Chapter VI
RESULTS AND INTERPRETATIONS - I
Characteristics of the sample households

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CHARACTERISTICS OF THE SAMPLE HOUSEHOLDS

6.1. Demographic Characteristics

The average age of sample cotton farmers was 47 years in Amaravati and 56 years in Nagpur. Age was one of the demographic characteristics assumed to influence the productivity, younger farmers willing to adopt more recent technologies and able to have higher productivity. Average experience of the sample farmers in cotton farming was 20 years in Amaravati and 30 years in Nagpur. The demographic characteristics of the sample households are summarised in Table 6.1.

Table 6.1- Demographic Characteristics of the Sample Households

Characteristics	Amravati	Nagpur
Average age of the farmer (Years)	47	56
Average household size (Number)	5	6
Average education of Head (Years)	7	10
Highest education in the household (Years)	13	13
Average education of all members (Years)	6	8
Experience in farming (Years)	20	30
Farmers having subsidiary occupation (%)	47	23

The average household size in Amaravati was 5 persons, consisting of 20 per cent of children of less than 14 years of age and 40 per cent each of adult males and adult females. The average household size in Nagpur was 6 persons consisting of 17 per cent children below the age of 14 years, 50 per cent adult males and 33 per cent adult females. Family size was hypothesized to influence farmers' production behaviour, in that farmers with large family were expected to be more likely to improve his farm productivity. Income from subsidiary sources could influence farm productivity through higher level of input use. In this respect, 47 per cent of the sample farmers in Amaravati and 23 per cent of the sample farmers in Nagpur had one or the other subsidiary occupation.

6.1.1. Age and experience of the farmer

As indicated by the lower average age of the farmers, nearly 45 per cent of the sample farmers in Amaravati were below the age of 45 years and 85 per cent were below 60 years of age. Only about 23 per cent of farmers in Nagpur were below 45 years. The frequency distribution of sample farmers according to age is indicated in Table – 6.2.

Table – 6.2. Frequency distribution of sample farmers according to age

Age of the farmer	Amaravati		Nagpur	
	Number	Percentage	Number	Percentage
30 years and below	14	11.67	4	3.33
31 to 45 years	39	32.50	23	19.17
46 to 60 years	50	41.67	60	50.00
61 years and above	17	14.16	33	27.5
TOTAL	**120**	**100.00**	**120**	**100.00**

Experience in cotton farming was a related variable to the average age of the farmers. As age was assumed to have a negative influence on productivity, being a variable related to age, more experienced farmers were expected to be reluctant to adopt more recent technologies, and hence, may not be able to have higher productivity. The experience in years ranged from 3 years to 40 years in Amaravati and 6 to 50 years in Nagpur. Farmers with less than 10 years of experience in cotton farming formed more than one third of the sample in Amaravati while they were only 13 per cent in Nagpur. Similarly, none of the sample farmers in Amaravati had experience in cotton farming of more than 40 years while 6 out of 120 farmers had 50 years of experience in cotton farming. The frequency distribution of sample farmers according to experience in cotton farming is given in Table – 6.3.

Table – 6.3. Frequency distribution of sample farmers according to experience in cotton farming

Experience in cotton farming	Amaravati		Nagpur	
	Number	Percentage	Number	Percentage
10 years and below	41	34.1 7	15	12.50
11 to 20 years	30	25.00	3	2.50
21 to 30 years	32	26.67	66	55.00
31 to 40 years	17	14.16	28	23.33
41 years and above	0	0	8	6.67
TOTAL	**120**	**100.0**	**120**	**100.0**

6.1.2. Education

The level of education was assumed to influence productivity, since literate farmers would have a greater ability to obtain, process and use information about improved technologies. It is also assumed that it may not be the mere number of years of schooling of the farmer alone that may have influence on production decisions, but the decision of the household member/s with higher education, also would have positive influence on productivity. In this study, therefore, apart from the level of education of the farmer himself, the highest education achieved in the household as also the average number of years of schooling of all members of the family were also examined. Average number of years of schooling of the sample farmers was 7 years in Amaravati and 10 years in Nagpur. Average number of years of schooling of all the members in the farm family was also higher in Nagpur at 8 years as against 6 years in Amaravati, while the highest number of years of education attained by anyone member of the farm family was 13 years in both the districts. The frequency distribution of farmers according to years of schooling is indicated in Table – 6.4.

