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Productivity of major dryland crops in Dindigul district of Tamil nadu

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Abstract : A study was conducted in Reddiarchatram block of Dindigul district in Tamil Nadu with an objective to analyse the productivity of selected dryland crops. The productivity analysis revealed the decline in growth rate of dryland crops, namely, sorghum, maize, cumbu, minor millets, cowpea, redgram, moong, groundnut, sunflower, soybean and cotton. Similarly positive growth rate was found in the crops, namely, blackgram, horse gram, sesame and castor. The quantity of rainfall received was found to influence the growth rate of the dryland crops.

Key words: Dryland crops, Productivity, Growth rate

Introduction

In India, dry farming regions contribute considerably to total production of millets, pulses, oilseeds and fibre crops, since a large share of area under these crops are rainfed. About 42 per cent of total food grain production of the country is received from dry farming regions (Veerabadaran *et al.*, 2000). Tamil Nadu has a total geographical area of 13 m ha, of which 7 m ha are cultivable area. From the total cultivable area, around 3.1 m ha are occupied by dryland agriculture *i.e.* area under dry farming constitutes 52 per cent of total cultivable area contributing to 40 per cent of total food production. The productivity of crops grown in dryland is not only low but also remains, stagnant over years (Kannaiyan *et al.*, 2001). Keeping this fact in view, the objective was framed to study the productivity of selected dryland crops in Reddiarchattaram block of Dindigul district.

Materials and Methods

Since the study is about dryland farmers, one major dryland district in Tamil Nadu was selected. Dindigul is one of the districts having major area under dryland crops in Tamil Nadu and hence it was selected purposively. Reddiarchatram block was selected since the main occupation of most of the people was agriculture which depended on poor and erratic rainfall and majority of the farmers of the block had been practicing dry farming. Hence Reddiarchatram block was purposively selected for this study. Secondary data regarding the amount of rainfall received and productivity of the dryland crops grown in the Reddiarchatram block of Dindigul District over a period of 10 years (1994 -2003) was used in the study. Compound Growth Rate was worked out to analyse the data.

Table 1. Crop-wise yield in Reddiarchatram block for 1994 to 2003 (kg ha^{-1})

Year Crops	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	CGR
Sorghum	1250	1200	1300	1425	1400	1350	1400	1200	1300	1250	-0.04
Maize	2600	2550	2600	2800	2825	2850	2800	2700	2800	2750	-0.82
Cumbu	1300	1250	1250	1225	1250	1300	1400	1350	1400	1375	-1.28
Minor millets	500	480	500	525	525	500	550	550	600	550	-1.79
Cowpea	575	525	550	540	550	525	550	540	550	580	-0.19
Redgram	540	500	550	525	525	550	570	540	540	550	-0.55
Blackgram	550	500	525	500	500	480	500	490	500	480	0.98
Horsegram	525	480	500	480	480	450	475	450	460	475	1.11
Moong	500	475	500	540	550	525	550	525	550	530	-1.09
Groundnut	1300	1100	1200	1300	1275	1300	1250	1200	1300	1250	-0.43
Sesame	425	400	425	450	440	420	425	400	400	375	1.00
Sunflower	1025	950	980	1050	1040	1020	1000	980	1050	1000	-0.19
Soybean	700	650	690	750	740	750	700	680	725	700	-0.30
Castor	400	375	410	450	440	420	400	390	400	400	0.12
Cotton	1025	950	980	1025	1050	1025	1050	1000	980	1000	-0.09

CGR = Compound Growth Rate

Source : Department of Agriculture, Dindigul (2003)

Results and Discussion

The data regarding rainfall received and productivity of dryland crops in presented in Table 1 and Table 2. The CGR analysis has been done and the crop wise result are depicted in Figure 1.

i. Sorghum

Regarding sorghum crop in the year 1997 the yield recorded was 1425 kg ha^{-1}, rainfall received was 969.4mm. whereas in 1994 it has been recorded as 1200 kg ha^{-1}. Here rainfall occurrence was also very low *i.e.* 442.52 mm. The growth rate of sorghum yield was -0.04 per cent for 1994-2003. So the trend is very clear and it shows that the productivity of sorghum had increased with the receipt of high rainfall (Fig. la).

