affecting photosynthesis and respiration Crop Sci., 14 : 291-293.

HEARAN, A. B. 1976. In Agricultural Research for development (Ed. M. H. Arnold) Cambridge University Press

MEMHAN, J. and A. Low 1972 Growing degree days as a measure of temperature effects on cotton. Cott. Grow. Rev. 49: 39-49.

NUTTONSON, M Y. 1955. Wheat-climate relationships and the use of phenology in assertaining thermal and photo - thermal requriments of wheat. Amer. Inst. of Grop Ecol., Washington

WILSIE, C. R. 1974. Crop adaptation and distribution. Chand and Co. (P) Ltd., New Delhi pp. 178-221.

YOUNG, F. F., T. M. TAYIOR, H. D. PETERSON 1980. Day - degree units in time in relation to vegetative development and fruiting for three cultivars of cotton. Crop Sci. 20 (3): 370-374.

---

https://doi.org/10.29321/MAJ.10.A02262

Madras Agric. J. 73 (5) : 255 –258 May, 1986

EFFECT OF DIFFERENT MOISTURE CONSERVATTION SYSTEMS ON THE YIELD OF SORGHUM (CSH 6) IN RAINFED VERTISOLS

J. G. ROBINSON[1], T. N. BALASUBRAMANIBN[2], and V. RAVIKUMAR[3]

An experiment was conducted at Cotton and Millets Experiment Station, Kovilpatti for three years to study the effect of different moisture conservation systems on the yield of sorghum. The result indicated that compartmental bunding was found to register significantly higher sorghum grain yield/ha over flat bed system and fonnd to be economically viable.

Drylands occupy about 75 per cent of the total arable land in India and contribute to 42 per cent of nations food production, which is unstable due to erratic rainfall. The main constraint limiting the crop production in dryland is moisture At the International Crop Research institute for semi-Arid Tropics, Hyderabad the technique of forming broad beds and furrows was developed for conserving moisture as well as to drain out the excees water during the period of heavy rainfall and this technology is found to be the appropriate land management technique on vertisols (Anonymous, 1976). The results of the experiment conducted at Coimbatore revealed that sorghum raised in ridges and furrows, and broad beds and furrows recorded 7.8 per cent and 5.2 per cent increased

1. Associate Professor of Agronomy 2 Assistant Professor of Agronomy 3 Professor & Head Cotton & Millets Experiment Station, Kovilpatti.

grain yield respectively over flat bed system and conserved higher moisture (Balasubramanian *et al.* 1982). With a view to develop a dryland technology for moisture conservation under VIIth agro-climatic zone of Tamil Nadu an experiment was conducted in the rainfed vertisols at Cotton and Millets Experiments Station, Kovilpatti.

MATERIALS AND METHODS

The experiment was conducted at Cotton and Millets Experiment Station, Kovilpatti for three years from 1981-82 to 1983 84. Sorghum CSH. 6 was the test crop in all the three years of study. The experiment was laid out in randomised block design with five replications. The treatments consisted of (1) Flat bed system (2) Compartmental bunding (3) Broad beds and furrows and (4) Ridges and furrows. The sorghum seeds were sown with a spacing of 45X15 cm in treatments, 2. 3 and 4 while in treatment 1 the seeds were broadcasted as adopted by the farmers. The recommended dose of 40 kg N and 20 kg P_2O_5 per ha was applied. Half of the dose of Nitrogen and entire dose of phosphorus was supplied basally and the remaining half of N was applied on the 30th day of sowing. The slope of the experimental field was 0 5 per cent.

The seeds were sown immediately after the receipt of rain during the second week of October. The soil moisture was recorded at fortnightly intervals from 0 to 15 cm depth. The crop was harvested and the grain and straw yield recorded. The rainfall received during the crop growth period is presented in Table 1.

From the data it is seen that, the treatments, compartmental bunding, board beds and furrows and ridges and furrows were on par with each other, but significantly superior

Table 1 Rain fall receivd duriug the crop growth period (mm)

Month	1981-82		1982-83		1983-84	
	Rainfall	Rainy days	Rainfall	Rainy days	Rainfall	Rainy days
Octoper	139.0	9	203.9	7	188.7	7
November	33.8	5	110.7	12	167.3	7
December	72.1	5	56.1	3	60.3	7
January	—	—	—	—	53.5	5
Total	244.9	19	370.7	22	469 8	26

RESEULTS AND DISCUSSION

The data on grain and straw yield of sorghum are presented in Table 2.