Table – 6.4. Frequency distribution of sample farmers according to education

Education	Amaravati		Nagpur	
of the farmer	Number	Percentage	Number	Percentage
Illiterate	19	15.83	11	9.17
Upto 4 years	28	23.33	5	4.17
5 to 7 years	10	8.34	13	10.83
8 to 10 years	43	35.83	30	25.0
11 to 12 years	8	6.67	21	17.5
13 years and above	12	10.0	40	33.33
TOTAL	**120**	**100.0**	**120**	**100.0**

Nearly 16 per cent of the sample farmers in Amaravati and 10 per cent in Nagpur district were illiterate. One third of the sample farmers in Nagpur and 10 per cent in Amaravati had education above higher secondary.

6.2. Socio-economic characteristics

6.2.1 Farmland

Average farm size per household was 5.88 hectares in Amaravati and 4.3 hectares in Nagpur. Of the total farm size, 38 per cent area was covered by irrigation in Amaravati while the coverage of irrigation was high at 50.1 percent at Nagpur. The average size of farmland per sample household in the study area is indicated in Table – 6.5.

Table – 6.5. Average farm size per household

Particulars	Amaravati	Nagpur
Net sown area (ha.)	5.88	4.3
Percentage of irrigated area (%)	38.0	50.1
Gross cropped area (ha.)	7.16	5.42
Cropping intensity (%)	122.0	130.0

The gross cropped area in the districts varied with the coverage of irrigation and the average worked out to 7.16 hectares in Amaravati and 5.42 hectares in Nagpur. Accordingly, the average cropping intensity was 122 in Amaravati and 130 in Nagpur. The size of farmland, however, shows considerable variation among the sample households in both the districts. The frequency distribution of sample households according to size of farmland is indicated in Table – 6.6.

Table – 6.6. Frequency distribution of households according to size of farmland

Size of farmland	Amaravati		Nagpur	
	Number	Percentage	Number	Percentage
2 hectares and below	37	30.83	30	25.0
Above 2 to 4 hectares	17	14.17	46	38.33
Above 4 to 10 hectares	50	41.67	32	26.67
Above 10 hectares	16	13.33	12	10.0
TOTAL	**120**	**100.0**	**120**	**100.0**

6.2.2. Cropping Pattern

Cotton was the major crop in the sample farms of both the study districts, which is cultivated as a kharif crop. Along with cotton, majority of the farms had sown black gram either as a mixed crop along the bunds of the cotton field or as a separate crop. Depending upon the availability of irrigation, crops like wheat, vegetables, etc. are cultivated in the rabi season. The cropping pattern of the sample households is given in Table 6.7.

Table 6.7. Cropping Pattern of sample farms

Particulars	Amravati		Nagpur	
	Area (ha)	Percent	Area (ha)	Percent
Cotton	2.88	40.3	2.25	41.5
Black Gram	1.59	22.2	1.01	18.6
Soyabean	0.57	8.0	0.62	11.4
Orange	0.76	10.6	0.54	10.0
Jowar	0.42	5.9	0.58	10.7
Vegetables	0.10	1.3	0.27	5.0
Green Gram	0.64	8.9	0.04	0.7
Wheat	0.10	1.5	0.11	2.1
Other fruits	0.10	1.3	0.00	-
TOTAL	**7.16**	**100.0**	**5.42**	**100.0**

Cotton dominated the cropping pattern of the sample households occupying 41 per cent of the GCA in both the districts. Next to cotton, black gram was the important crop occupying 19 per cent and 22 per cent of the GCA in Amaravati and Nagpur districts, respectively. Other crops in the cropping pattern in the descending order of their acreage included soyabean, orange, jowar, vegetables, green gram and wheat.

