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Knowledge gain by trainees through national training courses on dryland agriculture technology

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ABSTRACT

The present investigation was carried out at CET in Dryland Agriculture Technology, Dr. PDKV, Akola (Maharashtra). Six training courses on Dryland Agriculture Technology from 1996 to 2003 were purposively selected for study. An experimental design of social research was used. Majority of trainees in all the six National Training Courses were found in medium level of per cent in gained knowledge. Mean difference between pre and post knowledge score ranges from 4.14 to 5.91 and was found significant.

Key words : Gain in Knowledge, Dryland agriculture technology and training

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INTRODUCTION

Agriculture in general and dryland farming in particular is also a prominent feature of Indian agriculture. About 70 per cent of the net cropped area in the country depends upon the natural rain. Training is a crucial and continuous requirement for agricultural development. At national level, different Institutes under Indian Council of Agricultural Research (130) Centre's of Excellence for Training (CETs) 15, State Agricultural Universities 32, Central Government Organizations (CGOs) and National Institute for Management of Agricultural Extension (MANAGE) conduct subject matter trainings for senior and middle level extension functionaries. At regional level, four Extension Education Institutes conduct trainings in extension methods for middle level functionaries. At state level, State Agricultural Universities 32 and State Training Institutes conduct training on technology and communication for middle and field level workers. Directorate of Extension, New Delhi conducts different National Training Courses through different institutions to improve the performance of extension. Comparatively returns are not in the proportion to the investment actually made and training slots are also not being use fully by States. so, effort has been made to study the gain in knowledge by the trainees after completion of the National Training Courses (NTCs).

METHODOLOGY

The present investigation was carried at the Centre of Excellence for Training in Dryland Agriculture Technology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (Maharashtra). From the list of total 29 National Training Courses on Dryland Agriculture Technology organized by the centre, six training courses of eight days duration specifically on dryland agriculture organized were purposively selected for the study with view to get correct picture of evaluation of these courses. Details of the training courses selected for study are given below in Table 1.

An experimental design of social research was used. A structure schedule containing 22 common topics incorporated in day to day programme of sample National Training Courses was prepared and responses of respondents were collected before and after the training into two point continuum *i.e.* Yes - 1 score and No - 0 score.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

Professional position of trainees in NTCs

The data of Table 2 indicate that 25.92 per cent Agriculture Officers/Circle Agriculture Officers, Assistant Directors of Agriculture (16.66%), Assistant Soil Conservation Officers

Table 1: National training courses selected for study of trainees

Sr. No.	Title of National Training Courses	No. of trainees attended the course	Population for study
1.	National Training Course on Dry land Agriculture (T_1)	25	24
2.	National Training Course on Production Technology for Field Crops (T_2)	23	23
3.	National Training Course on Dry land Agriculture Technology (T_3)	23	23
4.	National Training Courses on Dry land Agriculture (T_4).	14	14
5.	National Training Course on Crop Production Technology (T_5)	14	14
6.	National Training courses on Dry land Agriculture Technology (T_6)	10	10
	Total	109	108