Table 2 Grain and straw yield of sorghum (kg/ha)

Treatments	1981-82		1982-83		1983-84		Mean of 3 years	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
1. Flat bed	685	3984	1740	4381	1141	5448	1255	4604
2. Compartmental bunding	1214	3836	2464	5943	1719	6575	1799	5451
3. Broad beds & furrows	1211	3733	2445	5393	1559	6012	1738	5046
4 Ridges and furrows	1236	3910	2348	5089	1492	6361	1692	5120
SE+	92.75	285.59	100.98	432.52	147.59			
CD(P=0.05)	—		286.99	—	321.48			

to traditional system of flat bed in all the years of study in respect of grain yield of sorghum. The increase in grain yield due to compartmental bunding, broad beds and furrows and ridges and furrows over flat bed system worked out to 43%, 38% and 35% respectively. The increase in yield under the above moisture conservation practices was mainly due to availability of higher moisture than flat bed system which could be seen from the table 3.

Table 3. Ssil Moisture (%)

Treatments	1981-82	1982-83	1983-84	Cost of preparing (Rs/ha)
Flat bed	23.14	15.61	18.53	—
Compartmental bunding	23.93	18.19	22.42	50.00
Broad beds and furrows	24.36	16.80	21.51	50.00
Ridges and furrows	24.65	17.50	21.59	180.00

It was reported that sorghum yield is affected. when available soil moisture was below 25 per cent of critical stages of crop growth (Balasubramanian *et al.* 1971). Hence increase in yield under different conservation systems is attributed to free supply of moisture, while moisture stress was observed under flat bed system, which pulled down the yield. Under different situations of rainfall of 3 years of study, compartmental bunding was found to record significantly higher grain yield than that obtained from broad beds and furrows and ridges and furrows. This may be due to less run off resulting in higher infiltration of rain water into the soil due to bunds all round. In respect of straw yield also compartmental bunding was found to register higher yield of straw except in the year 1981-82 than in other systems studied. This is probably due to higher uniform availability of soil moisture throughout

the crop growth period, which encouraged both vegetative stage and reproductive stage. Pooled analysis of three years yield of sorghum was done and the error is found to be heterogenous, Hence from the above result it is concluded that for rainfed vertisols of Kovilpatti, moisture conservation practices like compartmental bunding, broad beds and furrows and ridges and furrows are found mostly suitable in increasing the grain yield of sorghum under rainfed condition, considering the economical factor of different moisture conservation practices (Table 3). Hence it is better to have compartmental bunding than any other system in a field with a slope of 0.5 per cent. If the slope is more than one per cent, broad beds and furrows could be formed.

REFERENCES

Anonymous 1976. ICRISAT Annual Report 1976-77.

BALASUBRAMANIAN A., K. V. SELVARAJ, M. N. PRASAD and O. THANGAVELU 1982. Intercroping Studies in dryand sorghum. Sorghum Newsletter 25 47

BALASUBRAMANIAN, T.N., C R. VIJAYARAGHAVAN, S SEETHAPATHI and P. SIVARAMAN, 1981. Study on the water requirement of millet corps. of cumbu and cholam on sandy clay loam soils of Pudukottai District. Farm Sci. Vil. (12): 50-56.

Madras Agric. J. 73 (5) : 258—262 May, 1986

DEVELOPMENT OF NON-RESTORER PEARL MILLET LINES RESISTANT TO DOWNY MILDEW

P. MANIVASAKAM, S. PALANISAMY, M. N. PRASAD, G. ARJUNAN and R. APPADURAI*

Twenty nine inbred parents of pearl millet and four non-restorer inbreds were involved in a programme of developing non-restorer lines carrying the genes for resistance to downy mildew. By a series of backcrosses with the non-restorers PT 732B, J 126D2B, L111B and 5141B, as recurrent parents and twenty nine resistant inbreds as donor parents 76 non-restorer lines were generated. Among these, 18 involving 732B, 17 involving 126D2B, 20 involving L111B and 21 involving 5141B exhibited high degree of uniformity combined with high degree of resistance to downy mildew. They also maintain sterility in F1 with standard male sterile lines. This programme resulted in 76 non restorer pearl milletlines with resistance to downy mildew.

---

* Tamil Nadu Agricultural University, Coimbatore-641 003.