Figure 6.1. Cropping pattern of sample farms in Amaravati

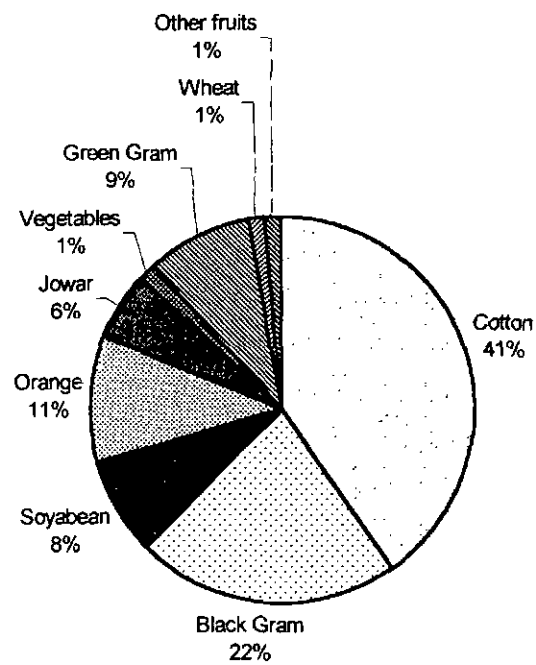
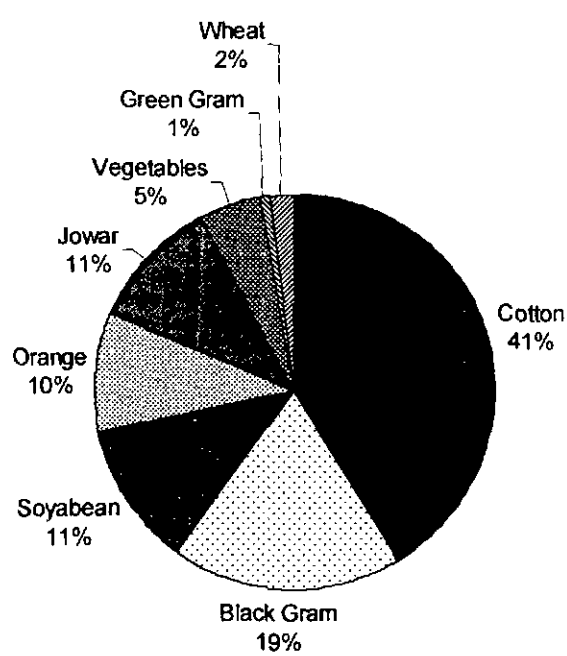


Figure - 6.2. Cropping pattern of sample farms in Nagpur



6.2.3. Subsidiary occupation

Involvement in subsidiary occupation is one of the socioeconomic characteristics hypothesized to influence the use of modern inputs and technology, in that households involved in subsidiary occupation may be able to invest in improved technologies to achieve higher productivity. The subsidiary occupation profile of the sample households is indicated in Table – 6.8.

Table – 6.8. Subsidiary occupation of sample farmers

Subsidiary occupation	Amaravati		Nagpur	
	Number	Percentage	Number	Percentage
Service	23	19.17	27	23.0
Business	18	15.0	-	-
Tractor	5	4.17	-	-
Agricultural labour	9	7.5	-	-
Pensioner	1	0.83	-	-
Member, Panchayat	1	0.83	-	-
Nil	63	52.5	93	77.0
Total	**120**	**100.0**	**120**	**100.0**

While nearly half of the cotton farmers in Amaravati had one or the other subsidiary occupation, only around one fifth of the farmers had engaged in subsidiary occupation in Nagpur district. Major subsidiary occupation in both the districts was in service sector. Nearly 20 per cent of the sample farmers in Amaravati and 23 per cent in Nagpur had services as subsidiary occupation while 77 per cent of the farmers in Nagpur had no other

subsidiary occupation. The farmers in Amaravati had business (15 per cent), tractor service (4 per cent) and agricultural labour (7 per cent) as subsidiary occupation.

6.2.4. Livestock

The average number of animals per household was 2.83 consisting of cows, buffaloes and bullocks in Amaravati while it was 4.2 animals in Nagpur consisting mostly cows and buffaloes. In terms of ownership, 19 per cent of the sample households owned cows, 8 per cent owned buffaloes and 14 per cent owned bullocks in Amaravati. In Nagpur, 24 percent of the sample households owned cows, 10 per cent owned buffaloes and 4 per cent bullocks.

The number of livestock units owned by a farmer was hypothesised to affect the adoption of improved technologies, since livestock units represent a ready source of cash for purchasing inputs. However, dairy income didn't emerge as a significant variable affecting productivity of the farmers in both the districts.

6.2.5. Total income of the households

The total annual income of the sample households ranged from Rs 2, 090 to Rs. 4, 44, 300 per annum in Amaravati district with average household income of Rs.64, 110. Total household income included income from 4 sources such as income from cotton cultivation, other farm income, dairy income and income from non-farm sector. Source wise average household income of the sample households in both the districts are indicated in Table – 6.9.

Table – 6.9. Source wise income of the sample households (Rs.)

Source	Amaravati		Nagpur	
	Amount	Percentage	Amount	Percentage
Cotton cultivation	25, 728 (8,921)	40.1	24, 425 (10,846)	40.2
Other farm income	21, 567	33.6	15, 424	25.3
Income from dairy	1, 542	2.5	3, 134	5.2
Non farm income	15, 273	23.8	17, 833	29.3
Total	**64, 110**	**100.0**	**60, 816**	**100.0**