Table 2: Training wise professional position of trainees participated in NTCs

Sr. No.	Professional position/ post held	Trainingwise frequency						Total	
		T_1	T_2	T_3	T_4	T_5	T_6	N=108	
		N=24	N=23	N=23	N=14	N=14	N=10	No.	PC
Higher level									
1.	Dy. Director of Agriculture	1	-	1	-	1	1	4	3.70
2.	Fodder Development Officer	-	1	-	-	-	-	1	0.92
3.	Agriculture Development Officers	-	-	1	1	-	-	2	1.85
4.	Project Officer	-	-	-	-	1	-	1	0.92
5.	Sub Div. Soil Cons. Officer	3	2	2	-	-	2	9	8.33
6.	Horticulture Officer	-	2	-	-	-	-	2	1.85
7.	Principal of Training Centre	-	1	-	-	-	1	2	1.85
8.	Sub. Div. Agril. Officer	-	-	-	-	2	-	2	1.85
	Total	4	6	4	1	4	4	23	21.30
Middle level									
9.	Asstt. Director of Agriculture	7	-	6	1	2	2	18	16.66
10.	Asstt. Fodder Dev. Officer.	1	-	-	-	-	-	1	0.92
11.	Subject Matter Specialist (SMS)	-	3	-	5	-	-	8	7.40
12.	Jr. Scientist	1	-	-	-	-	-	1	0.92
13.	Training Associate	4	-	-	-	-	-	4	3.70
14.	Asstt. Soil Cons. Officer	-	6	2	2	-	-	10	9.25
15.	Asstt. Professor	1	1	-	-	-	-	2	1.85
16.	TAO/Technical Officer	-	1	1	-	-	1	3	2.77
17.	Specialist Water Management	-	-	1	-	-	-	1	0.92
18.	Asstt. Project Officer	1	-	-	-	-	-	1	0.92
	Total	15	11	10	8	2	3	49	45.37
Lower level									
19.	Agriculture Officer /CAO	5	2	7	4	7	3	28	25.92
20.	Senior Research Assistant	-	-	1	-	-	-	1	0.92
21.	Instructor	-	-	1	-	-	-	1	0.92
22.	Horticulture Inspector	-	1	-	-	-	-	1	0.92
23.	Agriculture Research Officer	-	3	-	-	1	-	4	3.70
24.	Incharge Agri. Officer.	-	-	-	1	-	-	1	0.92
	Total	5	6	9	5	8	3	36	33.33

(9.25%), Sub. Div. Soil Conservation Officers (8.33%) and very few numbers of other officers in all categories participated in the National Training Courses on Dry land Agriculture Technology.

Thus, it may be inferred that National Training Courses (NTCs) were attended by various levels of trainees having different professional positions. This finding is supported by the observation made by Lambe (1999).

It is observed from Table 3 that majority of trainees in almost all 6 NTCs on Dryland Agriculture Technology

Table 3 : Distribution of trainees according to their per cent gain in knowledge about different aspects of Dryland Agriculture

Sr. No.	Per cent gain in knowledge levels		T_1 N = 24	T_2 N=23	T_3 N=23	T_4 N=14	T_5 N=14	T_6 N=10	Overall N=108
1.	Low (upto 10.38 pc)	Number	7	2	8	1	0	1	19
		Per cent	29.17	8.70	34.78	7.14	-	10.00	17.60
2.	Medium (10.39-31.1 pc)	Number	11	11	13	12	11	7	65
		Per cent	45.83	47.82	56.52	85.72	78.57	70.00	60.18
3.	High (above 31.1 pc)	Number	6	10	2	1	3	2	24
		Per cent	25.0	43.48	8.70	7.14	21.43	20.00	22.22

Mean = 20.74 SD = 10.36

Table 4 : Mean per cent gain in knowledge of trainees attended different National Training Courses on Dryland Agriculture Technology

Sr. No.	NTCs	Pre training mean knowledge score	Post training mean knowledge score	Difference in mean knowledge score	t value	Per cent gain in knowledge
1.	T_1	17.33	21.62	4.29	18.12**	19.50
2.	T_2	15.78	21.69	5.91	28.70**	26.86
3.	T_3	17.13	21.56	4.43	29.00**	20.14
4.	T_4	17.43	21.57	4.14	18.19**	18.83
5.	T_5	17.07	21.64	4.57	18.71**	20.77
6.	T_6	16.09	21.30	4.40	13.47**	20.00

** indicates significance of value at P= 0.01

were found in medium level of per cent gained in knowledge. Similarly, 43.48 per cent of trainees in NTC on Production Technology for Field Crops (T_2)and 34.78 per cent in NTC on Dryland Agriculture Technology (T_3) were found in high and low level of gained in knowledge respectively. Further when all 108 trainees classified for their per cent gain in knowledge level, majority (60.18 per cent) of respondents had medium level of gain in knowledge followed by 22.22 per cent and 17.60 per cent in high and low level of per cent gain in knowledge, respectively.

Thus, it may be inferred that majority of trainees gained medium level of knowledge about different aspects of dryland agriculture technology and the gain in knowledge was between 10.39 to 31.10 per cent. The present finding is supported by Mahipal and Prasad (1997), while studying impart of training on extension personnel.