ii. Maize

In the case of productivity analysis over a period of 10 years the highest yield 2850 kg ha^{-1} (rainfall received was 766.45 mm) was achieved during 1999, and the lower yield of 2550 kg ha^{-1} was recorded in the year 1995 (rainfall received was 442.5 mm). The growth rate of maize yield was -0.82 per cent. So it can be concluded that productivity of maize not only depends on rainfall but some other technological and socio-economic factors also involved to improve the productivity (Fig. 1b).

iii. Cumbu

The trend shows the extent of rainfall and yield of cumbu recorded

Table 2. Rainfall (mm) data of Reddiarchatram block for 1994-2003.

S.No.	Month	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1.	January	0	0.9	0	0	7.5	4.3	27.4	18.7	0.5	1.4
2	February	0	0	0	0	0	0	3.5	8.7	22.9	0
3	March	0	41.5	0	18.7	0	0	0	0	0	5.5
4	April	13	23.2	136.3	25.8	95.6	103.4	26	45.7	33.8	31.7
5.	May	94.2	0	43.5	196.2	99.6	88.1	82.8	52.2	65.5	107.7
6.	June	1.5	70.72	20.5	138.5	19.7	0	25.8	6.6	38.8	22.3
7.	July	90	42.8	23	0	59.9	38	7.5	9.5	0	34.1
8.	August	0	40.5	153.7	0	98.6	44.6	78.6	0	10.3	24.2
9.	September	118	22.5	142.6	70.9	99.6	34.6	175.6	141.3	66	25.8
10.	October	231.9	152.6	76.1	155.7	73	334.85	84.4	178.4	340.7	133.3
11.	November	284.8	47.8	132.2	257.9	243	67.4	129.6	0	86.7	158.5
12.	December	15	0	125.3	105.7	151.1	51.2	139.8	54.1	45	10
	Total	848.4	442.52	853.2	969.4	947.6	766.45	781	515.2	710.2	554.5

Source : Department of Statistics, Dindigul (2003)

over 10 years. It indicates that during 2002, the recorded yield was 1400 kg ha^{-1} with a rainfall of 969.4 mm and during 1997, 1225 kg ha^{-1} with a rainfall of 710.2 mm. The growth rate of cumbu yield was -1.28 per cent. So we can conclude that the impact of the rainfall on yield was not much significant in the case of cumbu (Fig. lc).

iv. Minor millets

The trend shows that the higher productivity of minor millets namely Samai, Thenai and Varagu was achieved during the year 2002. But in the year 1994, 1996 and 1999 the yield was 500 kg ha^{-1} and it was the lowest. The highest rainfall was recorded in the year 1997 (969.4 mm). The growth rate of minor millet yield was -1.79. So it can be concluded that productivity of minor millets was not influenced by rainfall alone (Fig. 1d).