Figures in bracket indicate income per hectare

Figure 6.3. Share of different sources in household income in Amaravati

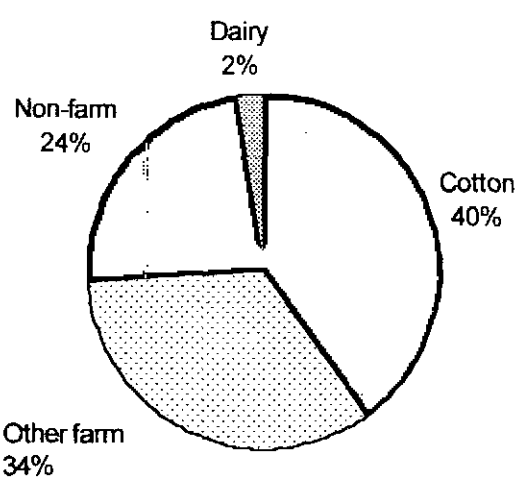
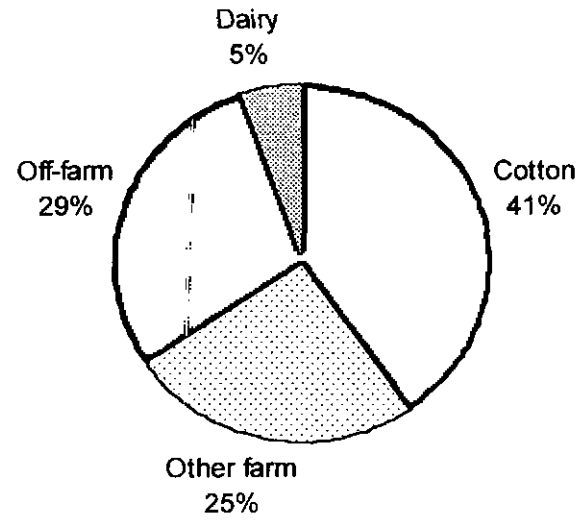


Figure - 6.4. Share of different sources in household income in Nagpur



The average household income of the sample farmers in Amaravati was Rs.64, 110 and in Nagpur was Rs. 60, 816. The share of income from cotton cultivation for the sample farmers in both the districts was 40 per cent. However, income per hectare of cotton cultivation was high in Nagpur at Rs. 10, 846 as compared to Rs. 8, 921 in Amaravati. While income from other crops amounted to 33.6 per cent of the farm household income in Amaravati, it was only 25.4 per cent in Nagpur. Income from non-farm sources amounted to 23.8 per cent in Amaravati and 29.3 per cent in Nagpur while income from dairy was 2.5 per cent and 5.2 per cent, respectively.

6.3. Institutional characteristics

6.3.1. Source of Technical Information

Access to technical information was one institutional characteristic hypothesised to influence a farmer's decision and ability to use modern production technology. The farmers gain technical information about new technologies and practices through various sources. Depending on the possibility

of on the spot interaction by the farmer with the source of information, these sources can be categorised into two, such as source of one-way or passive communication and source of two-way or active communication.

The technical information received by the farmer by reading farm news from dailies, farm journals, etc., and by listening to Farm Information Bureau programmes in radio, television, etc. belong to the channels of one-way communication as the flow of information is single sided when it is being received. The technical information received by the farmer by attending farmers' training programmes, visit to the farm by the agricultural extension officer, visit to the agricultural extension office by the farmer himself, by discussions with progressive farmers in the locality or neighbour farmers, etc. belong to the channels of two-way communication as there is the possibility for the farmer to interact with the source of information while he is receiving the information. There is also possibility of receiving technical information by the farm being nearer to any office of the agricultural university or agricultural department or cotton development, or by virtue of any member in the farm household being employed in any of these offices, by the farm getting selected for conducting a minikit trial[1] or a demonstration plot by government agricultural department or agricultural university. The sources of technical information indicated by the sample farmers in the study districts are summarised in Table 6.10. Percentage of farmers receiving technical information from different sources is depicted in figure 6.5.