Mean percent gain in knowledge:

From Table 4, it is revealed that highest (26.86) per cent gain in knowledge over their pre-knowledge score was observed in trainees of NTC on Production Technology for Field Crops (T_2) followed by about 20.00 per cent gain in knowledge during organization of NTCs *i.e.* T_5, T_3, T_6 and T_1. The lowest per cent gain in knowledge (18.83%) was observed in NTC on Dryland Agriculture Technology (T4) . Mean difference between pre-post knowledge scores ranged from 4.14 to 5.91 and was found significant. The above finding is supported by Sanoria and Khare (1987) and Mahipal and Prasad (1997).

Conclusion:

Majority of trainees in almost all 6 NTCs on Dryland Agriculture Technology were found in medium level of per cent gained in knowledge. Mean difference between pre-post knowledge scores ranged from 4.14 to 5.91 and it was found significant. NTC on Dryland agriculture technology (T_6) was perceived least effective by the participants attended this course. They were also least satisfied about different aspects. The probable reasons as discussed with organizers were the overlapping of various National level programmes and other University programmes etc. during organization of these courses, due to which the host institutes could not provide facilities up to the level of satisfaction to the trainees during the training period.

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Knowledge of post graduate students of agriculture about information technology

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ABSTRACT

The study was conducted at College of Agriculture, Parbhani and College of Agriculture, Latur, under jurisdiction of Maratwada Agricultural University, Parbhani. Total 80 respondents of M.Sc. Part-II students were selected randomly for the purpose of study (40 boys and 40 girls). The students were interviewed with the help of well structured pre-tested interview schedule. The findings revealed that majority of the students respondents had medium level of knowledge about IT *i.e.* 76.25 per cent followed by 17.50 per cent students who had low level knowledge about IT and only 6.25 per cent respondents had high level of knowledge about IT.

Key words : Knowledge, Information Technology

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INTRODUCTION

Information technology tools play an effective role in educational media. Advances in information technology provides opportunities for agriculture graduates to establish computer aided and internet connected rural knowledge centre. A virtual college linking such as village knowledge centre to Agricultural Universities and Research Institutions can be established so that men and women are able to get upto date authentic technical advice. Nearly, a million agriculture graduates can be involved in operating such rural information centres based on modern information and communication technology. At present, status of information technology is a crucial requirement. This is an important aspect of preparing students for their future in a complex knowledge based world.

Under the changing dynamics of economical and industrial growth, agriculture has to undergo changes with new approaches. Computer and internet can play important role in various sectors of agriculture in order to prepare the agricultural graduates for exposure to international agriculture, world trade organization, trade related intellectual property rights, global convention on climate, biodiversity etc. and here the IT instrument can play important role. IT instruments are also important in harnessing front line sciences and information about new inventions in various fields such as agriculture economics, management and agribusiness management etc. IT fields can now provide job opportunities to agriculture graduates. With this specific idea, the present investigation was undertaken to study the knowledge of post graduate students of agriculture about various information technologies.

METHODOLOGY

The study was conducted at College of Agriculture, Parbhani and College of Agriculture, Latur, under jurisdiction of Marathwada Agricultural University, Parbhani. Total 80 respondents of M.Sc. Part-II students were selected randomly by lottery method for the purpose of study (40 boys and 40 girls). The data were collected through personal interview using a well structured pre-tested interview schedule. For measurement of knowledge, 20 questions were asked to the respondents students about information technology, each correct answer was given one score. The total number of correct answers formed total score. The extent of knowledge was measured with the help of knowledge index:

$$\text{Knowledge index} = \frac{\text{Actual obtained IT knowledge score}}{\text{Maximum obtainable IT knowledge score}} \times 100$$

It was depicted from Table 1 that 100 per

Table 1: Distribution of respondents according to their knowledge level (N=80)

