	253	107
Pimpli												
A Hybrid Jawar	-	-	83	-	283	-	-	-	-	-	196	-
Local Jawar	-	-	217	-	339	82	381	100	333	33	331	65
B Local Jawar	262	167	286	115	185	153	246	239	-	-	257	105
Bhandgaon												
A Hybrid Jawar	150	-	200	-	276	-	440	-	300	-	310	-
Local Jawar	220	-	196	200	174	73	109	82	-	80	159	78
B Local Jawar	125	133	194	117	176	67	126	50	-	-	167	74
Total												
A Hybrid Jawar	83	-	133	50	286	97	352	163	248	286	248	174
Local Jawar	290	-	276	104	268	78	235	106	347	287	270	92
B Local Jawar	272	169	246	121	212	106	216	96	-	-	239	108

(continued)

Table 15 : (continued)

Village and variety	0.1 to 5.0 acres		5.1 to 10.0 acres		10.1 to 25.0 acres		25.1 to 50.0 acres		50.1 and above acres		Total acres	
	Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated
A Hybrid Jawar	83		126		234		246		269		222	
Local Jawar	290		167		134		135		104		124	
B Local Jawar	226		175		117		110		-		131	
Average Irrigated and Non-irrigated												

A = Participants.

B = Non-participants.

Table 16 : PRODUCTION AND DISPOSAL OF THE PRODUCE

Size	Variety	Production (quintals)	Sales		Agency of sale		
			Quantity (quintals)	Value (Rs.)	Co-operative society (Rs.)	Govern- (Rs.)	Others (Rs.)
PARTICIPANTS							
0.1 - 5.0	H	0.85	-	-	-	-	-
	L	19.00	4.00	260	-	-	260
5.1 - 10.0	H	18.25	7.25	433	-	238	195
	L	106.20	2.08	116	-	116	-
10.1 - 25.0	H	80.40	28.20	1,579	-	1,579	-
	L	457.70	38.49	2,531	-	916	1,615
25.1 - 50.0	H	61.00	16.11	912	-	912	-
	L	353.40	76.07	4,876	-	2,356	2,520
50.1 and above	H	43.75	28.00	1,639	-	1,219	420
	L	434.00	28.00	1,568	-	1,568	-
Total	H	204.25	79.56	4,563	-	3,948	615
	L	1370.30	148.64	9,351	-	4,956	4,395
NON-PARTICIPANTS							
0.1 - 5.0	L	151.00	1.50	93	-	28	65
5.1 - 10.0	L	122.20	16.18	909	-	883	26
10.1 - 25.0	L	268.00	39.13	2,929	-	1,849	1,080
25.1 - 50.0	L	225.50	29.00	1,618	-	1,618	-
50.1 and above	L	-	-	-	-	-	-
Total	L	766.70	85.81	5,549	-	4,378	1,171

H = Hybrid.

L = Local.

35. Disposal of the produce

The figures for the production and sales for the two varieties in the case of the participating and nonparticipating groups of the cultivators have been noted in Table 16. By the time of these investigations in the first week of June 1968, the participants had sold 38.9 per cent of hybrid jowar and 10.8 per cent of local jowar produced on their farms. The nonparticipants had also sold 11.1 per cent of local jowar produced on their farms. The participants, it appears, were inclined to sell more of hybrid jowar but retain local jowar for self consumption.

The produce was either sold to the Government under the monopoly procurement scheme or marketed locally. Under the monopoly procurement scheme the cultivators obtained a fixed price of Rs. 56 per quintal for both varieties. In the local market, however, hybrid jowar was sold by only two of the participants at a price varying from Rs. 65 to Rs. 70 per quintal. On the contrary local jowar could fetch a price varying from Rs. 69 to Rs. 80 per quintal. It is on these accounts that a larger part of the marketed hybrid jowar was sold under the monopoly procurement scheme whereas a substantial part of the marketed local jowar was disposed of locally.

36. Profitability of the new variety

An attempt can be made from the tables on the costs and production to work out the margins left after deducting the costs (excluding the costs over family labour) from the values of the production of grains and fodder, separately for the two varieties. The prices prevalent in the local markets for grains of the hybrid and local varieties were around Rs. 65 and Rs. 75 per acre. So also the price of fodder from the hybrid variety was around Rs. 15 per 100 bundles whereas that for fodder from the local variety was around Rs. 20 per 100 bundles. ^{1/} These prices can be made use of to determine the margins from the two varieties on the irrigated and the nonirrigated farms.