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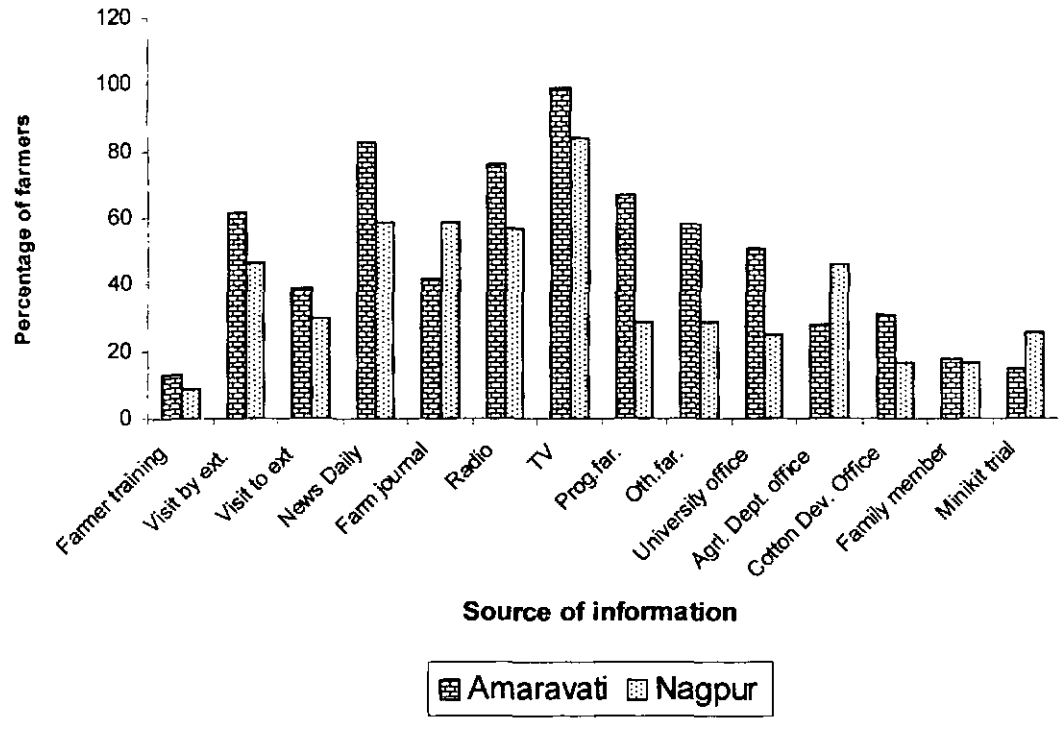
[1] The trials are conducted to popularise a new improved seed or farm technology. The selected farmers will be given a kit containing improved seed, fertilisers and pesticides. Extension support will also be provided by the office to cultivate the seed in his plot so that the performance of the plot will serve as demonstration to other farmers in the locality.

Table 6.10 Number of farmers receiving farm information from different sources

Source	Amaravati		Nagpur	
	No.of Farmers	Percentage	No. of Farmers	Percentage
One-way channel or passive source				
News daily	83	69.2	59	49.2
Farm journal	42	35.0	59	49.2
Radio	76	63.3	57	47.5
Television	99	82.5	84	70.0
Two-way channel or active source				
Farmer training	13	10.8	9	7.5
Visit by extension officer	62	51.7	47	39.2
Visit to extension office	39	32.5	30	25.0
Progressive farmer	67	55.8	29	24.2
Neighbour farmer	58	48.3	29	24.2
Proximity to office of the farm university	51	42.5	25	20.8
Proximity to office of the department of agriculture	28	23.3	46	38.3
Proximity to office of cotton development	31	25.8	17	14.2
Members of farm household employed in agriculturally related service	18	15.0	17	14.2
Minikit trial	15	12.5	26	21.7

Figures are not additive as one farmer uses more than one source for information.

Figure - 6.5. Perentage of farmers receiving technical information from differnt sources



In the same way formal education of the farmers is hypothesised to have postive effect on productivity, the above listed sources of technical information can be considered as non-formal education of the farmer which also would have postive effect on productivity. However, some of the sources of technical information like reading news daily or farm journal would be complimentary to the former education of the farmer because information from all the other sources can be obtained by even illiterate farmers. Further, these sources of technical information can be one way or passive and two-way or active channels depending upon the possibility for the farmer to interact with the source while receiving the information.

Among the various sources of information indicated by the sample farmers, the Marathi program *Amchi Mati Amchi Manase* in television ranked first in both the districts. Out of 120 sample farmers, 99 farmers (82.5 per cent) were reportedly watching this programme in Amaravati district and 84 farmers (70 per cent) in

Nagpur. Reading farm related information in Marathi dailies like *Sakal, Lokmat, Loksatta, etc.* was the second largest source of technical information among various one-way channel or passive sources. In Amaravati district 83 sample farmers (69.2 per cent) and in Nagpur district 59 sample farmers (49.2 per cent) were reported to read farm related information from these dailies. Listening to Marathi radio programme *Majhe Ghar Majhevavar* was the third largest source of technical information in Amaravati district while it was reading farm journals in Marathi viz. *Kshetkari* and *Baliraja* was in Nagpur district. The radio programme was reported to give technical information to 76 sample farmers (63.3 per cent) in Amaravati and 57 sample farmers (47.5 per cent) in Nagpur. Farm journals were read by only 42 sample farmers (35.0 per cent) in Amaravati and their number was 59 (49.2 per cent) in Nagpur.