Sr. No.	Knowledge level	Frequency	Percentage
1.	Electronic media	78	97.50
2.	ICT stands for	77	96.25
3.	Mostly used input device	80	100.00
4.	Instrument controls	79	98.75
5.	RAM is kind of memory	49	61.25
6.	CPU stands for	80	100.00
7.	Long form of CD	47	58.75
8.	Electronic aids for learning and presentation	76	95.00
9.	Long form of www	74	92.50
10.	Agril. related website	77	96.25
11.	External storage device	73	91.25
12.	In e-learning 'e' stands for	71	88.75
13.	Most popular search engine	71	88.75
14.	Moving from one website to another	47	58.75
15.	Internet	57	71.25
16.	Mostly used internet service	74	92.50
17.	LANS stands for	75	93.75
18.	Wireless common channel	62	77.50
19.	Device enable for computer to transmit data over telephone line	69	86.25
20.	Server	60	75.00

cent student respondents possessed the knowledge about mostly used input device and CPU, 98.75 per cent students respondent had knowledge about instrument controls pointer on monitor, 97.50 per cent students were aware of electronic media, 96.25 per cent students had information about agricultural related website and ICT, 95.00 per cent respondents had knowledge about electronic aids for learning and presentation, 93.75 per cent respondents had information about local area networks, 92.50 per cent students were aware about www and mostly used internet service followed by 91.25 per cent respondents had knowledge about external storage device.

It was observed from Table 2 that most of the respondent students (76.25 per cent) had medium level

Table 2: Distribution of respondents according to their knowledge about IT (N=80)

Sr. No.	Knowledge level	Frequency	Percentage
1.	Low	14	17.50
2.	Medium	61	76.25
3.	High	5	6.25

of knowledge about IT followed by 17.50 per cent students, had low level knowledge about IT and only 6.25 per cent respondent students had high knowledge about IT. These findings are similar to the observations made by Babar (2003) and Walke *et al*. (2005).

Conclusion:

It was observed from the relevant findings that 100 per cent student respondents possessed the knowledge about mostly used input device and CPU, 98.75 per cent students were aware of instrument controls pointer on monitor, 97.50 per cent students were knowing electric media, 96.25 per cent students had information about agricultural related website and ICT.

It was also noticed from data that most the respondent students (76.25 per cent) had medium level of knowledge about IT followed by 17.50 per cent respondent students, who had low level knowledge about IT.

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Extent of empowerment and variation caused through self-help group women in Junagadh District of Gujarat

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ABSTRACT

In the present study, attempt has been made to know the extent of empowerment and variation caused by independent variable on independent variable. The study was under-taken in Junagadh district of Gujarat state. Total 200 respondents were selected from nine villages. In light of the objectives, the interview schedule was prepared. The data were collected by personal interview of the respondents. The study revealed that majority (66.50 per cent) of the self-help group women had medium level of empowerment about self help group. The R^2 value (0.63) expressed the ideas that fourteen variables jointly contributed toward 63.97 per cent of the variation in level of empowerment about self-help group of respondents.

Key words : Self-help group, Empowerment, Multiple regression

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INTRODUCTION

The concept of the Self-Help Groups (SHGs) stands to underline the principle "for the people, by the people, and of the people". Empowerment implies on overall positive change in the physical quality of life and this positive change for the better encompasses economic as well as social aspect. Empowerment, a concept that has become popular in recent times to describe an enabling process for socially marginalized persons and groups to gain advantage and opportunities otherwise non-available to them. Serageldin (1991) describe it as follows:

"The empowerment idea manifests itself at all levels of societal interaction. It is found in giving a voice to the disenfranchised, in allowing the week and the marginalized to have access to the tools and the materials they need to forge their own destinies".

METHODOLOGY

To measure the women empowerment through SHG, the teacher made scale was developed and used. The scale with various parameters related to empowerment measurement was developed. The empowerment scores of self-help group women were calculated as sum of the correct responses and converted into percentage. The respondents were classified into three categories based on mean and S.D.

Low empowerment group = < mean – S.D.
Medium empowerment group = mean ± S.D.
High empowerment group = > mean + S.D.

Multiple regression analysis was carried out to study the extent of variation towards empowerment of self-help groups women by various independent variables.

The collected data of respondents' empowerment of self-help group are presented in the Table 1 and 2.

