

Relative Efficiency in Sugarcane Production by Different Farm size and Tenure Classes in Selected Areas of Kushtia Sugar Mills Zone

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ABSTRACT

The relative efficiency of resource-use and yield with respect to tenancy and farm size in sugarcane production was studied during 1981-82 season. The results revealed that there were no major differences in resource-use among the tenure classes except pure tenants. However, the owner-operator farms obtained the highest yield. The yield/ha was lowest in the pure tenant class. The large farm (1.6189 hectares+) were found more productive.

INTRODUCTION

The existing farm size and tenancy play an important role in low level of productivity and under utilization of resources (Myrdal, 1963). A number of studies have been conducted in Bangladesh to determine the role of farm size and tenancy on resource use and productivity (Zaman, 1973 ; Jabber, 1977 ; Hossain, 1973 ; Mandal, 1980 ; Talukder, 1980). It was reported that production of farmers and farm areas falling into different tenure classes varied from crop to crop within a single year. Input use also varied. Since no study was made with sugarcane, so the present study was conducted during 1981-82 season to assess the impact of tenancy and farm size on resource use and productivity of sugarcane. This was done by measuring and comparing between small, medium and large farms.

MATERIALS AND METHODS

The study was based on collection of data from 82 farm families during January 1981-March 1982. The farms were selected from twenty four villages (six villages under P. S. Mirpur, thirteen villages under P. S. Kotwali in the district of Kushtia and five villages under P. S. Sailkopa in the district of Jessore). Representative samples were selected.

Four different tenure classess identified among farms producing sugarcane were: (a) part-operators :—those cultivating part of the own land and renting out the rest, (b) owner-operators :—those cultivating own land, (c) owner-tenants :—those owning some land and renting additional land from others, (d) pure-tenants :—those renting all the land from others. The farm size has been defined as the cultivated area which is composed of total hectares owned minus hectares rented out plus hectares rented in. Sample farms are divided into three size groups based on size of sugarcane cultivated areas (a) small farms (0-0.8094 ha.), (b) medium farms (0.8095-1.6188 ha.) and (c) large farms (1.6189 ha. and above).

Some judgemental selection of respondents was however necessary to assure representation from those categories that were important to the study. Thus an effort was made to obtain a quota of respondents from one millzone areas depending on farm sizes and tenure classes. It was not possible to select a completely random sample. Instead survey districts and thanas were selected on the basis of their importance in sugarcane production while survey unions and villages were selected randomly. Farm survey technique was applied to collect data by 3-4 visits by the field investigators.

For working out the economics of sugarcane, various cost components of human labour (family+hired), animal power, seeds, manures, fertilizers, harvesting and carrying were recorded. Cost of inputs like seeds, manures, fertilizer and pesticides were computed on the basis of market prices. Cost of human labour (family+hired) were computed as per wage rate prevailing in a village on a certain date was taken to be the rate of all labourers in that village (Chaudhuri and Ali, 1962). Cost of animal power were also computed on that basis.

Gross costs of sugarcane production consisted of all labour and material costs including opportunity costs of land and operating capital. Gross returns per hectare is expressed by the value of crops and by-products. The net return is derived by deducting the gross cost from gross return. Cost of cane was estimated at Tk. 402.00/m. ton. Intercrops were valued at prices the farmers obtained after sale. By-product values estimated as per farmers' guess or from the experience of actual buying and selling of by-products. Data were tabulated and analysed for scientific interpretation.

RESULTS AND DISCUSSION

CHARACTERISTICS OF THE SAMPLE FARM:

Distribution of sample farms falling into different tenure classes are presented in Table 1. It would be evident from the Table that the size of farm consistently decreased from the tenure class of part-operators to that of pure-tenants.

Table 1. Average farm land owned, rented and cultivated per farm by tenure classes.

Tenure Classes	No. of farms (1)	Average in hectare per farm				Percentage of	
		Farm land owned (2)	Farm land rented out (3)	Farm land rented in (4)	Farm land cultivated $5=2-3+4$	Owned area rented out	Operated area rented in
Part-operator	15	2.94	0.77	na	2.17	26.19	na
Owner-operator	32	1.81	na	na	1.81	na	na
Owner-tenant	30	0.81	na	0.90	1.71	na	52.63
Pure-tenant	5	na	na	0.47	0.47	na	100
All Farms	82	1.54	0.14	0.36	1.76	9.09	20.45

na=not applicable.

The average operated area per part-operator was 2.17 hectares per farm (Table 1). Pure tenants operated area of 0.47 hectare per farm could by no means be considered as viable cultivated area. It is evident that part-operators rented out 26.19% of their own land whereas the area rented in constituted 52.63% of the operated area of the owner-tenant farms indicating that degree of tenancy was substantial from both ends.