The prominent source of two-way channel or active source of technical information was progressive farmers in Amaravati while it was visit by extension officer in Nagpur. While 67 sample farmers (55.8 per cent) in Amaravati reported to have received technical information regarding cotton seeds, fertilisers, pesticides, etc. from progressive farmers in the locality, 47 sample farmers (39.2 per cent) in Nagpur reported this source as visit by the extension officer to the farm during the crop season. However, the number of sample farmers reported to have received information from visit by the extension officer to the farm was high in Amaravati. Visit by extension officer to the farm at least once during the reference crop duration was reported by 62 sample farmers (51.7 per cent) in Amaravati. Attendence in farmer training programmes was reportedly negligible in both the districts as only 10.8 per cent of the sample farmers in Amaravati and 7.5 per cent in Nagpur reported to have attended at least once such programme. They included the farmers who had gone for a one day visit to Dr. Punjabrao Deshmukh Krishi Vidyapeeth (PKV), Akola and those who were taken to Central Institute for Cotton Research, Nagpur at the instance of the local Krishi Vigyan Kendras (KVKs). Discussoin with neighbour farmers, visit to extension office for technical advice, proximity to office/s of the

farm university, agricultural department, cotton development, etc. were other prominent sources of receiving technical information under the two-way channel or active source of information for the sample farmers.

6.3.2. Borrowings of sample households

Access to credit was hypothesised as one of the major institutional factors that influence the decision of a farmer to use more of purchased inputs like HYV seeds, fertilisers and pesticides. The share of different agencies in amount and number of borrowings by sample households is indicated Table 6.11.

Table 6.11. Share of various agencies in amount and number of borrowings

(Percentage)

Source of borrowing	Amaravati		Nagpur	
	Amount	Number*	Amount	Number*
Co-operatives	30.7	45.0	84.2	63.2
Commercial Banks	66.0	47.0	11.2	16.8
Total Institutional	**96.7**	**92.0**	**95.4**	**80.0**
Money lenders	2.4	5.0	2.8	11.6
Relatives	0.9	3.0	1.8	8.4
Total non-institutional	**3.3**	**8.0**	**4.6**	**20.0**
Grand total	**100.0**	**100.0**	**100.0**	**100.0**

** The total number of borrowers was 110 out of 120 in Amaravati and 95 in Nagpur*

Majority of the sample households in both the study districts had availed credit facilities from various sources. The number of sample farmers who had borrowed from one source or the other was 110 (91.6 per cent) in Amaravati and 95 (79.2 per cent) in Nagpur. Among the various sources of borrowings, institutional sources comprising of co-operatives and commercial banks accounted for 92 per cent of the borrowers and 96.7 per cent of the amount of borrowings in Amaravati, figures for Nagpur being 80 per cent and 95.4 per cent respectively. Borrowings from commercial banks were more prevalent among sample farmers in Amaravati while it was from co-operatives in Nagpur. The share of different agencies in the amount of borrowings of sample households in Amaravati and Nagpur are depicted in figures 6.6 and 6.7, respectively.

Figure - 6.6. Share of different agencies in amount of indebtedness - Amaravati

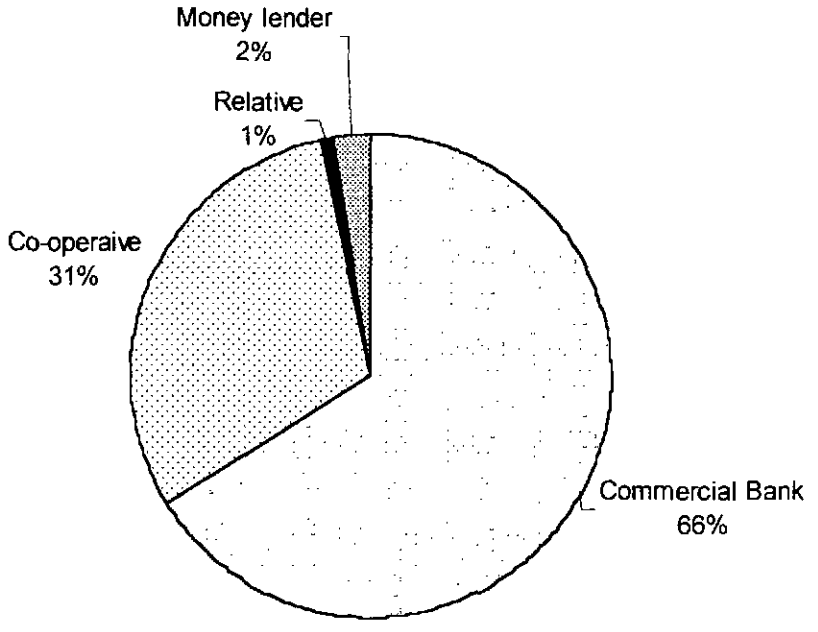
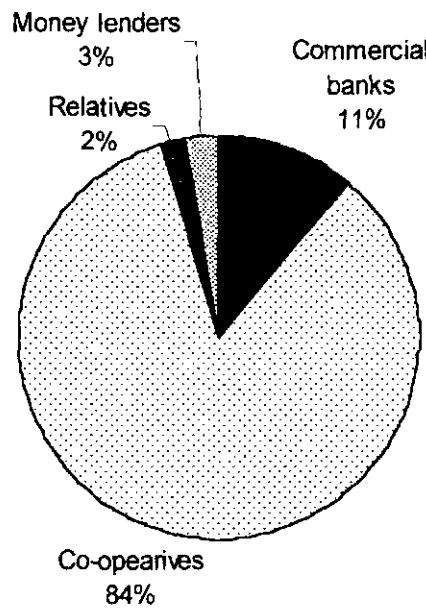