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented below:

Extent of empowerment of women through self-help groups:

From Table 1 it is quite clear that majority of self-help group women (66.50 per cent) had medium level of empowerment. Then 17.50 and 16.00 per cent of the respondents gained high and low empowerment through self-help group, respectively.

Hence, it can be concluded that majority (66.50 per cent) of the self-help group women possessed medium extent of empowerment of self-help group. Such a high empowerment observed may be due to training received and participation in group activity. Moreover, they

Table 1: Empowerment of women through self help groups (n = 200)

Sr. No.	Categories	Knowledge score	Frequency	Percentage	Mean	S.D.
1.	Low empowerment	Below 41.32	32.00	16.00		
2.	Medium empowerment	Between 59.71 to 90.10	133.00	66.50	41.30	9.30
3.	High empowerment	Above 90.10	35.00	17.50		
	Total		200	100		

all were found educated, having good contact with NGOs, more confidence talking to group meeting, regular attendance in meeting and maintaining register regularly. Thsre findings are closely confirmed with the findings of Singh *et al.,* (2007).

The extent of variation caused by dependent variables on extent of empowerment in self-help groups:

Two hundred SHG women were selected randomly for multiple regression. Eight, out of fourteen independent variables, had shown significant association with the extent of empowerment regarding self-help group in zero order correlation. The multiple regression analysis indicated the contribution of eight variables namely, age (X_1), education (X_2), family size (X_3), size of land holding (X_6), training undergone (X_{10}), amount saved and deposited (X_{11}), age of self-help group (X_{12}) and number of members in SHG (X_{13}).

The R^2 value (0.6397) in Table 2, expressed the ideas that ten variables jointly contributed toward 63.97 per cent of the variation in level of empowerment about self-help groups of respondents.

It can be inferred on the basis of standard regression co-efficient 'β' value given in Table 2, that the order of relative importance (ignoring sign) for these eight variables from the highest to lowest was X_2 education, X_6 size of land holding, X_{10} training undergone, X_{12} age of self-help group, X_3 family size, X_{13} number of members in self-help group, X_{11} amount of saving and X_1 age, member has substantial effect on empowerment level. The calculated't' values of the partial regression coefficient were significant at 0.05 levels in case of X_2 education, X_6 size of land holding and X_{10} training undergone were effect level of empowerment.

The calculated't' values of the partial regression coefficient were significant at 0.05 level in case of age (X_1), family size (X_3), amount of saving (X_{11}), age of self-help groups (X_{12}) and number of member in self-help group (X_{13}).

The variable education explains highest variation (9.208) as shown in (b x r) value. So, it indicates that education plays most important role towards level of empowerment of the self-help group members. The results

Table 2: Multiple regression analysis between the level of empowerment of women and selected independent variables (n= 100)

Sr. No.	Independent variables	Regression co efficient "b" value	Standard error of regression co efficient	" t" value for partial 'b' (df =189)	Standard regression co efficient "β" value	Rank	R^2
1.	Age	0.017	0.088	2.017*	0.046	VIII	
2.	Education	5.414	0.588	9.208**	0.001	I	
3.	Family size	-0.151	0.401	2.378*	0.044	V	
4.	Family type	1.297	1.758	0.738	0.462	XIII	
5.	Annual income	4.893	2.726	1.795	0.076	IX	
6.	Size of land holding	0.074	0.416	3.820**	0.024	II	
7.	Marital status	1.351	0.457	0.927	0.356	X	0.6397
8.	Occupation	0.516	0.593	0.871	0.38	XI	
9.	Social participation	0.538	0.631	0.853	0.395	XII	
10.	Training undergone	0.942	1.277	2.738**	0.020	III	
11.	Amount saved and deposited	-0.734	0.499	-2.469*	0.014	VII	
12.	Age of self help groups	-2.708	0.992	-2.728*	0.030	IV	
13.	Number of members in SHG	0.200	0.096	-2.330*	0.047	VI	
14.	Market orientation	0.035	0.115	1.383	0.170	XIV	

* and ** indicate significance of values at P=0.05 (r= 1.980) and P=0.01 (r= 2.620), respectively.

are also in accordance with the findings of Sinha *et al*. (2003).