RESOURCE USE AND YIELD IN SUGARCANE BY TENURE GROUP AND FARM SIZE.

Human Labour :

Part-operated farms used the highest number of labour (man-days) followed by owner-tenants, owner-operators and pure-tenants farms. Part-operators and owner-operators used substantial amount of hired labour (Table 2).

Manures, Fertilizers, Pesticides and Seeds :

Part-operators used the highest quantity of manure (2124.93 kg/ha) and pure-tenants used the lowest (10.14 kg/ha). There was no marked difference among the tenure classes except pure-tenants in respect of use of fertilizers. However, the highest quantity (659.40 kg/ha) was used by the owner-tenants followed by owner-operators (586.59 kg/ha), part-operators (507.51 kg/ha) and pure tenants (356.16 kg/ha) respectively. Although there was no marked variation among tenures except pure-tenants in the use of fertilizers, value of fertilizer per hectare varied directly with the quantity used (Table 3).

Table 2. Human Labour use per hectare for Producing Sugarcane by Tenure Classes.

Tenure Classes	Average per hectare				Cost (Taka) ha
	Man-days				
	Family	Hired	Total	Hired as % of total	
Part-operator	40.90	162.69	203.56	79.91	2825.51
Owner-operator	37.19	126.65	163.84	77.30	3616.97
Owner-tenant	155.03	15.20	170.28	8.93	4919.79
Pure-tenant	45.65	31.52	127.17	64.10	2104.35

In pesticide use, the highest amount of Tk. 219.35/ha was spent by the owner-tenants and the lowest amount of Tk. 71.33 was spent by the pure-tenants (Table 3).

Use of seeds also did not vary markedly except pure-tenants among the tenure classess. Seed costs were the highest and lowest for the owner-tenants and pure-tenants respectively (Table 3).

Table 3. Use of manures, fertilizers, pesticides and seeds by tenure classes.

Tenure classes	Average per hectare							
	Manures		Fertilizer		Pesticides		Seeds	
	Quantity (kg)	Value (Taka)	Quantity (kg)	Value (Taka)	Quantity (kg)	Value (Taka)	Quantity (Taka)	Value (Taka)
Part-operator	2124.93	146.07	507.51	1256.33	2.86	147.40	5.00	2008.99
Owner-operator	167.25	48.28	186.59	1456.49	2.08	183.90	4.95	2047.85
Owner-tenant	356.12	228.94	659.40	1691.70	2.58	219.35	5.04	2024.32
Pure-tenant	10.14	29.89	356.16	933.96	0.81	71.33	3.04	1222.82

Comparative use of selected inputs and yields of sugarcane of the tenure classes are presented in Table 4. It would be evident that the highest amount was spent on animal power (Tk.798.32/ha) by the part-operators followed by owner-operators, owner-tenants and pure-tenants respectively. There was no major differences in resource use among the tenure classes except pure-tenants.

As regards yield per hectare of sugarcane, it would be evident from Table 4 that differences in yield between tenures were substantial particularly between owner-operators and pure-tenants. Highest yield of 51.91 MTH was obtained by

the owner-operators followed by owner-tenants (50.86 MTH) and part-operators (47.48 MTH) respectively. Pure-tenants obtained 30.1 MTH which was substantially lower than all tenures classes. However, the differences of yield between owner-operators and owner-tenants was very negligible (Table 4).

Table 4. Resource Use and Yield in sugarcane by tenure classes.

Resource	Part-operator	Owner-operator	Owner-tenant	Pure-tenant
Human labour (days)	203.59	163.84	170.27	127.17
Animal power (Tk.)	798.32	731.96	618.55	435.87
Seeds (Tk.)	2008.99	2007.35	2024.32	1222.82
Manures (Tk.)	146.07	48.28	228.94	29.89
Fertilizers (Tk.)	1256.93	1456.49	1691.70	933.96
Pesticides (Tk.)	147.40	183.90	219.35	71.33
Yield (M. Tons/Ha)	47.48	51.91	50.86	30.01

Gross cost and Net Return :

Gross cost of sugarcane was the highest for owner-operators (Tk. 15285.76/ha). It was Tk. 6182.61/ha for pure-tenants. Owner-operators produced the highest benefit/cost of Tk. 1.38 : 1.00 among the tenure classes. Pure-tenants were the loosing concern due to lower production and sharing of the products by the land owner (Table 5).

