Note on Potential and Economics of One-Year Crop Sequence under Saurashtra Conditions*

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In order to feed the ever increasing population in our country, we have to resort to intensive cropping. Recent technological advancement in agriculture has made multiple cropping economically feasible. Hence, it is necessary to work out suitable crop combinations for a particular agro-climatic complex. This being a recent concept, no considerable research work has been done particularly for the important crops of the Saurashtra region of Gujarat State. This investigation was, therefore, conducted on the farm of the Gujarat Agricultural University at Junagadh Campus, during monsoon 1972 through summer 1973 with a view to compare different one-year crop sequences in relation to their production potentials, economics and effect on the fertility status of soil.

The study involved four different cropping sequences viz., groundnut-wheat — green gram, pearlmillet—wheat, green gram, pearlmillet—wheat—maize fodder; and maize — wheat — cow pea. The experiment was laid out in a randomized block design with six replications.

The results (Table 1) have shown that the performances of pearlmillet and groundnut crops were better than maize during monsoon. The wheat crop gave the highest production and economic returns in winter when it was succeeded after groundnut as a preceding monsoon crop. Cow pea and maize as fodder crops during summer were proved worth to be adopted.

The crop sequence pearlmillet — wheat — maize fodder was the best treatment from which the productions of food grains, green fodder and total dry matter (5024, 15539 and 15676 kg/ha, respectively) were the maximum. This crop sequence also poved to be the most remunerative one giving the highest total gross income (Rs. 10803/ha), gross income per day of crop duration (Rs 40·61/ha), net profit (Rs 6409/ha) and net return per rupee invested (Rs 1·46).

The next promising sequence was maize — wheat — cow pea from which the productions of total food grain (4850 kg/ha), green vegetable pods 2141 kg/ha), dry fodder (8064 kg/ha), pulse grain (83 kg/ha), green fodder (6399 kg/ha) and total dry matter (15092 kg/ha) were obtained. But this sequence occupied the field for the highest number of days (286) during the year. It also stood the second from the view point of total gross income (Rs 10,724/ha), gross income per day of crop duration (Rs 37·50/ha), net profit (Rs 6,342/ha) and net return per rupee invested (Rs 1·42).

The sequences groundnut — wheat — green gram and pearlmillet — wheat — green gram were poor in performance as the summer crops of green gram in

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both the sequences were almost destroyed by dry root rot disease. The sequence groundnut — wheat — green gram showed some favourable trend than pearlmillet — wheat — green gram from the view point of economics while the agricultural productions were higher under the latter one. The sequences consisting of pearlmillet — wheat — maize fodder and maize — wheat — cow pea proved to be promising.

The soil fertility status in terms of available nitrogen and available potash improved at the end of each of the crop sequences studied. However, the phosphate was decreased slightly in the deeper soil layer of 15 — 30 cm in the case of all the sequences excluding groundnut — wheat — green gram. The soil *p*H remained almost unchanged under all the crop sequences.

In view of the results obtained in this investigation, it can be stated that it is possible to increase crop production and economic returns without any deleterious effect on soil fertility by adopting one-year crop sequence of either pearlmillet — wheat — maize fodder or maize — wheat — cow pea. They increased the agricultural productions with increased economic returns and fulfilled the requirements of food, forage and vegetable for the farm family at appropriate time.

TABLE 1

Mean productions and economics of crops and crops sequences.

Crop sequence and crop	*Production in kg/ha*			*Total gross income Rs/ha*	*Total cost of production Rs/ha*	*Net Profit Rs/ha*	*Return Rs/Re invested*	*Crop duration (days)*
	Main product	*By product*	*Total dry matter*					
(A) *Groundnut—Wheat—Green gram*								
Groundnut	1259	2741	3999	3202	1298	1904	1·50	97
Wheat	2926	3189	6114	5080	1929	3151	1·72	110
Green gram	84	—	84	252	1088	—836	—0·77	78
Total			10197	8534	4315	4219	1·02	285
(B) *Pearlmillet—Wheat—Green gram*								
Pearlmillet	2318	5804	8121	3768	1272	2496	1·96	91
Wheat	2588	2696	5284	4477	1929	2548	1·32	110
Green gram	30	—	30	89	1088	—999	—0·92	78
Total			13435	8334	4289	4045	0·94	279
(C) *Pearlmillet—Wheat—Maize fodder*								
Pearlmillet	2319	5818	8137	3771	1272	2499	1·96	91
Wheat	2705	2617	5322	4653	1929	2724	1·41	110
Maize fodder	Green fodder	15539	2217	2376	1189	1187	1·00	65
Total			15676	10800	4390	6410	1·46	266
(D) *Maize—Wheat—Cow pea*								
Maize	2179	5119	7298	2947	1364	1583	1·16	90
Wheat	2671	2945	5615	4711	1929	2782	1·44	110
Cow pea*	2141+32	6399	2178	3166	1188	1978	1·66	86
Total			15091	10724	4481	6343	1·42	286

* Cow pea produced green vegetable pods, pulse grain and green fodder.