Conclusion:

For the above discussion, the self-help group women had medium level of empowerment. The calculated "t" vales of the partial regression coefficient were significant at 0.01 levels in case of education (9.208), size of land holding (3.820) and training undergone (2.738). Such a high empowerment has been observed may be due to training received and participation in group activity.

Moreover, they all were found educated, having good contact with NGOs, more confidence talking to group meeting, regular attendance in meeting and maintaining register regularly.

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Performance of major cereals in Marathwada region

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ABSTRACT

The study was conducted in districts of Marathwada region to see the performance of major cereals in respect of area, production and productivity. Major cereal crops *viz., Kharif* sorghum, pearl millet, wheat and *Rabi* sorghum and total cereals were selected for study. Time series data for the period from 1985-86 to 2004-05, regarding area, production and productivity were collected from Epitoma of Agriculture, published by Government of Maharashtra. The compound growth rate was worked out by fitting exponential trend equation and significance was tested with help of correlation coefficient by using 't' test. The results of study revealed that majority of districts showed decline in area under *Kharif* sorghum, *Rabi* sorghum and total cereals, whereas the area and production increased in case of pearl millet and wheat during the study period. Stagnation in productivity of *Kharif* sorghum was observed during the study period while productivity of pearl millet, wheat and total cereals raised in region and State.

Key words : Compound growth rate, Performance, Foodgrains, Cereals

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INTRODUCTION

Importance of foodgrains in world economy is being recognized and there is urgent need to raise foodgrains production, in view of large gap between demand and supply of foodgrains. The foodgrains comprise cereals and pulses. Among cereals rice, wheat, maize and the coarse grains like sorghum, pearl millet, barley etc. are the major crops. Cereals form an important ingredient in the vegetarian diet and they are also rich source of energy, minerals and contain vitamins. The major cereals growing States in India are Tamil Nadu, West Bengal, Punjab, Uttar Pradesh, Maharashtra, and Madhya Pradesh. Karnataka, Rajasthan and Bihar, which together account for 70 per cent of area under total cereals crops.

Maharashtra is the largest producing State of coarse cereals with 19.35 per cent share of production to all India level. During 2006-07, the area, production and yield of cereals recorded up to 9.56 million ha., 10.47 millions tonnes and 1095 kg/ha, respectively. Nearly one third area of the State falls under rainshadow region, where rain is scanty and erratic. The productivity level in the State are much below the national average. Inspite of huge investment in irrigation sector, the area under irrigation and production has practically remained at low level. Keeping in view the above importance the present study has been under taken to study the performance of major foodgrains in respect of area, production and productivity.

METHODOLOGY

For study purpose, the major cereal crops *viz.,* sorghum, pearl millet, wheat and *Rabi* sorghum and total cereals were selected. All the eight districts of Marathwada region *viz.,* Aurangabad, Jalna, Latur, Osmanabad, Parbhani and Hingoli, Nanded and Beed were selected purposively. The time series data on area, production and productivity were collected from Epitoma of Agriculture, published by Government of Maharashtra for the period of 20 years *i.e.* from 1985-86 to 2004-05. For accessing performance of major cereals in respect of area, production and productivity, exponential trend equation was fitted and the compound growth rate was worked out:

$$\hat{y} = ab^t$$

where

$\hat{y}$ = estimated area/production / productivity

a = constant

b = regression coefficient

t = time variable in year

After transforming into a linear form by taking logarithms.

log y = log a + t log b

on writing A = log a B = log b and Y = log y this becomes

$Y = A + Bt$

Annual per cent compound growth rate (CGR) was obtained by following formula:

CGR = (anti log b' - 1) * 100

The significance of linear and compound growth rate was tested with the help of correlation coefficient (r) by using 't' test:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

RESULTS AND DISCUSSION

Table 1 reveals that the area under *Kharif* sorghum was declined during the study period in all the districts, regions and State. The highest negative annual compound growth rate was recorded in Jalna (-6.57 per cent) fallowed by Aurangabad (-5.66 per cent) and Beed (-3.63 per cent). The decline in area under *Kharif* sorghum might be attributable to price consciousness of farmers and switching over to more remunerative crops.