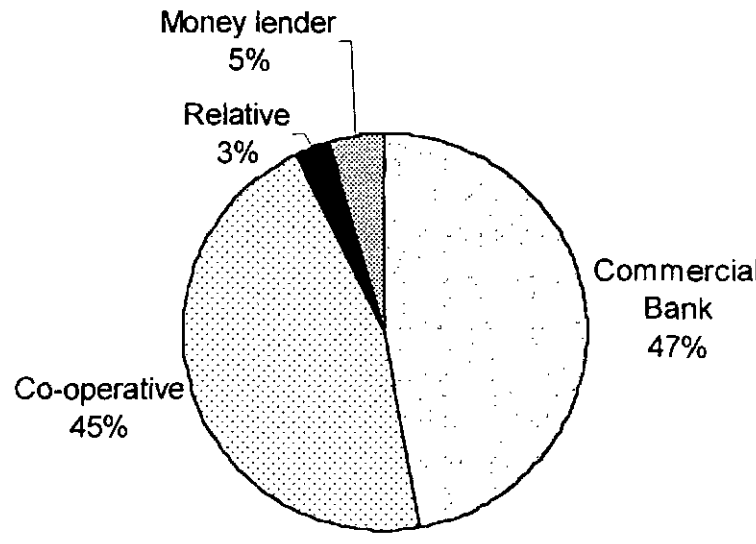
Figure - 6.7. Share of different agencies in amount of indebtedness - Nagpur



The shares of various agencies in number of borrowings were also in conformity with their shares in amount of borrowings. Institutional sources accounted for 92 per cent of the number of borrowings in Amaravati and 80 per cent in Nagpur. In other words, only 8 per cent of the sample farmers had resorted to borrowings from non-institutional sources in Amaravati while it was little higher at 20 per cent in Nagpur. Among the institutional sources, while commercial banks accounted for 47 per cent of the number of borrowings in Amaravati, their share was only 16.8 per cent in Nagpur. Co-operatives had a share of 45 per cent of the number of borrowings in Amaravati and 63.2 per cent in Nagpur. The shares of different agencies in number of borrowings by sample households in Amaravati and Nagpur are depicted in figures 6.8 and 6.9, respectively.

The amount of borrowings from institutional sources varied from Rs.6, 541 per hectare of GCA in Amaravati district to Rs.7, 668 in Nagpur district.

Figure - 6.8. Shares of different agencies in number of borrowings - Amaravati



While majority of the borrowing was for investment purposes like purchase of tractor (56.3 per cent) in Amaravati, it was crop loan (61.3 per cent) in Nagpur district. Crop loans formed only 37 per cent of the borrowings from institutional sources in Amaravati. The purpose wise distribution of institutional loans in the study districts is indicated in Table 6.12.

Figure 6.9. Share of different agencies in number of borrowings - Nagpur

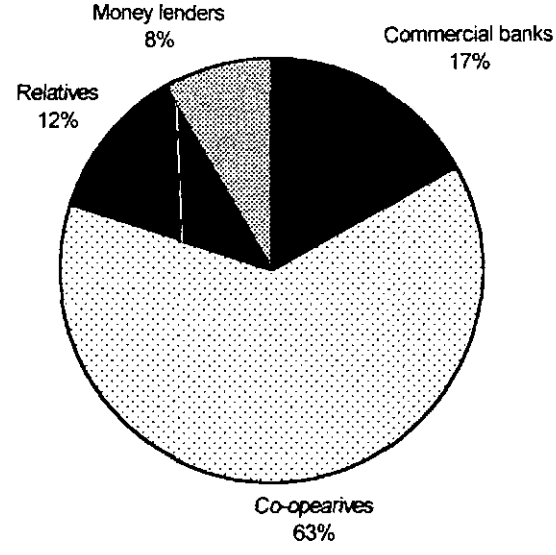


Table 6.12. Purpose wise borrowings from Institutional sources

(Rs. per ha. Of GCA)