On the irrigated farms, the cost over hybrid jowar works out to Rs. 297.2 per acre and the value of grains and fodder works out to Rs. 237.9 and Rs. 37.2 per acre respectively. This means that the returns were negative to an extent of Rs. 22.1 per acre. The cost over growing local jowar in the same cases works out to Rs. 155.9 per acre and the value of the grains and fodder to Rs. 289.5 and Rs. 54.0 per acre respectively. This indicates that the cultivators were left with a positive margin of Rs. 87.6 per acre. The cost over growing local jowar with irrigation in the case of the nonparticipants works out to Rs. 106.1 per acre and the value of the grains and fodder to Rs. 264.0 and Rs. 47.8

^{1/} Unlike the price for grains, the price of fodder varied considerably from one village to the other depending upon the local supplies. The price for the fodder from hybrid jowar varied from Rs. 10 to Rs. 20 and that for the fodder from local jowar varied from Rs. 15 to Rs. 30.

per acre respectively. The nonparticipants were thus left with a substantial positive margin of Rs. 205.7 per acre.

On the nonirrigated farms, however, the margins are positive for both varieties and for both groups of cultivators. For hybrid jowar however, the margin works out to Rs. 42.4 and Rs. 65.2 per acre on the participants and the nonparticipants holdings respectively. This indicates that though the hybrid variety had produced more on the nonirrigated farms there was not much difference in the margins between the hybrid and the local varieties on the participants' holdings whereas the nonparticipants were left with a margin of about Rs. 20 per acre through not growing the hybrid variety. The new variety, thus, could not enable the cultivators to get any monetorial returns except an amount of Rs.2.6 per acre under the rainfed conditions on the participants' holdings.

37. Prospects for the variety

In view of the practical low productivity of grains and fodder many cultivators were reluctant to grow the variety on any large scale even on their irrigated farms in the ensuing years. It was, therefore, futile to relate the target with the irrigated area under the crop. There is some scope for introducing the variety under the rainfed conditions on lands having a high water holding capacity but such lands are limited only to the beds of the rivers and streams. From the point of replacement not of the local variety but of the other crops, it appears that the variety has to compete with sugarcane and the bajra-wheat rotation which are quite common in the area. Because of the introduction of the high yielding varieties for bajra and wheat themselves it is doubtful if the cultivators would replace wheat by hybrid jowar. Again it is the experience of the cultivators that the cultivation of wheat after bajra adds more to the productivity of the second crop than the cultivation of jowar after bajra. The prices of these different competitive food crops also do not favour the replacement of wheat or bajra by jowar. There is a free market for wheat and bajra whereas the price of jowar is fixed under the monopoly procurement. The prices contracted by the sugar factories for sugarcane are also so high that it is doubtful if two or more successive crops of the high yielding varieties in a year would compete with this crop. On account of these various factors there does not appear much scope for the introduction of this variety on any large scale in Poona district as a rabi crop. In spite of these difficulties, the target fixed for the district for the ensuing year is again one lakh acres.

38. Conclusions and some lessons from the study

From the above discussions certain conclusions become evident. An attempt is, therefore, made here to draw some broad conclusions and to make tentative suggestions to improve the extension of the concerned variety in the selected district.

It was evident from the foregoing discussion that the target

was fixed at quite a high level without considering the potentialities for such a target in the second year of the programme. This resulted in a considerable non-utilisation of the resources mobilised for the purpose. At its own initiative the Zilla Parishad had, therefore, to fix a smaller working target which was only two-thirds of the official target given by the State. This procedure did not differ from the one observed in Nasik district surveyed for the Kharif programme.

The working target of the Zilla Parishad was based on the village-wise lists of the probable participants, prepared by the Gramsevaks. These lists, however, proved to be fictitious and the variety could be grown on hardly 10 per cent of the area contemplated in the working target and 7 per cent of the one contemplated in the official target.

A number of reasons contributed towards the fictitiousness of these lists. Firstly, the Gramsevaks were given large and unrealistic targets exceeding at places even the irrigated areas under the crop. They were thus compelled to operate in that atmosphere and there was no alternative for them but to enlarge these lists as far as possible. Secondly, the cultivators themselves were not firm on the adoption of the variety at the time when these lists were prepared. They had no previous experience with the variety and where there was some experience as at Khanote, it was not favourable for the adoption of the variety on a large scale. Most of them, therefore, signed these lists either unknowingly or just to please the Gramsevaks. Thirdly, the area to be cultivated per acre appeared to be much inflated in these lists. The area to be devoted to the variety according to these lists came to on an average 2 acres per cultivator for the district but the survey indicated that the average for the selected participants came to 1.06 acres only.

Moreover, the relationship of the target with the total irrigated area under the crop in the district itself appeared to be wrong. This implied that practically the entire area of 1 lakh acres under irrigated jowar would get transferred to hybrid jowar with just an experience over 500 acres in the entire district in the previous year. The experience in the past with other varieties in the other districts in the State had on the contrary shown that such a great leap was likely to result in a failure. Secondly, the relationship implied that the cultivators grew jowar mainly for grains and not for fodder. The farmers in the selected area had been on the contrary adopting methods of thick sowing for irrigated jowar to meet their requirements of fodder. Grains were somewhat readily available in the area but fodder was a scarce commodity and had to be imported from distant villages at high costs under the conditions of scarcity. The cultivators had, therefore, to plan their crops to meet the demand for fodder for their farms, irrespective of any consideration of the high yield in the form of grains from the variety. This aspect of the problem has put such a severe restriction on their adoption of the variety that it would be futile to contemplate an extension of the variety over all irrigated area under the crop in the district even in the ensuing year.