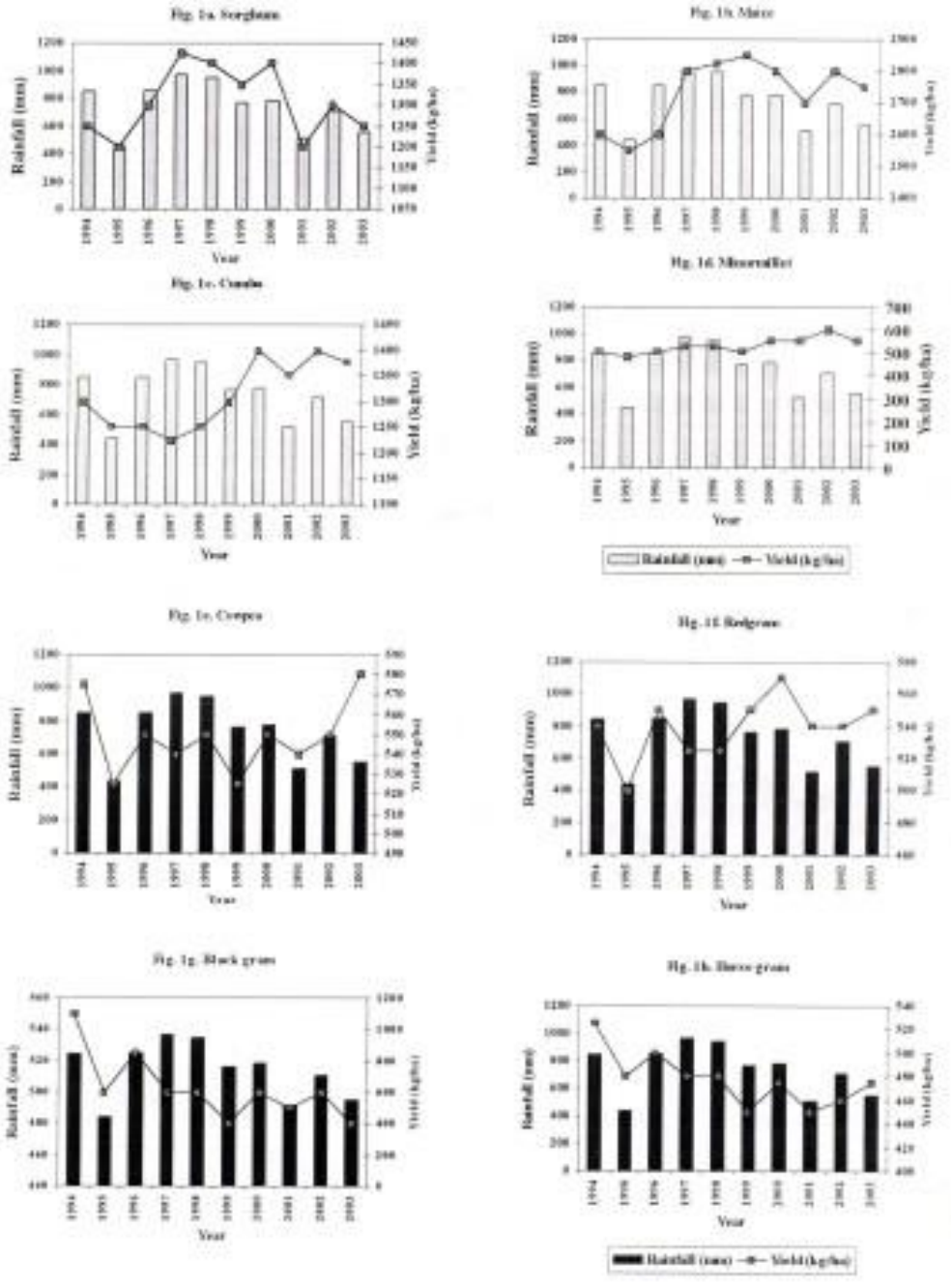
v. Cowpea

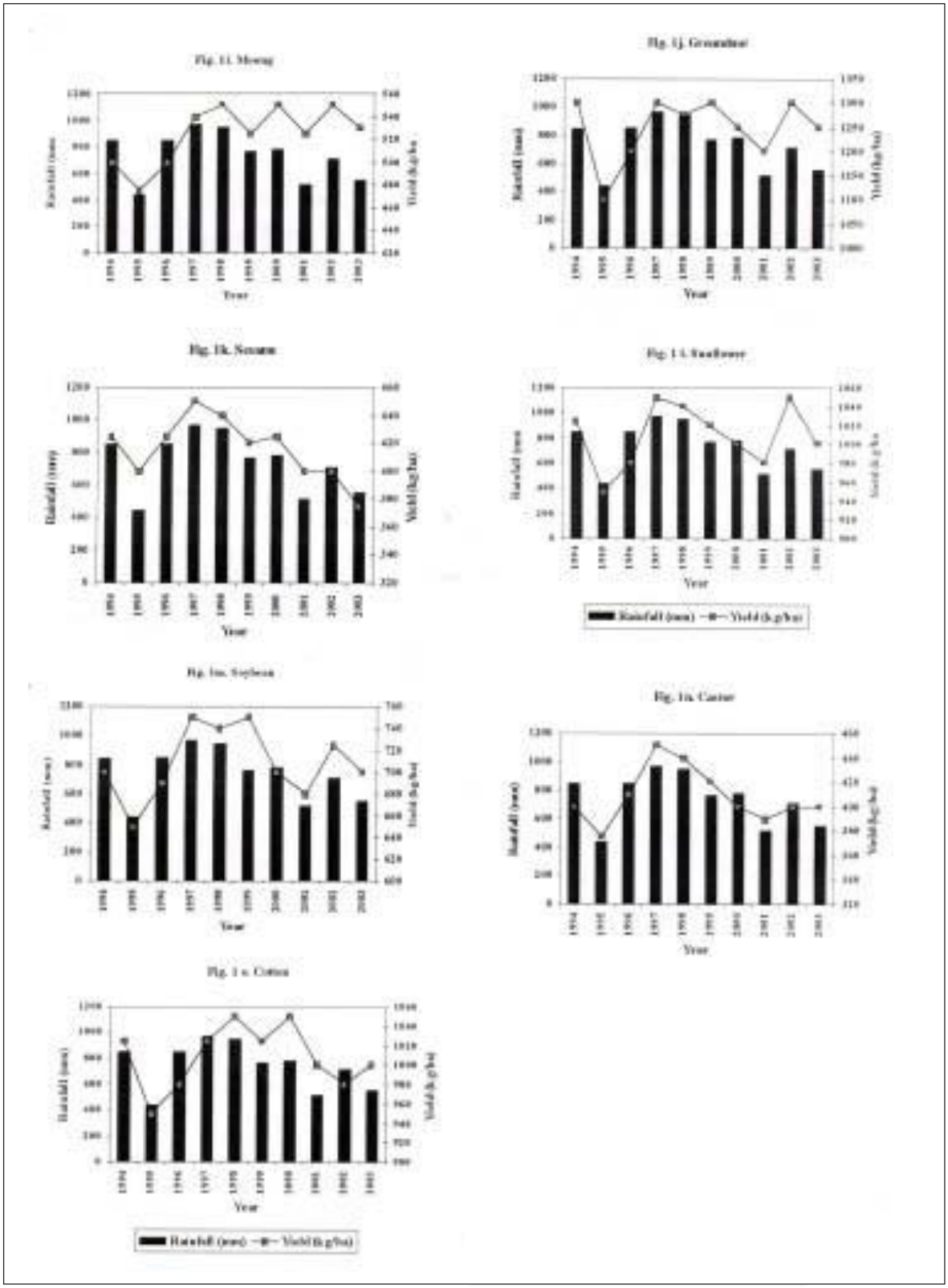
The trend shows that the productivity of cowpea recorded a yield of 580 kg ha^{-1} in the year 2003 and the rainfall received was 515.2 mm. During 1997, the rainfall received was highest among the above mentioned year but the yield was 540 kg ha^{-1}. The growth rate of cowpea yield was -0.19 per cent. The trend shows that the rainfall is not the only factor affecting the productivity of a crop (Fig. le).

vi. Red gram

Productivity of red gram has shown the same trend as it was observed for the blackgram. The growth rate of redgram yield was -0.55 per cent (Fig. 1f).

Fig. 1. Extent of rainfall received (mm) and crop productivity (kg/ha) recorded over years (1994-2003) in Reddiarchatram block

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vii. Blackgram

The productivity of blackgram for the specified period (1994-2003) was not much varying though rainfall showed a lot of variation. It shows, that in the year 1995, rainfall was 442.52 mm and the productivity was 1100 kg ha^{-1}. The highest yield (1300 kg ha^{-1}) was also achieved during the years 2002, 1997 and 1994. The growth rate of blackgram yield was 0.98 per cent. From this, we could conclude that the rainfall had only minimum impact on the productivity of blackgram (Fig. 1g).

viii. Horse gram

Graph obtained from the collected data on productivity of horse gram shows that variation on rainfall is not having a high effect on the productivity. The growth rate of horse gram was 1.11 per cent (Fig. 1h).