In case of pearl millet annual compound growth rate was positive and significant in Osmanabad (4.91 per cent), Beed (1.37 per cent) and Jalna (1.32 per cent) districts implied that the area under pearl millet increased in these districts (Table 1). The highest negative annual compound growth was recorded in Nanded (-4.20 per cent) fallowed by Latur (-2.29 per cent) and Aurangabad district (-1.82 per cent). Pearl millet is one of the best dry land crops which can be grown on less rainfall. Osmanabad, Jalna and Beed districts receive less rainfall (< 750 mm) and are in scarcity zone. So, the climatic conditions in these districts are suitable for pearl millet which causes increase in area under pearl millet. While Aurangabad, Nanded and Latur districts receive high rainfall (750 to 900 mm), so there is large scope to cultivate commercial crops, other than pearl millet. The present results are in the line with the findings of Doshi and Dange (1997), Shah (2003) and Swin and Bhakar (2006).

From Table 1, it is observed that the majority of districts showed increasing trend in area under wheat during study period except Jalna district. The significant annual positive compound growth rates varied between 1.97 per cent in Nanded district to 2.78 per cent in Latur district. The increase in area under wheat in majority of districts is due to shift in area from the coarse cereals and pulses to the wheat and availability of assured irrigation facility. The results are in conformity with those obtained by Bhatnagar and Nandal (1994) and Kumar *et al.* (2007).

Table 1 further depicts that the area under *Rabi* sorghum showed declining trend in Aurangabad (-2.05 per cent), Latur (-2.41 per cent) and Nanded district (-1.29 per cent) and also in the State (-0.79 per cent) while Osmanabad district recorded significant positive annual compound growth rate (2.47 per cent). The area of total cereal crops declined in majority of districts except Osmanabad. Significant negative annual growth rate was recorded in Aurangabad (-0.90 per cent), Latur (-1.31 per cent), Nanded (-1.89 per cent) and Parbhani district (-1.04 per cent) and also in Marathwada region (-0.48 per cent). The decline in area under total cereals attributed to significant decline in area under *Kharif* sorghum, *Rabi* sorghum and pearl millet and the area shifted from cereal crops to pulses and commercial crops. The present results are in the line with the findings of Ashturkar *et al.* (1992) and Shah (2003).

From Table 2 it is observed that the annual compound growth rate of production of *Kharif* sorghum was negative and significant only in Aurangabad (-3.52

Table 1 : District wise area trends of major cereals in Marathwada region (1985-86 to 2004-05)

District/ Crops	*Kharif* Sorghum		Pearl Millet		Wheat		*Rabi* Sorghum		Total Cereals	
	r	CGR	r	CGR	r	CGR	r	CGR	r	CGR
Aurangabad	-0.93**	-5.66	-0.77**	-1.82	0.21	0.89	0.57**	-2.05	-0.52*	-0.90
Jalna	-0.93**	-6.57	0.52*	1.32	-0.56**	-2.23	0.34	0.34	0.32	0.33
Beed	-0.94**	-3.63	0.64**	1.37	0.46*	2.01	0.08	0.14	-0.08	-0.09
Latur	-0.78**	-1.53	-0.77**	-2.29	0.63**	2.78	-0.63**	-2.41	-0.81**	-1.31
Osmanabad	-0.77**	-1.87	0.90**	4.91	0.47*	2.19	0.81**	2.47	0.78	1.39
Nanded	-0.95**	-2.47	-0.48*	-4.20	0.55*	1.97	0.57**	-1.29	-0.94**	-1.89
Parbhani & Hingoli	-0.67**	-2.23	-0.37	-0.79	0.16	0.77	-0.09	-0.14	-0.56**	-1.04
Marathwada Region	-0.91**	-2.66	0.12	0.17	0.32	1.06	0.01	-0.03	-0.51*	-0.48
Maharashtra	-0.95**	-3.37	-0.64**	-1.09	-0.03	-0.08	0.53*	-0.79	-0.22	-3.62

* and ** indicate significance of values at P=0.05 and 0.01, respectively CGR – Compound Growth Rate