Purpose	Amaravati	Nagpur
Crop loan	2420	4698
	(37.0)	(61.3)
Tractor	3680	2460
	(56.3)	(32.1)
Minor irrigation	243	510
	(3.7)	(6.6)
Service/Business	198	
	(3.0)	—
Total	6541	7668
	(100.0)	(100.0)

Figures in brackets are percentages

Among the various purposes for which borrowings had made from the non-institutional sources, crop cultivation was the major purpose (71.8 per cent) in Amaravati while it was unanticipated expenditure due to hospitalisation (61.5 per cent) in Nagpur. The purpose wise distribution of borrowings from non-institutional source in the study districts is indicated in Table 6.13.

Table 6.13. Purpose wise borrowings from non- Institutional sources

(Rs. per ha. Of GCA)

Purpose	Amaravati	Nagpur
Hospitalisation	—	153.75
		(61.5)
Crop cultivation	163.0	96.25
	(71.8)	(38.5)
Family ceremony	17.0	
	(7.5)	—
Marriage	47.0	
	(20.7)	—
Total	**227.0**	**250.0**
	(100.0)	**(100.0)**

Among the sample farmers in Amaravati district, 6 farmers had borrowed for crop cultivation from relatives during the year of which 4 farmers had defaulted the repayment of crop loan from PACS during the previous year, reportedly due to crop failure while the rest 2 farmers reportedly borrowed for urgency of weeding the crop. In Nagpur, of the 11 sample farmers who had borrowed from relatives for crop cultivation, 3 were reportedly due to insufficiency of the crop loan taken from the PACS while the rest 8 felt the interest rates are higher for crop loans as compared to interest free loans from relatives.

6.3.3. Infrastructural characteristics

The study districts were selected from two groups of cotton districts in Maharashtra on the basis of differences in infrastructure development as suggested by the index of relative infrastructure. Accordingly, Amaravati represented cotton districts with relatively lower level of infrastructure development (index 85.3) while Nagpur represented cotton districts with relatively higher level of infrastructure development (index 96.58). The farm level observations were in conformity with the district level variation. The various indicators that could suggest the infrastructure base of the cotton farms in two districts are summarised in Table 6.14.

It could be seen that only 54 per cent of the sample farms in Amaravati was connected with all weather roads as against 86.7 per cent farms in Nagpur. Connectivity of farm households to electricity was 60 per cent in Amaravati as against 86 per cent Nagpur. Nearly 60 per cent of the farms had a distance of more than 10 kilometres to the market place of cotton in Amaravati while 90 per cent of the farmers in Nagpur had distance of less than 10 kilometres.

Table 6.14. Infrastructural characteristics of the sample households

Characteristic	Amaravati		Nagpur	
	Number of farms	Percentage	Number of farms	Percentage
Farm connected by all weather road	65	54.2	104	86.7
Farms connected by electricity	72	60.0	104	86.7
Distance to the *nearest market for cotton*				
Upto 2 km	26	21.7	16	13.3
2 to 10 km	24	20.0	92	76.7
10 to 20 km	61	50.8	12	10.0
Above 20 km	9	7.5	0	0
Farms with irrigation				
Well + Electric pumpset	39	32.5	17	14.2
Canal	8	6.7	75	62.5
Sprinkler	7	5.8	0	0
Drip	1	0.8	0	0
Total	55	45.8	92	76.7
Mode of transport used for cotton				
Bullock cart	68	56.7	17	14.2
Tractor	32	26.7	88	73.3
None (sale at farm)	20	16.6	15	12.5

More than one-third of the sample farms had irrigation facilities in Nagpur (76.7 per cent) and only 45.8 per cent farms had irrigation facilities in Amaravati. Major source of irrigation was well with electric pumpset in Amaravati and canal water in Nagpur. Bullock cart was the major mode of farm transport for marketing of cotton in Amaravati and major mode was tractor in Nagpur.

Thus it emerges from the discussion above that the sample cotton farms in Amaravati were having comparatively less connectivity, less electrification and less coverage of irrigation. The average distance to the market place was more and most of them were using the traditional mode of transport like bullock cart. The distance to marketplace was lower in Nagpur and majority of the sample farmers were using tractors for farm transport.