ix. Moong

In the case of moong the trend is very clear and it shows that the productivity has been increased in 1995-1998 when the receipt of rainfall was also high. Whereas in 1998-2003 the trend shows fluctuation due to variation in rainfall and productivity of moong crop. The growth rate of moong yield was -1.09 per cent. So we can conclude productivity of moong is not much influenced by the rainfall (Fig. 1i).

x. Groundnut

Regarding groundnut crop the productivity for that particular year was not highly affected by rainfall variation. The growth rate of groundnut yield was -0.43 per cent. It is clear that the productivity of groundnut is not influenced by the rainfall alone (Fig. lj).

xi. Sesame

In the case of sesame the highest yield was 450 kg ha^{-1} in 1997 and lowest yield was 375 kg ha^{-1} in 2003 while the rainfall was received 969.4 mm in 1997 and 554.5 mm in 2003. The growth rate of sesame yield was 1.00 per cent during 1994-2003. It can be inferred that sesame productivity has not been influenced by rainfall (Fig. Ik).

xii. Sunflower

*The trend is c*learly shown that productivity of sunflower is highly sensitive to rainfall, for the specified period in 1997-2001 productivity of sunflower decreased with respect to rainfall. The growth rate of sunflower yield was -0.19 So, we conclude that the productivity of sunflower highly depends on rainfall pattern (Fig. 1l).

xiii. Soybean

In the case of soybean the highest yield was 750 kg ha^{-1} in 1997 and 1999 and the lowest yield was 650 kg ha^{-1} in 1995. While the rainfall was 969.4 mm in 1997, 766.45 mm in 1993 and 442.52 mm in l995. The growth rate of soybean yield was -0.30 per cent. So we can conclude that productivity of soybean was influenced by rainfall pattern (Fig. lm).

xiv. Castor

With respect to castor, the graph drawn for a period of 1994-2003 shows that the lowest yield (375 kg ha^{-1}) was recorded in the year 1995 (Rainfall - 442.52 mm) and during 1997 (Rainfall - 969.4 mm), the yield achieved was highest (450 kg ha^{-1}). The growth rate of castor yield was 0.12 per cent. Here rainfall plays a major role on the productivity of castor crop (Fig. 1n).

xv. Cotton

The highest cotton yield (1050 kg ha^{-1}) was achieved in the year 1998 and 2000. If we consider the rainfall, they were 947.6 mm and 781.00 mm for the respective years So on the particular year 2000, other than rainfall, there may be some other factors prevailed which helped in having high productivity of cotton crop with less rainfall. So, the growth rate of cotton yield was-0.09 per cent (Fig. lo).

Conclusion

From the analysis of compound growth rate (CGR) it could be stated that there was decline in the growth rate of crops, namely, sorghum (-0.04%), maize (-0.82), cumbu (-1.28), minor millets (-1.79%), cowpea (-0.19%), redgram (-0.55%), moong (-1.09%), groundnut (-0.43%), sunflower (-0.19%), soybean (-0.30%) and cotton (-0.09%). Increasing growth rate was observed in the crops like blackgram (0.98%), horsegram (1.11%), sesame (1.00%) and castor (0.12%). Regarding rainfall of the study area, it was found that, the rainfall was highest (969.4 mm) in the year 1997 and lowest (442.52 mm) during the year 1995. The average rainfall of the study area during 1994 - 2003 was 738.85 mm. The reason for the decline in the yield of dryland crops *i.e.*, negative growth rate might be due to the factors such as fluctuation in the seasonal climate, lack of rainfall, loss of crop due to heavy winds and rains, lack of drought resistant and tolerant varieties. minimum usage of organic manures (FYM), reduction in crop cultivated area, most of the pulse crops raised as a intercrop, pest and disease incidence and reduction in the soil fertility status. The reason for the positive growth rate might be due to the drought tolerant nature of the crops and low incidence of pest and disease attack in these crops. It is concluded that the rainfall received in the study area was found to be the influencial factor for productivity of dryland crops in the Reddiarchatram of Dindigul district. This finding suggests the agricultural scientists to develop promising drought tolerant and pest and disease resistant crop varieties suited to dryland area to sustain the productivity level of dryland crops in Tamil Nadu.

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