Sugarcane Farm Size, Resource Use and Yield :

Table 6 presents the estimated yield of sugarcane and resource use for each farm size groups along with the percentage difference. Comparison was made between "all farms" clumped together irrespective of tenure classes and "all owner farms only." In case of "all farms" large farms had 23.57% higher yield than small farms but it was not significantly different. The result also revealed that in case of "owner farms only", large farms had 37.26% higher yield per hectare than all small farms (Table 6). The large farms of owner-operators used higher percentages of inputs like animal power, seeds, manures and fertilizers and pesticides than the small farms (Table 6). But the input use between small and large farms were not significantly different except seeds use of the large farms of owner-operators (Table 6). The results of the owner-farms confirmed the earlier conclusion that the large sugarcane farms had the best performance in respect of resource use and yield.

Table 5. Gross Cost and Net Returns of Sugarcane by Different Tenure Classes.

Tenure classes	Average per hectare							Yield of sugarcane (m. tons)	Net return (Taka)	Benefit cost ratio
	Gross return				Gross cost					
	Sugarcane	Intercrop	By products	Total	Sugarcane	Intercrop	Total			
Part-operator	19319.66	1223.60	105.00	20648.26	14942.12	203.21	15145.33	47.48	5502.93	1.37:1.00
Owner-operator	20869.16	109.89	102.00	21081.05	15285.76	33.76	15319.52	51.91	5761.53	1.38:1.00
Owner-tenant	16801.14	na*	104.00	16905.13	15272.99	na*	15272.99	50.86	1632.14	1.11:1.00
Pure-tenant	6032.61	na*	81.00	6113.61	6132.61	na*	6132.61	30.01	-19.00	997:1.00

na* = not applicable

The work suggest that pure-tenant group (share cropping tenancy) was more inefficient. Owner-operators were found to be more productive than all other tenure classes. Inter-size group comparison revealed that large sugarcane farms were relatively more productive than medium and small farms.

Table 6. Resource use and yield by Farm Size Groups.

Resources and Productivity	Small (1)	Medium (2)	Large (3)	Percentage difference		
				Medium with small (2-1)	Medium with large (2-3)	Large with small (3 1)
—All Farms—						
Human labour (MD./ha)	198.67	187.40	154.91	-5.67	-20.97	-22.03
Animal power (Tk./ha)	607.85	650.98	624.40	7.09	4.25	2.72
Seeds (Tk./ha)	1746.10	2035.45	2737.34	16.57	-4.77	22.41**
Manures & fertilizers (Tk./ha)	1722.94	1497.12	1596.97	-13.11	-6.25	-7.31
Pesticides (Tk./ha)	106.67	175.74	451.97	64.75	-61.12	323.71
Average				13.92	-17.77	63.9
Yield (M.T./ha)	45.43	48.72	56.14	7.24	-13.22	23.57
—All owner-farms—						
Human labour (MD/ha)	194.38	172.83	154.62	-11.09	11.78	-20.45
Animal power (Tk./ha)	633.58	729.24	891.67	15.10	-18.22	-40.73
Seeds (Tk./ha)	1645.83	2028.27	2179.77	23.99**	-6.95	33.25**
Manures and fertilizers (Tk./ha)	1383.51	1425.43	1673.42	3.09	-14.82	20.95
Pesticides (Tk./ha)	69.97	183.08	165.24	161.65*	10.80	136.16
Average				38.53	-3.48	42.13
Yield (m.tons/ha)	48.12	41.35	66.05	-14.07	-37.39**	37.26

** t-values estimated from separate variance are significant at 5% level.
MD. = Man-days.

REFERENCES

- Chowdhury, S. D, and Ali, M. A. 1962. Report on survey of cost of production of jute in East Pakistan, 1958-59. Dhaka. Pakistan Central Jute Committee. p. 6.
- Hossain, M. October, 1973. Farm Size and Productivity in Bangladesh Agriculture. A Case Study of Phulpur Farms. New series no. 14, Bangladesh Institute of Development Studies, Adamjee Court, Motijheel Area, Dacca 2, pp. 1-45.
- Jabber, M. A 1977. Relative Productive Efficiency of Different Tenure Classes in Selected Areas of Bangladesh. *The Bangladesh Development Studies*, Adamjee Court, Motijheel Commercial Area. Dacca-2, 1 : 16-50.
- Mandal, M. A. S. 1980. Farm size, Tenure and Productivity in an Area of Bangladesh. *Bangladesh J. Agric. Econ.* 3(2) : 21-42.
- Myrdal, 1968. Asian Drama : An Enquiry into the Poverty of Nations. London. Allenlane the Penguin Press. pp. 1859-1960.
- Talukder, R. K. 1980. Land Tenure and Efficiency in Boro Rice Production in an area of Mymensingh District. *Bangladesh J. Agric. Econ.* 3(2) : 43-55.
- Zaman, M. R. 1973. Share Cropping and Economic Efficiency in Bangladesh : *The Bangladesh Economic Review*, 1 (2) : 149-172.