In view of these difficulties it is doubtful whether it would be possible to accomplish the large target given to the district though the target has been maintained at the same level as in the previous year. It should be possible to accomplish as far as possible a large part of the target when compared to the previous year if proper steps are taken in advance for its formulation and implementation. It is necessary to know the capacity of this district to absorb the programme. Attempts are being already made by the district officials at the initiative of the State Agricultural Department to prepare villagewise lists (Master lists as they are known) of the cultivators growing local jowar under different soils and sources of irrigation. Precautions may have, however, to be taken to safeguard that the material available through these lists does not follow the type of material obtained through the earlier village lists prepared by the Gramsevakés. The preparation of the master lists implies a survey wherein the Gramsevak will act as the investigator. There is no mechanism at present either at the district or block level to scrutinise this material collected by the Gramsevakés. This leads to improper interrogation as well as fictitious entries on the part of the Gramsevakés. The cultivators also sign such lists if required without knowing their importance. It is therefore, necessary to introduce some methods of scrutiny of this material to maintain its accuracy.

These master lists are expected to give a precise idea about the potentiality for the introduction of the variety in the district. It is, however, necessary to differentiate here between the total long term potentiality to be indicated through the master lists and the potentiality in the ensuing year. A more appropriate method may have to be evolved for the purpose to replace the present method of preparing village-wise lists of the probable participants.

The building up and implementation of the target would again need some specific efforts in a number of directions. Firstly, there has to be proper co-ordination between the Zilla Parishad and the Irrigation Department in fixing the target for the area under canal irrigation to be brought under the new variety. Such a target should be made the responsibility not only of the Zilla Parishad but also that of the Irrigation Department. Secondly, Planning will have to be undertaken by both these agencies for each distributory of a canal. Thirdly, adequate provision will have to be made for bringing adequate area under the variety at the time of the revision of the canal water distribution which is to take place after March 1968. Fourthly, the Irrigation Department and the State Electricity Board will have to co-ordinate in the matters of supplying canal water and the electric current with proper voltage simultaneously. Fifthly, the Irrigation Department will have to give preference for hybrid jowar over local jowar in deciding the areas under jowar in an irrigation block. Once hybrid jowar is, however, brought under the two seasonal blocks it may not be worthwhile to encourage the cultivators to grow the variety outside these blocks under canal water at the mercy of supply of water. A policy of promoting a variety,

requiring intensive cultivation and a high degree of technology, under the uncertainties of supply of canal water may not bring out the real merits of the variety and might, therefore, impede the programme in the subsequent years.

If the targets are properly built up, the Extension Officers and the Gramsevaks will not be compelled to distribute the seed through the use of influence as happened practically in all the selected villages. This resulted in misutilization of the seed, use of inferior soils for the variety and use of lower doses of such inputs as fertilizer and irrigation in some cases, which created a bad demonstration effect and a sense of risk and uncertainty in the adoption of the variety on the part of the farmers.

So also a cultivator's resources have to be taken into account in considering his eligibility for the programme. This was not done in some of the cases in the selected villages. Unless the cultivator is able to acquire the needed inputs he should not be guided to grow the variety to avoid its failure.

The crop as was observed in the field was very thin even after adopting a seed rate of 3.5 kgs. per acre. This suggested that if the farmers were to use a higher seed rate it would have been possible to increase the plant population in these fields. Though the seed rate of 3 kgs. per acre may prove to be adequate under the ideal field conditions such conditions may not be available on all farms. The farmers might get more benefit if they adopted a higher seed rate under the non-ideal conditions. The cultivators were already used to sow local jowar with 4 to 5 kgs. of seed per acre in the irrigated fields. The recommendation of a higher seed rate for hybrid jowar say 4 kgs. per acre may have, however, to be considered only upon the technological scrutiny of the problems posed above.

From the experience during this year, it appears that it would be worthwhile continuing the subsidy of Rs. 8 per 3 kg. bag or even increasing the rate of subsidy to popularise the variety. There is already a difference of about Rs. 20 per acre in the cost of the hybrid and local seed. These rates of subsidy may have to be standardized for the State to check the flow of subsidized seed from one district to the other at the level of the cultivators.

Finally, since the variety is highly susceptible to the attack of stem borer, arrangements may have to be made to supply Endrine along with seed itself. This measure needs to be undertaken with a view to control the pest which might in future prove to be virulent because of the breeding grounds provided by the variety. Soils in the field which are heavily infested with the pest as in Pimpali, may have to be treated even with a soil sterilizer on a subsidized basis to destroy the breeding grounds. Such measures may have again to be adopted only upon the technological scrutiny of the problems posed above.